

Western Electric

TELEPHONE APPARATUS *and* SUPPLIES

No. 6



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Western Electric TELEPHONE APPARATUS AND SUPPLIES

Catalog No. 6



Aeroplane View of Hawthorne Works, Chicago, Ill.

Western Electric Company
Offices in All Principal Cities

THE *Western Electric Company*

History

The Western Electric Company was organized in 1881—just five years after Alexander Graham Bell invented the telephone—as the successor of the Western Electric Manufacturing Company, a Chicago firm engaged in the manufacture of telephone apparatus. The Company is the oldest electrical manufacturer in the United States, no other company having been engaged continuously in the production of electrical apparatus for so long a period.

Factory and Products

Telephones and telephone central office equipment have always been the Company's chief products. Its main factory is located at Hawthorne, Ill., six miles from the center of Chicago. This plant covers 211 acres of ground. The centralized purchasing of raw materials of manufacturing and of testing enables us to produce telephone equipment of the highest quality and merits.

Coincident with the extension of its manufacturing facilities, it has developed a distributing organization which now embraces fifty-four houses located in the principal business centers of the United States.

This means that an architect, engineer or contractor located in one city, and handling work in another half way across the continent, not only is assured of a convenient source of supply, but also that within easy calling distance, either by telephone, telegraph or letter, there are Western Electric specialists, who understand his requirements and can render him definite and comprehensive information and assistance. The value of this co-operation has been proven in numerous instances.

Permanent Source of Supply

Although the advances in the art make it necessary to develop and market various new types of apparatus, equipment for additions or extensions to the original installations is obtainable. One of the important factors to be considered in the purchase of telephone apparatus is the certainty of a permanent source of supply for repairs and additional parts.

Engineering Services

At every Western Electric distributing house there are telephone specialists ready to cheerfully render any assistance desired relative to telephone matters. The benefit of long experience in the design and manufacture of telephone apparatus is at the disposal of customers.

Prices

Western Electric prices are as low as possible consistent with high quality material and expert workmanship. Prices have been omitted from this catalog on account of fluctuations in the market.

Prices on apparatus listed in this catalog and on any special equipment that we are in a position to furnish will be quoted upon application to our nearest distributing house. Inquiries should clearly describe the apparatus and quantity desired.

Ordering Telephone Apparatus Parts

In order to avoid mistakes in ordering replacing parts, please furnish the following information:

First: Quantity desired.

Second: "P" number of the parts required in case this information is available.

Third: Name of the part required.

Fourth: Code number of the apparatus on which the part is used.

Fifth: Page number and date or number of the catalog in which the part appears.

If the part desired is not shown in the catalog, please furnish the following information:

First: Quantity desired.

Second: Name of part.

Third: Code number of apparatus in which the part is used.

Fourth: If possible, submit a sample of the part desired. Be sure to place a tag on the sample, giving your name, the name of your company and description of the part wanted: for example: "3 Contact Springs for No. 48A Generator, per sample attached."

BACKBOARDS

No. 136C
BackboardNo. 146A
BackboardNo. 148A
BackboardNo. 1533 Type Telephone
Mounted on a No. 148A Back-
board together with a
No. 146A Backboard

Code No.	Backboards Description and Principal Use	Overall Dimensions, Ins.
79	Wood, black finish. Used to facilitate mounting No. 58 type protectors on brick or stone walls.	12½ x 5 x 1½
136B	Wood, oak finish; arranged with battery box for 3 dry cells. Used with No. 1293 and No. 1305 type telephone sets. Top of battery box forms writing shelf.	26 x 8½ x 7½
136C	Wood, black finish; arranged with battery box for 3 dry cells. Used with Nos. 1293, 1533 and 1553 type local battery telephones. Top of battery box forms a writing shelf.	24½ x 8½ x 7½
139A	Cast iron bracket, black finish; used to support No. 50A coin collector on a horizontal surface.	18½ x 8 x 17½
144A	Wood, black finish; for mounting a No. 50 type coin collector and a No. 334 or 534 metal desk set box where it is desired to insulate this apparatus or mount it on irregular surfaces.	27½ x 7¼ x ¾
146A	Black finished pressed sheet metal shelf attachment; used with No. 1533 and 1553 telephone sets and No. 534 and 554 type desk set boxes. Has lugs at upper end which engage slots in the base of the telephones. May be used with or without a backboard. Has flanged edge the same as the telephones it is used with.	9½ x 7½ x 6¼
147A	Wood, black finish; used with Nos. 1533 and 1553 telephone sets and Nos. 534 and 554 desk set boxes in cases where it is desired to insulate them or facilitate mounting on brick or irregular surfaces.	9½ x 7½ x 1½
148A	Wood, black finish; used with Nos. 1533 and 1553 type telephones and Nos. 334 and 534 type desk set boxes in connection with the No. 146A backboard.	18½ x 7½ x 1½
148B	Wood, black finish; used with Nos. 1333 and 1533 type telephones and Nos. 334 and 534 type desk set boxes in connection with No. 7A and 7J coin collectors, where it is desired to insulate this apparatus.	18¼ x 7½ x 5½
149A	Wood, finished with slate colored paint; used with No. 392 type extension bells. Has a sloping roof which protects the bell from falling water and other substances. (See No. 342 type extension bells).	14½ x 18½ x 6¼
150A	Wood, black finish; used with No. 7A and No. 7J coin collectors, where it is desired to insulate them from the walls or mount them on brick or other irregular surfaces.	8½ x 6½ x ¾
151A	Black finished sheet metal writing shelf for use in connection with No. 50 type coin collectors.	4½ x 7½ x 5½

BATTERIES AND SUPPLIES

Blue Bell Dry Batteries

For Telephone Service



Gray Label Dry Cell



Blue Bell Battery

The Blue Bell or Gray Label Battery is designed for telephone transmitter work and meets the demand for a reliable, highly efficient, long-lived cell. Its purpose is to supply small amperage for short periods—during telephone conversations—and it will supply this amperage thousands of times during its life.

Moderate current, uniform voltage, and long life are secured in these batteries by special designs and the use of materials of exceptional purity and rigid inspection during manufacture. Samples of every lot made are given check tests, and this practice assures uniform quality.

Western Electric distributing houses are supplying a large and constant demand for these batteries. This fact insures the filling of orders promptly and with fresh batteries.

The slow rate of deterioration when not in actual use—the long shelf life—which is the special feature of Blue Bell or Gray Label Batteries, has been attained through careful research and design by telephone engineers working to produce a battery specially suited to telephone service.

Size of Zinc Cans Ins.	Size Overall Ins.	Description	Wt. per Cell	No. in Bbls.	Shipping Wt. per Bbls.
2½ x 6	2½ x 6¾	Standard Fahnestock Clip.....	2	125	300 lbs.

No. 540 Cord Battery Connector

This is a stranded conductor battery connector for connecting dry cells equipped with Fahnestock clips. Its use insures freedom from short circuit due to poorly insulated conductors, saves time in connecting, and gives the battery a neat appearance.

Code No.	Description
540	Standard length 5 inches. The moisture-proof cotton insulation is cut back at each end for ½ inch, and the bar stranded conductor soldered to prevent fraying.



No. 1A—Battery Box

Battery Boxes

The Nos. 1 and 2 type Battery Boxes provide a neat and convenient means of mounting dry cells and protecting them from injury. They are made of sheet metal, finished with black japan and are lined with insulating material. Pear-shaped mounting slots are provided to facilitate mounting the boxes on vertical surfaces, and for readily removing them. This permits of their being located at the sides of or under desks, and in other places where they will be out of the way and yet be accessible and adjacent to the telephone or apparatus to which they are connected.

Code No.	Dry Cell Capacity	Dimensions Ins.
1A	3 No. 6 cells	3¼ x 7 11⁄16 x 9 1⁄16
2A	4 No. 6 cells	3¼ x 7 5⁄8 x 12 1⁄4
2B	9 No. 6 cells	5 11⁄16 x 7 1⁄16 x 14 1⁄16

BATTERIES AND SUPPLIES



Complete Cell



Cells in Tray



Complete Renewal

EDISON PRIMARY BATTERIES AND RENEWALS
General

Edison Primary Cells are furnished in capacities ranging from 200 to 1,000 ampere hours. The sizes best adapted for telephone work are the 250, 400 and 500 ampere hour types, for average conditions, and the 1,000 ampere hour cells for heavy duty service or when it is desirable to bring the renewal periods far apart.

The characteristics of this battery, which make it particularly well suited for telephone service, are: uniform voltage under continuous discharge; extremely low and constant internal resistance; freedom from depreciation when the circuit is open; long life, with no attention between renewals; indicator panels in plates, which accurately show the approach of exhaustion in ample time to arrange for renewal and suitability for either open circuit (intermittent discharge) or closed circuit (continuous discharge) work.

The initial open circuit voltage of all Edison Primary cells is 0.95. The closed circuit voltage averages 0.60 to 0.65 depending on the rate at which the cells are discharged.

Use of Cells

Edison primary cells are used extensively for the following purposes: Local Battery Telephone Exchange Switchboards; Telephone Train Dispatching (Talking Circuits); Intercommunicating Telephone Systems; Small Common Battery Telephone Systems; Private Branch Exchange Switchboards; Pole Changers, Supervisory Lamps and Relays; Telegraph Work (Local Sounder and Main Line Circuits); Railway Signals and Crossing Bells; Railway Interlocking Plants; Gas and Gasoline Engine Ignition; Low Voltage Motors; Battery Dental Engines; Fire, Police and Burglar Alarms; Auxiliary Fire Alarm Systems (Closed Circuit); Mine Signals, Bell Systems and Annunciators; Program and Self-Winding Clocks; Electroplating; Highway Beacon Lighting; Chemical Analysis and other school work.

TYPE S-252 CELL



S-252 Cell

The Type S-252 cell is the most perfectly balanced of any of the cells of less than 500 ampere hours capacity. The other low capacity cells were designed to meet certain requirements, with definite specifications as to size, etc. In developing this cell, no restrictions were placed on the laboratory and the result is a cell with the zinc, copper-oxide and electrolyte nicely proportioned and the element suspended high in the solution where its action is not interfered with by the dense solution at the bottom of the cell.

This cell is recommended for Railway Telephone Dispatching Transmitters; Intercommunicating Telephones; Self-Winding and Program Clocks; Fire and Burglar Alarm Systems; Radio "A" Batteries, etc.

Initial open circuit voltage 0.96. Average closed circuit voltage 0.6 to 0.65 per cell. Maximum recommended continuous current 1 ampere. Maximum recommended intermittent current 1.5 amperes.

TYPE S-252 CELL

Capacity 250 ampere hours.
Rectangular heat resisting glass jar.
Size overall, $3\frac{1}{2} \times 6 \times 12\frac{1}{2}$ inches.
Jar on y, inside $2\frac{3}{8} \times 5\frac{1}{4} \times 10$ inches.

Description
Type S-252 Cell complete

Description
Type S-250 Renewal complete

Separate Parts

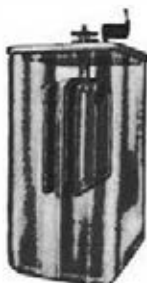
Type 252 Jar
Type 252 Cover
Wing Nuts and Washers, per set

Type S-250 Element
Type 250 Caustic Soda, per can
Type 250 Oil, per bottle

BATTERIES AND SUPPLIES



Type No. S-403



Type No. S-402



Type No. S-404

Edison Primary Batteries and Renewals

TYPE S-403 CELL

The Type S-403 is the successor of the old Edison Lalande Type RR cell, which was used extensively for telephone work, gas engine ignition, etc. The older type was converted into the Type S-403 several years ago, by the use of Type 403 covers, which were furnished with the improved style renewals. The S-403 is still furnished for the benefit of customers that wish to keep their cells uniform, when making additions to or changes in their battery. However, the S-402 and S-404 are more efficient cells and should be used when an entire new battery is purchased.

The 400 ampere hour cells are suitable for telephone transmitter, interrupter and pole-changer operation, private branch exchanges, inter-communicating systems, fire and burglar alarm systems, self-winding and program clock systems, railway signaling, etc.

The maximum recommended continuous current is 2 amperes and the maximum intermittent current is 3 amperes. The initial open circuit voltage is 0.95 and the average closed circuit voltage 0.6 to 0.65 per cell.

TYPE S-403 CELL

Capacity 400 ampere hours
Cylindrical heat resisting glass jar
Size overall, $7\frac{1}{4} \times 11$ inches
Jar only, inside, $6\frac{1}{8} \times 8\frac{3}{4}$ inches

Description

Type S-403 Cell complete
Type S-400 Renewal complete

Separate Parts

Type 403 Jar
Type 403 Cover
Wing Nuts and Washers, per set
Type S-400 Element
Type 400 Soda, per can
Type 400 Oil, per bottle

TYPES S-402 AND S-404 CELLS

These are the popular types in the 400 ampere hour cells. In capacity and operating characteristics they are the same. Therefore, it is only a question of which shape of jar is preferred and while the barrel-shaped jar has the greater mechanical strength, the rectangular is particularly well suited for locations where space is limited.

The cells are adapted for telephone transmitter, interrupter and pole-changer operation, private branch exchanges, inter-communicating systems, fire and burglar alarm systems, self-winding and program clock systems, railway signaling, etc.

The maximum recommended continuous current is 2 amperes and the maximum intermittent current is 3 amperes. The initial open circuit voltage is 0.95 and the average closed circuit voltage 0.6 to 0.65 per cell.

TYPE S-402 CELL

Capacity 400 ampere hours
Rectangular heat resisting glass jar
Size overall, $5\frac{1}{2} \times 6\frac{1}{2} \times 12\frac{1}{4}$ inches
Jar only, inside, 5 x 6 x 10 inches

Description

Type S-402 Cell complete
Type S-400 Renewal complete

Separate Parts

Type 402 Jar
Type 402 Cover
Wing Nuts and Washers, per set
Type S-400 Element
Type 400 Caustic Soda, per can
Type 400 Oil, per bottle

TYPE S-404 CELL

Capacity 400 ampere hours
Barrel shaped heat resisting glass jar
Size overall, $7\frac{1}{4} \times 12\frac{1}{4}$ inches
Jar only, inside, 6 in. diameter at top x 10 in. deep

Description

Type S-404 Cell complete
Type S-400 Renewal complete

Separate Parts

Type 404 jar
Type 404 Cover
Wing Nuts and Washers, per set
Type S-400 Element
Type 400 Caustic Soda, per can
Type 400 Oil, per bottle

BATTERIES AND SUPPLIES



Type No. S-502



Type No. S-504



Type No. M-1002

Edison Primary Batteries and Renewals

M AND S TYPES

The 500 ampere hour cells are furnished with either multiple or single plate elements. The letter M before the reference number indicates multiple plate, two copper-oxide and three zinc plates. The letter S means single plate, one copper-oxide and two zinc plates.

The cells shown on this page are used for telephone and telegraph service; railway signal, fire and burglar alarm systems, highway beacons and in many other fields where a high capacity cell is desirable. The cells shown above are equal in efficiency, the preference in the shape of jar determining which cell is to be used.

For service in which the load frequently goes to three amperes, or where the cells are exposed to low temperature, the multiple plate cells are recommended. For service in which the load does not go over two and one-half amperes and the cells are protected from the cold the single plate type will fully meet the requirements.

Initial open circuit voltage 0.95. Average closed circuit voltage 0.6 to 0.65 per cell. Maximum recommended continuous current for single plate types 2 amperes; for multiple plate types 2.5 amperes. Maximum recommended intermittent current for either types 3 amperes.

TYPE S-502 CELL

Single Plate Element

Capacity 500 ampere hours
Rectangular heat resisting glass jar
Size overall, $5\frac{1}{2} \times 6\frac{1}{2} \times 12\frac{1}{4}$ inches
Jar only, inside dimensions $5 \times 6 \times 10$ inches

Description

Type S-502 Cell (single plate element)
Type S-500 Renewal

Separate Parts

Type 502 Jar
Type 502 Cover
Wing Nuts and Washers, per set
Type S-500 Element
Type 500 Caustic Soda, per can
Type 500 Oil, per bottle

TYPE S-504 CELL

Single Plate Element

Capacity 500 ampere hours
Barrel shaped heat resisting glass jar
Size overall, $7\frac{1}{2} \times 12\frac{1}{4}$ inches
Jar only, inside dimensions 6×10 inches

Description

Type S-504 Cell (single plate element)
Type S-500 Renewal

Separate Parts

Type 504 Jar
Type 504 Cover
Wing Nuts and Washers, per set
Type S-500 Element
(Copper-oxide and zinc plates)
Type 500 Caustic Soda, per can
Type 500 Oil, per bottle

THE 1,000 AMPERE HOUR CELLS

The 1,000 ampere hour cells are furnished with either rectangular or cylindrical jars. Type M-1001 is the specification for the cell with the cylindrical jar and M-1002 for the rectangular; the prices are the same. This size was developed to meet the demand for a battery that would operate efficiently in places of service where heavy discharges are required for long periods. In railway signaling these cells are used for operating remote controlled switch movements, color light-signals and track circuits.

Initial open circuit voltage is 0.95 per cell; the average closed circuit voltage 0.6 to 0.65. The cells can be discharged continuously up to 4 amperes and intermittently up to 6 amperes.

TYPE M-1002 CELL

Capacity 1,000 ampere hours
Rectangular heat resisting glass jar
Size overall, $6\frac{1}{2} \times 8\frac{3}{8} \times 14$ inches
Jar only, inside dimensions at top 5×6 inches
Depth $12\frac{1}{4}$ inches

Description

Type M-1002 Cell complete
Type M-1000 Renewal Complete

Separate Parts

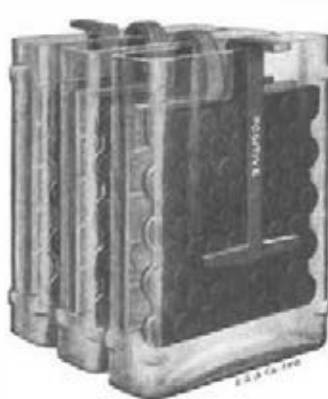
Type 1002 Jar
Type 1002 Cover
Wing Nuts and Washers, per set
Type M-1000 Element
Type 1000 Caustic Soda, per can
Type 1000 Oil, per bottle

Western Electric

BATTERIES AND SUPPLIES



Type "BT"



Type "ET"



Type "PT"

Chloride Accumulator Storage Batteries

TWO-PLATE TYPE

This type of the Chloride Accumulator is especially suitable for service where a small capacity is required. The positive plate of one cell and the negative plate of the adjacent cell are fused to one connecting strap and the pair are supported on the edges of the two adjacent glass jars.

By this method no connecting bolts or burning are required to install any number of cells in a group, and there are no contacts to corrode or become loose.

These cells have demonstrated their superiority for telephone, telegraph, police and fire alarm signaling, laboratory, experimental service, etc.

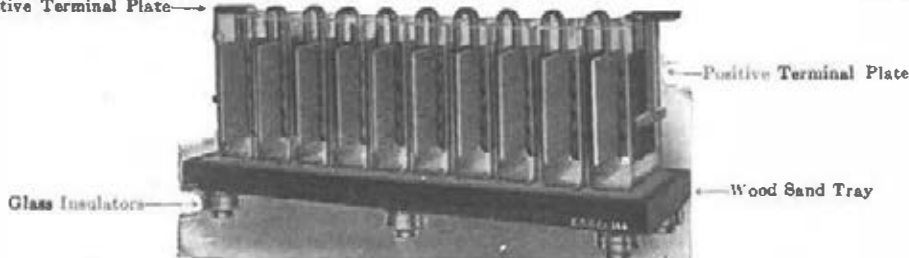
The resistance between cells is practically eliminated—this feature being an item of importance in cells of small capacity.

Manufacturers Designation		Individual Cells			
		BT	CT	PT	ET
Discharge rate in amperes {	For 8 hours.....	1 3/4	1 3/4	3	4 1/2
	For 5 hours.....	1	2	4 1/2	6 1/2
	For 3 hours.....	1 1/4	3	6	9
Normal charging rate in amperes.....		1 1/4	2 1/2	3	4 1/2
Outside dimensions of glass jars in inches {	Length.....	1 1/4	2 1/4	2 1/4	2 1/4
	Width.....	3 3/4	6 1/4	6	8 1/4
	Height.....	6 3/4	8	12	11
Weight of electrolyte required for one cell, lbs.....		1	2 1/4	4 1/2	5 1/2
Weight of complete cell, including electrolyte.....		3 3/4	7 1/4	13 1/2	22

Complete Outfits for Telephone Service

The following outfits cover complete equipment including accessories as described for 1 and 2 sets of 11 storage cells each

Negative Terminal Plate—



10 Cells of Type "CT" on Sand Tray

Mfrs. Code No.	BT		CT		PT		ET	
	11 Cells (1 Set)	22 Cells (2 Sets)	11 Cells (1 Set)	22 Cells (2 Sets)	11 Cells (1 Set)	22 Cells (2 Sets)	11 Cells (1 Set)	22 Cells (2 Sets)
Size of Outfit.....	No.	No.	No.	No.	No.	No.	No.	No.
Elements or couples.....	10	20	10	20	10	20	10	20
Positive terminal plate.....	1	2	1	2	1	2	1	2
Negative terminal plate.....	1	2	1	2	1	2	1	2
Glass Jars (1 extra).....	12	23	12	23	12	23	12	23
Connectors Type "B".....	3	5	3	5	3	5	3	5
Connectors Type "B".....	1	1	1	1	1	1	1	1
Hydrometer Type "B".....	1	1	1	1	1	1	1	1
Hydrometer Type "E".....	1	1	1	1	1	1	1	1
Floating Mercury Thermometer.....	1	1	1	1	1	1	1	1
Terminal lugs.....	1	1	1	1	1	1	1	1
Terminal lugs.....	1	1	1	1	1	1	1	1
Terminal lugs.....	1	2	1	2	1	2	1	2
Wood sand tray.....	1	2	1	2	1	2	1	2
Glass covers.....	12	23	12	23	12	23	12	23
Glass insulators.....	6	12	6	12	6	12	6	12
Terminal punching (No. P-85740).....	2	4	2	4	2	4	2	4
Electrolyte (spec. gravity 1.210) lbs.....	20	40	30	60	60	120	70	140
Set instructions, E. S. B. Co's. Form No. 421R-6.....	1	1	1	1	1	1	1	1

*Where the number of cells in a set does not exceed 6 either glass or wood sand trays can be furnished, but the order should cover the type desired.

Method of Ordering

Orders for complete storage battery outfits as listed above should read as follows:

"1 complete (11 or 22) cell type 'CT' storage battery outfit including accessories."

BATTERIES AND SUPPLIES



Type "D" 7

Chloride Accumulator Storage Batteries.

TYPE D

The Type D. comprises cells ranging in capacity from $2\frac{1}{4}$ to 15 amperes at the normal eight hour discharge rate.

They are supplied in either glass or hard rubber jars, but inasmuch as glass jars are commonly used for telephone purposes dimensions are listed for glass jars only. In ordering elements or parts thereof, specify whether intended for glass or rubber jars.

Individual Cells

Mfrs. Code No.	D-3	D-5	D-7	D-9	D-11	D-13
Discharge in amperes { For 8 hours.	2 $\frac{1}{4}$	5	7 $\frac{1}{2}$	10	12 $\frac{1}{2}$	15
{ For 5 hours.	3 $\frac{1}{2}$	7	10 $\frac{1}{2}$	14	17 $\frac{1}{2}$	21
{ For 3 hours.	5	10	15	0	25	30
Normal charging rate in amperes.	2 $\frac{1}{4}$	5	7 $\frac{1}{2}$	10	12 $\frac{1}{2}$	15
Outside dimensions of glass jar, ins. { Length.	3 $\frac{1}{2}$	5 $\frac{1}{2}$	6 $\frac{1}{2}$	8 $\frac{1}{2}$	9 $\frac{1}{2}$	11 $\frac{1}{2}$
{ Width.	7 $\frac{1}{2}$	7 $\frac{1}{2}$	7 $\frac{1}{2}$	7 $\frac{1}{2}$	7 $\frac{1}{2}$	7 $\frac{1}{2}$
{ Height.	10 $\frac{1}{4}$	10 $\frac{1}{4}$	10 $\frac{1}{4}$	10 $\frac{1}{4}$	10 $\frac{1}{4}$	10 $\frac{1}{4}$
Wt., electrolyte in glass jar, lbs.	7 $\frac{1}{4}$	11 $\frac{1}{4}$	14 $\frac{1}{4}$	17 $\frac{1}{4}$	20	24
Wt. of cell complete with electrolyte in glass jar, lbs.	20 $\frac{1}{4}$	32 $\frac{1}{4}$	42 $\frac{1}{4}$	53 $\frac{1}{4}$	62 $\frac{1}{4}$	74 $\frac{1}{4}$
Height from bottom of jar to top of strap, ins.	15 $\frac{1}{4}$	15 $\frac{1}{4}$	15 $\frac{1}{4}$	15 $\frac{1}{4}$	15 $\frac{1}{4}$	15 $\frac{1}{4}$

Complete (11 Cell) Outfits for Telephone Service

The following outfits cover complete equipment, including accessories for an 11 cell, Type D telephone battery, and includes the following:

11 complete elements, including plates, separators, etc.	12 glass sand trays with feet
12 glass jars (1 extra)	Terminals
5 extra wood separators	Bolt connectors
1 hydrometer	Displacement block
1 thermometer	Electrolyte
12 glass covers	Wood sand trays } See Note 2.
	Glass insulators }

Note 1. To determine the size of jars and plates required figure both the present and ultimate current requirements. Then refer to the battery tables and choose the size of jars that nearest fill the ultimate requirements. In the same way choose the size of plates that will meet the present requirements and order the jars for the ultimate size, but equipped with plates of size for present requirements.

As the demand for current increases, this demand can be met by simply adding plates to make up the necessary capacity. For example, say on the 8 hour rate of discharge the present requirements will take 4 amperes and the ultimate requirements 14 amperes. Order No. D-13 jars equipped with No. D-5 elements. Then as the demand for current increases you can add Nos. D-7, D-9, D-11 or D-13 elements. This is made possible by the construction of the batteries.

Note 2. If Type "D" battery is to be in more than one row specify the number of rows in the order.

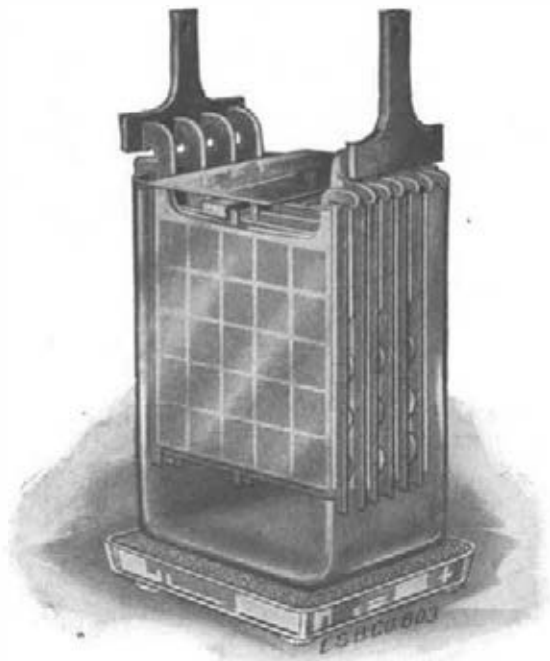
Note 3. Individual glass sand trays are most commonly used in telephone systems for this type of battery, but large wood sand trays with the necessary glass insulators can also be furnished. The order should be specific in regards to this feature.

Method of Ordering

Orders for complete storage battery outfits of the above described types should read as follows:

"One complete 11 or 22 cell Type D storage battery outfit including accessories and glass covers consisting of No. 11 D (give size) elements placed in D (give size) glass jars. Furnish (glass-wood) sand trays.

BATTERIES AND SUPPLIES



Type "E" 7

Chloride Accumulator Storage Batteries

TYPE E

The Type E comprises cells ranging in capacity from 10 to 35 amperes at the normal eight-hour discharge rate.

They are supplied in either glass or hard rubber jars, but inasmuch as glass jars are commonly used for telephone purposes dimensions are listed for glass jars only. In ordering elements, or parts thereof, specify whether intended for glass or rubber jars.

Individual Cells

Mfra. Code No.	E-5	E-7	E-9	E-11	E-13	E-15
Discharge in amperes {						
For 8 hours.....	10	15	20	25	30	35
For 6 hours.....	14	21	28	35	42	49
For 3 hours.....	20	30	40	50	60	70
For 1 hour.....	40	60	80	100	120	140
Normal charging rate in amperes.....	10	15	20	25	30	35
Outside dimensions of glass jar, ins. {						
Length.....	8 3/4	8 3/4	8 3/4	9 1/2	11	12 1/4
Width.....	9 1/2	9 1/2	9 1/2	9 1/2	9 1/2	9 1/2
Height.....	12 1/2	12 1/2	12 1/2	12 1/2	12 1/2	12 1/2
Height of cell from bottom of glass jar to top of strap, ins.....	17 1/2	17 1/2	17 1/2	17 1/2	17 1/2	17 1/2
Wt. of electrolyte in glass jar, lbs.....	15 1/4	20 1/2	25 1/2	30 1/2	35 1/2	40
Wt. of cell complete with electrolyte in glass jar, lbs.....	58	80	100 1/2	121 1/2	141 1/2	162 1/2

Complete (11 Cell) Outfits for Telephone Service

The following outfits cover complete equipment including accessories for an 11 cell Type "E" telephone battery, and includes the following:

- 11 complete elements, including plates, separators, etc.
- 12 glass jars (1 extra)
- 12 glass sand trays with feet
- 12 glass covers
- 5 extra wood separators
- 1 hydrometer

- 1 Thermometer
 - Terminals
 - Bolt connectors
 - Displacement block
 - Electrolyte
 - Wood sand trays
 - Glass insulators
- } See Note 2.

Note 1. Refer to Note No. 1 under D type batteries for determining size.

Note 2. If battery is to be in more than one row specify the number of rows in the order.

Note 3. Individual glass sand trays are most commonly used in telephone systems for this type of battery, but large wood sand trays with the necessary insulators can also be furnished. The order should be specific in regard to this feature.

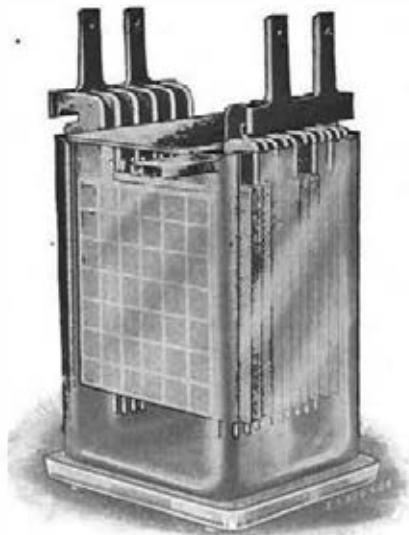
Method of Ordering

Orders for complete storage battery outfits of the above described types should read as follows:

One complete (11-22) cell type "—" storage battery outfit including accessories and glass covers consisting of give size and type) elements placed in (give size and type) glass jars. Furnish (glass-wood) sand trays.

For sizes above 10 amperes on miscellaneous orders it is necessary to specify the size of wire for which the terminals are to be drilled and the number of wires for which terminals are to be provided.

BATTERIES AND SUPPLIES



Type "F" 11 in Style A Glass Jar

Chloride Accumulator Storage Batteries

TYPE F

The Type F comprises cells ranging in capacity from 40 to 70 amperes at the normal eight-hour discharge rate. They are supplied for telephone purposes in Style A glass jars. In ordering elements, or parts thereof, specify "for use with Style A glass jars."

Individual Cells

Mfrs. Code No.	F-9	F-11	F-13	F-15
Discharge in amperes { For 8 hours	40	50	60	70
{ For 5 hours	56	70	84	98
{ For 3 hours	80	100	120	140
{ For 1 hour	180	200	240	280
Normal charging rate in amperes	40	50	60	70
Outside dimensions of Style "A" glass jar, ins. { Length	8 1/4	9 1/4	11	12 3/4
{ Width	12 3/4	12 3/4	12 3/4	12 3/4
{ Height	17	17	17	17
Height of cell in Style "A" glass jar from bottom of sand tray to top of strap, ins.	23 3/4	23 3/4	23 3/4	23 3/4
Wt. of electrolyte in Style "A" glass jar, lbs.	55	62	69	76
Wt. of cell complete with electrolyte in Style "A" glass jars, lbs.	174 3/4	201 3/4	229	258

Complete (11 Cell) Outfits for Telephone Service

The following outfits cover complete equipment including accessories for an 11 cell Type "F" telephone battery, and includes the following:

- 11 Complete elements, including plates, separators, etc.
- 12 Glass jars (1 extra)
- 12 Glass sand trays with feet
- 12 Glass covers
- 5 Extra wood separators
- 1 Hydrometer

- 1 Thermometer
- Terminals
- Bolt Connectors
- Displacement block
- Electrolyte
- Wood sand trays
- Glass Insulators } See Note 2.

Note 1. Refer to Note 1 under D type batteries for determining size.

Note 2. If battery is to be in more than one row specify the number of rows in the order.

Note 3. Individual glass sand trays are most commonly used in telephone systems for this type of battery, but large wood sand trays with the necessary insulators can also be furnished. The order should be specific in regard to this feature.

Method of Ordering

Orders for complete storage battery outfits of the above described types should read as follows:

One complete (11-22) cell type "F" storage battery outfit including accessories and glass covers consisting of (give size and type) elements placed in (give size and type) glass jars. Furnish (glass) (wood) sand trays. For sizes above 10 amperes on miscellaneous orders it is necessary to specify the size of wire for which the terminals are to be drilled and the number of wires for which terminals are to be provided.

Information and specification for special battery requirement or for larger sizes of batteries than shown will be furnished on request.

BATTERY CABINETS



No. 1441B Battery Cabinet

Interrupter Battery Cabinet

Oak cabinets for accommodating dry batteries and Edison primary batteries necessary to operate our No. 84 interrupter. For proper operation the interrupters should be mounted vertically. The dry or gravity batteries used in the transmitter circuit of magnetic switchboards can also be included if desired.

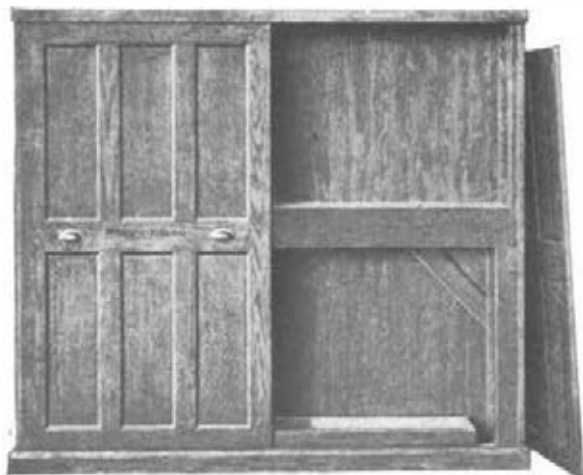
Various sizes of these cabinets are furnished as follows:

The number 1442B cabinet is the same as the number 1442 except that it is equipped with a back-board for mounting the interrupters vertically.

Code No.	Accommodations for		
	No. 84 Interrupter	Dry Cells	Edison BSCC Cells
1440B	1	72	2
1441B	2	140	4
1442	2	280	4
1442B	2	280	4

Storage Battery Cabinets

Destructive and irritating fumes escape from a storage battery during periods of charging. These fumes attack the charging apparatus as well as any inclosing structure unless it is carefully designed to overcome this acid action.



No. 1454 Storage Battery Cabinet

Western Electric storage battery cabinets are constructed of oak, having doors and sides of mortised panel construction. The doors can be easily removed exposing the entire interior of the cabinet and permitting of access to all parts for inspection and maintenance.

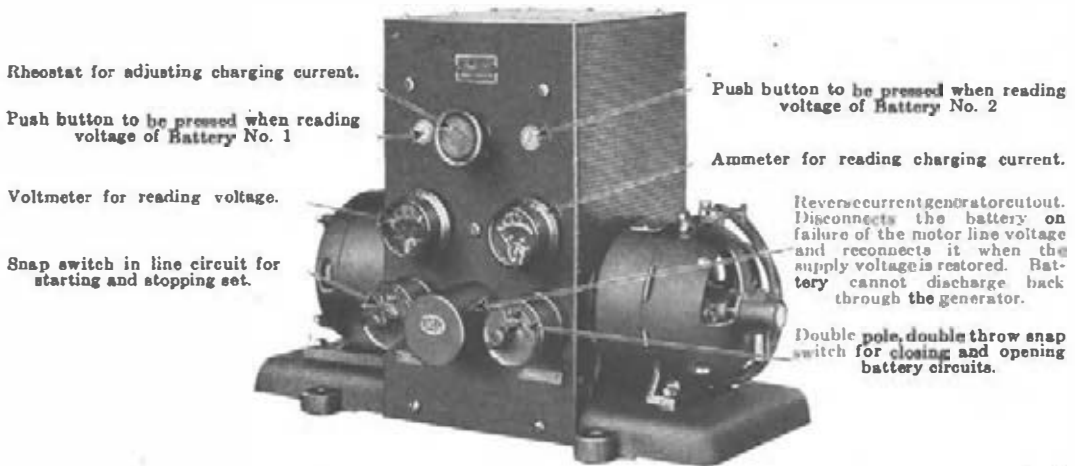
The interior is heavily coated with an acid resisting paint, which prevents the wood from being rotted by the acid fumes.

Wooden sand trays mounted on glass insulators are furnished.

These cabinets are of two types, one having a removable front and hinged top and designated as "chest" type cabinet, and the other as "cabinet" type, having removable doors only. These two types of cabinets can be easily identified by the dimensions, the "chest" type being 1 foot 9¼ inches high, while the "cabinet" type varies from 5 to 7 ft. 5 inches in height.

Code No.	Type	Dimensions			No. of Cells	Type of Cell
		Height	Width	Length		
1450	"Chest"	1 ft. 9¼ ins.	11 ins.	3 ft. 0 ins.	11	BT., CT. or PT.
1451		1 ft. 9¼ ins.	1 ft. 1½ ins.	3 ft. 0 ins.	11	ET.
1452		1 ft. 9¼ ins.	1 ft. 6¼ ins.	3 ft. 0 ins.	22	BT., CT. or PT.
1453	"Cabinet"	1 ft. 9¼ ins.	1 ft. 11¼ ins.	3 ft. 0 ins.	22	ET.
1454		5 ft. 0 ins.	1 ft. 2 ins.	5 ft. 4 ins.	11	D-11
1455		5 ft. 5¾ ins.	1 ft. 2 ins.	5 ft. 11 ins.	11	E-11
1458	"Cabinet"	5 ft. 0 ins.	1 ft. 6½ ins.	9 ft. 4½ ins.	22	D-9
1460		5 ft. 4 ins.	1 ft. 8½ ins.	10 ft. 11½ ins.	22	E-7, E-9 or E-11

BATTERY CHARGING UNITS



**Battery Charging Set
(Front View)**

Telephone Battery Charging Units

Western Electric four-bearing motor-generator sets have been combined with a switchboard panel, arranged for mounting directly on the machine framework.

These battery charging units are designed for use in private branch and small central battery telephone exchanges for charging eleven-cell storage battery sets, where two such sets are available so that one may be connected to the telephone system while the other is being charged.

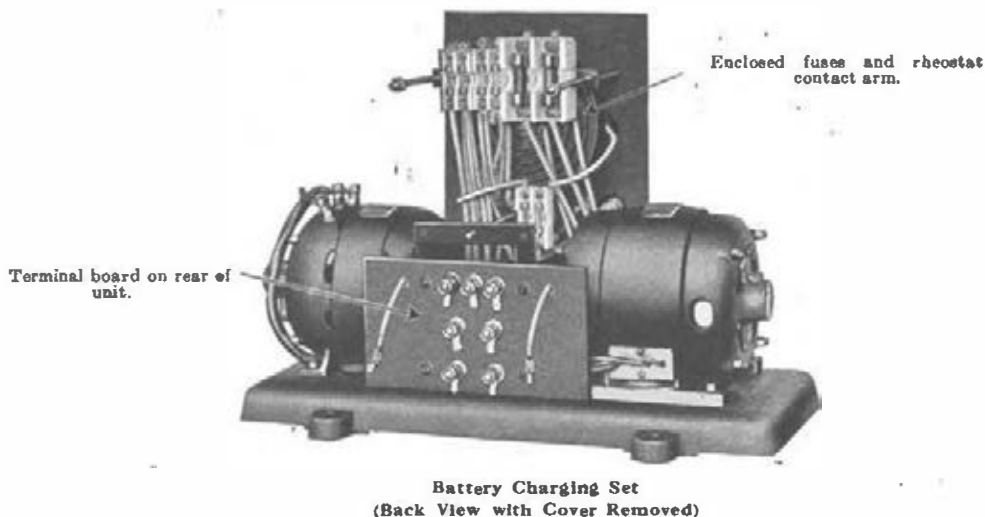
The switchboard panel of the charging unit is equipped with all necessary switches and fuses, a generator field rheostat, reverse current dynamo cutout, charging current ammeter, generator voltmeter and all connections are extended to terminals mounted on a terminal board located at the rear of the unit. These terminals are clearly marked in order to facilitate installation. All fuse blocks and the movable contact arm of the rheostat are encased in a removable cover which protects them from dust and mechanical injury.

"The units listed in the following table show two types, one type being equipped with a motor for operation on D.C., and the other type being equipped with a motor for operation on A.C." Either type is available for either 110 or 220 volts. The alternating current machines are for 60 cycles, single-phase current. Where two or three phase A.C. power must be used, the outfit selected may be connected across one leg of the polyphase circuit, the amount of power required not being sufficient to seriously unbalance the power circuit.

To determine the proper charging unit to order for any given condition, first determine the character of the power circuit on which the motor is to operate, then select from the first two columns headed "Storage Battery to Be Charged," the battery to be charged. On the same line, in the column headed by the type of power circuit available, find the Code No. of the proper charging unit, which will have an ampere output sufficient to charge the battery at the eight-hour discharge rate specified.

In exchanges, where future growth is expected, batteries partially equipped with plates may be furnished, as for example, "D-5 (5 ampere) elements in D-9 (10 ampere) tanks." The charging unit in this case should have an ampere output sufficient to charge a battery of the ultimate rating of 10 amperes.

BATTERY CHARGING UNITS



Telephone Battery Charging Units—(Continued)

SIZE AND CAPACITY DATA

Type	Storage Battery To Be Charged— 8 Hour Discharge Rate Amperes	Output of Charging Unit Amperes	Charging Unit Required				Fuses	
			A.C. 60 Cycle		D.C.		Ampere Capacity Required	
			110 Volt Code No.	220 Volt Code No.	110 Volt Code No.	220 Volt Code No.	Charged	Discharge
B	0.625	5	1531A	2531A	3531A	4531A	3	1
BT	0.75	5	1531A	2531A	3531A	4531A	3	1
C-3	1.25	5	1532A	2532A	3532A	4532A	3	2
CT	1.50	5	1532A	2532A	3532A	4532A	3	2
C-5	2.5	5	1533A	2533A	3533A	4533A	3	3
D-3	2.5	5	1533A	2533A	3533A	4533A	3	3
PT	3.0	5	1563A	2563A	3563A	4563A	6	5
C-7	3.75	5	1565A	2565A	3565A	4565A	6	3
ET	4.5	5	1565A	2565A	3565A	4565A	6	5
D-5	5.0	5	1565A	2565A	3565A	4565A	6	5
D-7	7.5	10	1000A	2000A	3000A	4000A	10	10
D-9	10.0	10	1000A	2000A	3000A	4000A	10	10
E-5	10.0	10	1000A	2000A	3000A	4000A	10	10

The speed of all sets is 1750 R.P.M.

DIMENSIONS AND APPROXIMATE SHIPPING WEIGHTS

Code Nos.				Overall Dimensions			Approximate Shpg. Wt., Lbs.
				Length, Ins.	Width, Ins.	Height, Ins.	
1531A	2531A	3531A	4531A	22	11 $\frac{7}{8}$	15 $\frac{1}{2}$	175
1532A	2532A	3532A	4532A	22	11 $\frac{7}{8}$	15 $\frac{1}{2}$	175
1533A	2533A	3533A	4533A	22	11 $\frac{7}{8}$	15 $\frac{1}{2}$	175
1563A	2563A	3563A	4563A	22	11 $\frac{7}{8}$	15 $\frac{1}{2}$	175
1565A	2565A	3565A	4565A	22	11 $\frac{7}{8}$	15 $\frac{1}{2}$	175
1000A	2000A	3000A	4000A	25 $\frac{3}{8}$	13 $\frac{3}{4}$	16 $\frac{1}{2}$	225

Orders should read:

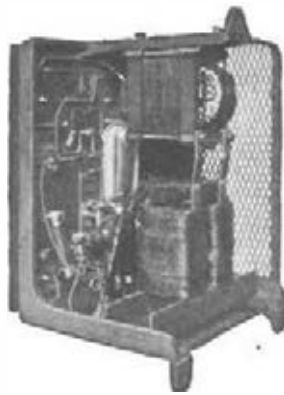
1—Code No. 1565A Telephone Battery Charging Unit.

A booklet giving complete instructions covering the installation, operation and maintenance of the battery charging units will be included with each outfit shipped.

BATTERY CHARGING UNITS



10 Ampere Outfit



Rear View of 10 Ampere Outfit—With Half of Cover Removed



Front View of 30 Ampere Outfit—Cover Removed

Mercury Arc Rectifiers

The type "AT" Mercury Arc Rectifiers supply a means of converting alternating current into the direct current required for charging the storage batteries used in telephone exchanges. These outfits occupy small floor space and operate at high efficiency at from less than one-third to full load. The units operate satisfactorily in multiple, two 50 ampere rectifiers giving 100 amperes output at the full load efficiency of each machine. Any desired number of units may be operated in multiple, the power being taken from the same or from different phases of a polyphase supply system. Link connections are provided for adapting the outfits to either 110 or 220 volt power circuits.

The type "AT" Rectifiers have been designed especially for telephone work in that precautions have been taken to eliminate the battery noise due to the use of alternating current and to insulate the battery circuit from the supply circuit so that disturbances due to grounds on the latter will be avoided. To decrease the noise while the batteries are being charged, a choke coil is incorporated in each rectifier; and the battery is insulated from the power circuit by the use of a special transformer.

All type "AT" Rectifiers have dial switches for regulating the rate of charge. All outfits will give their full rated current when the battery for which they were designed is fully charged. Due to the wide range of adjustment provided, a greater or less number of cells may be charged, but at some sacrifice of maximum or minimum current.

The ten-ampere size is arranged for wall mounting and is provided with control and meter switches so that no additional power switchboard is required. No exposed parts carry line potentials. Meters are not included, nor are meters shown on the set illustrated, but a Weston model No. 267 voltmeter and an ammeter may be ordered separately and mounted on the panel.

The 30 and 50 ampere size differ from the smaller unit in that they are arranged for support from the floor and that there is no space provided for mounting meters on the regulation panel.

The 10 and 30 ampere sizes are arranged for hand starting, while the 50 ampere size is the "automatic starting" type.

In the second column of the table below, the number of cells first mentioned is that for which the outfit is best fitted. It can, however, in each case be used with another number of cells, as given, by changing links under the back cover. The ten ampere size may be used to charge ten cells on the 11 cell connection.

The outfits for 11 and 17 cells are designed to give more uniform adjustment steps on 11 cells, those for 17 and 11 cells give more uniform steps on 17 cells. This is the only difference between them, and either outfit may be used for charging either number of cells by means of changes in the link connections under the rear cover. The ten-ampere outfit has practically uniform steps on both 8 and 11 cells when the links are properly connected.

Rectifiers for 60 Cycle Circuits (Single Phase)

Overall Dimensions and Weights (Approx.)

List No.	No. of Cells	Direct current Output		A.C. Volts Input.	Breadth Ins.	Height Ins.	Depth Ins.	Approx. Wt. in Lbs	
		Amperes	Volts					Net	Boxed
220241	8 and 11	10	16 to 30	110 or 220	16 3/4	24 1/2	16 1/2	385	485
220246	17 and 11	30	20 to 45	110 or 220	18 3/4	44 3/4	20 3/4	435	535
300305	11 and 17	50	20 to 45	110 or 220	21 3/4	56	21 3/4	650	850

The outfits are furnished complete, with one bulb as illustrated and described.

BELLS AND BUZZERS



No. 10 Type D. C. Bell



No. 10 Type D. C. Buzzer

Bells For Direct Current

No. 10 Type

The No. 10 type is shown in the illustration. The gong is 3 inches in diameter and the overall dimensions approximately $3\frac{1}{2} \times 6\frac{1}{8} \times 1\frac{1}{4}$ inches. The gong and binding posts are nickel plated, all other exposed parts being black. The bells will operate satisfactorily without change in adjustment upon voltage considerably greater and less than those given as "rated voltage." All No. 10 type bells have platinum contacts.

Code No.	Resistance Ohms	Rated Voltage	Code No.	Resistance Ohms	Rated Voltage
10A	2.5	3	10D	325	24
10B	15	7	10E	650	36 and 48
10C	100	15			

No. 11 Type

The No. 11 bells are of the iron box vibrating type, and are similar in general appearance to the No. 10 type bells, having the same overall dimensions. They are provided with nickel gong and binding posts; other exposed surfaces are finished in black. The No. 11 type bells have silver contacts.

Code No.	Resistance Ohms	Rated Voltage	Use
11B	15	7	Interphone and in the No. 6034 type telephone for No. 1801 switchboards.
11D	325	24	

For alternating current bells, see listing of ringers and extension relays.

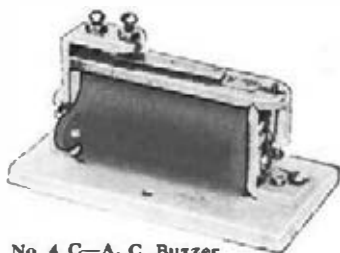
Buzzers For Direct Current

The No. 10 type buzzers are similar to the No. 10 bells, but are not provided with gongs; all exposed surfaces are black with the exception of the binding posts which are finished in nickel. The approximate overall dimensions are $3\frac{1}{8} \times 2\frac{1}{4} \times 1\frac{1}{8}$ inches. These buzzers will operate without readjustment on voltage considerably above or below those given as "rated voltage." They have platinum contacts.

Code No.	Resistance Ohms	Rated Voltage	Code No.	Resistance Ohms	Rated Voltage
10A	2.5	3	10D	325	24
10B	15	7	10E	650	36 and 48
10C	100	15			



No. 1A—A. C. Buzzer

No. 4 C—A. C. Buzzer
with cover removed

No. 2D—A. C. Buzzer

Buzzers For Alternating Current

Code No.	Resistance Ohms	Type	Dimensions Inches	Principal Use
1A	1000	Polarized	$3\frac{1}{2} \times 2\frac{1}{8} \times 1\frac{1}{2}$	Telephone and switchboards.
1B	2500	Polarized	$3\frac{1}{2} \times 2\frac{1}{8} \times 1\frac{1}{2}$	Telephone and Switchboard.
2A	100	Not polarized	$2\frac{1}{4} \times 2\frac{1}{4} \times \frac{1}{4}$	No. 1006 Type Test Sets
2C	1000	Not polarized	$2\frac{1}{4} \times 2\frac{1}{4} \times \frac{1}{4}$	Test Sets
2D	100	Not polarized	$2\frac{1}{4} \times 2\frac{1}{4} \times \frac{1}{4}$	No. 1017 Type Test Sets
4B	1200	Not polarized	$3\frac{1}{4} \times 1\frac{1}{4} \times 2\frac{1}{4}$	P.B.X. Switchboards operates on A.C. ringing current only
4C	1200	Not polarized	$3\frac{1}{4} \times 2\frac{1}{4} \times 2\frac{1}{4}$	P.B.X. Switchboards operates on A.C. ringing current, also on 24 volts D.C. Has a dustproof cover.

Western Electric

BINDING POSTS

15



No. 1A



No. 2A



No. 2E



No. 3A



No. 1B



No. 16A



No. 20A



No. 29A



No. 30A

Binding Posts For Telephones

Code No.	Description	Finish
1A	Thumbscrew connections, no soldering terminals	Brass
1B	Screw connections, one front soldering terminal	Tin dipped
2A	Lock nut connections, one back soldering terminal	Nickel
2E	Similar to No. 2A but with wing nut instead of lock nuts	Nickel
3A	Lock nut connections, one front soldering terminal	Brass
16A	Lock nut connections, one back soldering terminal	Nickel
20A	To take one tubular tip	Nickel
29A	Screw connections, one front soldering terminal	Nickel
30A	Used in No. 8 and No. 10 cable terminals when the original binding posts break off above the lower nut. For 10-32 thread only	Tinned
	Screw connection, one soldering terminal	Tinned



Ace



Corporal Midget
Sergeant Captain



Ensign Engraved
Commander Commander S



Sergeant
S. S. Buddy

Eby Binding Posts

Eby Metal Posts are scientifically right in design and attractive in appearance. The tops are non-removable and the patented sliding shoe operates parallel in the slot. This unique feature permits a fine wire to be firmly held without being damaged and the base being knurled, prevents turning.

MIDGET

Tapped base; size $\frac{1}{2} \times \frac{1}{2}$ inches. Slot will take No. 15 base wire. 10 amperes.

BUDDY

Solid Stem $\frac{1}{2}$ inches; size $\frac{1}{2} \times \frac{1}{2}$ inch. Slot will take No. 12 base wire. 25 amperes.

CORPORAL

Tapped base; size $\frac{1}{2} \times \frac{1}{2}$ inches. Slot will take No. 12 base wire. 25 amperes.

SERGEANT

Tapped base; size $\frac{1}{2} \times \frac{1}{2}$ inches. 50 amperes. The slot in this post is $\frac{1}{4}$ inch, and it will readily accommodate a telephone cord terminal, also a No. 9 bare wire.

SERGEANT SS

Solid Stem $\frac{1}{2}$ inch; size $\frac{1}{2} \times \frac{1}{2}$ inches. 50 amperes. The slot in this post is $\frac{1}{4}$ inch.

CAPTAIN

Tapped base; size $\frac{1}{2} \times 1$ inches. 100 amperes. The square slot in this post is $\frac{1}{4}$ inch wide and will readily accommodate a No. 6 bare wire.

MAJOR

Tapped base; size $\frac{1}{2} \times 1\frac{1}{2}$ inches. 150 amperes.

GENERAL

Tapped base; $1 \times 1\frac{1}{2}$ inches. 250 amperes.

ACE

Length of Stem $\frac{1}{4}$

ENSIGN

Length of Stem $\frac{1}{4}$

ENSIGN

Length of Stem $\frac{1}{4}$

COMMANDER—ENGRAVED

Length of Stem $\frac{1}{4}$

COMMANDER S

Length of Stem $\frac{1}{4}$

Finish
Black and Nickel

Red

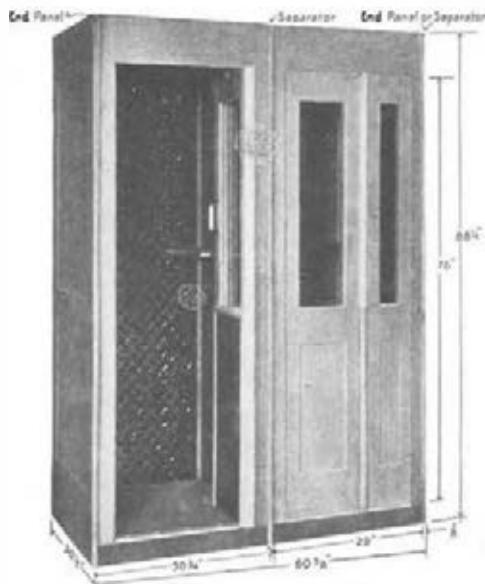
Red

Red

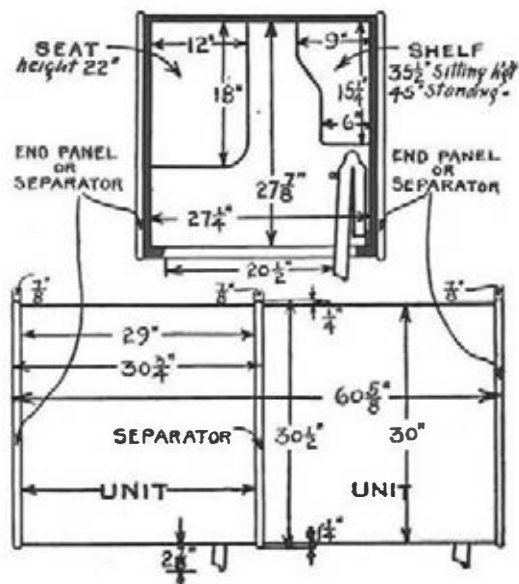
Black

Western Electric

BOOTH—TELEPHONE



No. 1 Folding Door Telephone Booth



No. 1 Type Folding Door Telephone Booths

The No. 1 type booths are designed for installation in groups, being built in units with unfinished sides. They are placed with separators between adjacent units and assembled with panels at either end of the group of compartments. The backs of the units are finished as indicated in the code listings. The hardwood backs can be equipped with an upper panel of glass upon request, at an extra charge.

The folding door construction makes these booths particularly desirable for use in narrow hallways or passages as the door opens and closes in a space only three inches beyond the front surface of the booth. This door will remain as placed in any position. It is both opened and closed by the simple motion of pulling upon the handle, there being no locks or catches. No guide slot is required in the floor, thus eliminating one common cause of trouble and the construction of the joint in the middle of the folding door is such as to prevent the chance of injury to the hand or fingers.

The sides, ceiling and the lower panel of the door on the inside are lined with sheet metal. The floor and front baseboard are covered with linoleum and the threshold is protected with a safety tread.

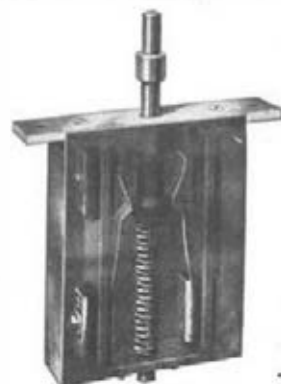
The ceiling of the booth is 4 1/2 inches below the roof and the intervening space may be used as a wiring chamber and to house an electric light relay or door switch equipment when these features are required.

These booths are strong and substantial in construction and rich in appearance as solid mahogany or quartered oak is used. The door is normally open, which permits the maximum of ventilation.

Code No.	Description
1A	Light Mahogany Booth Unit with Hardwood Back
1B	Light Mahogany Booth Unit with Softwood Back
1C	Oak Booth Unit with Hardwood Back
1D	Oak Booth Unit with Softwood Back
1E	Dark Mahogany Booth Unit with Hardwood Back
1F	Dark Mahogany Booth Unit with Softwood Back

Note. The above Code No. listings of No. 1 type booths does not include end panels, separators, seat, locks, keys or lighting equipment; therefore, if any of this material is required, it must be specified separately or ordered in addition to the type of booth selected.

Note. Overall width includes end panels and separators.

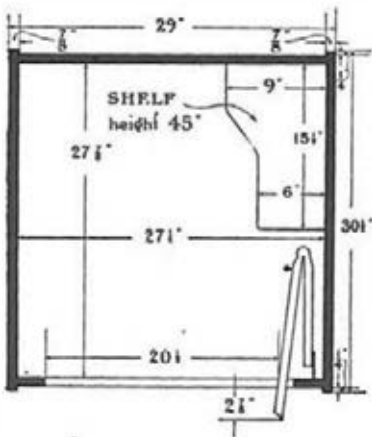


No. 1A Booth Switch

Code No. BOOTH SWITCHES

- 1A** This switch is used for disconnecting a telephone, located in a booth or pole-box, from the line when the booth or pole box is locked. It operates when a hasp is placed over the staple, and held in place by a padlock. It guards the telephone set against injury from lightning discharges. The approximate dimensions of the switch case are: width, 3 1/2 in., depth, 1 in. and length, 4 1/2 ins.

BOOTHS—TELEPHONE



Overall Height, 88 1/4 inches



Folding Door Telephone Booths

No. 2 Type Folding Door Telephone Booths

The No. 2 type booth is similar in design to the No. 1 type except that it is built as a single unit and presents a neat and pleasing appearance from all points of view. Several of these booths may be placed next to each other to form a group, such booths being ordered without glass panels in the sides, but having glass panels in the door only.

The following points should be noted in considering the advantages of this form of booth construction.

1. **Economy of Space.** The movement of the Folding Door takes but three (3) inches of space beyond the front of the booth, making it possible to use this type of booth in narrow passageways.
2. **Ventilation.** The design of the Folding Door is such that the door is open at all times when the booth is not in use. This is the only practical plan for booth ventilation.
3. **Protection from Injury.** The point where the two leaves of the Folding Door meet is of such design as to prevent any chance of injuring the fingers or hand.
4. **Maintenance.** The Folding Door does not require the use of tracks in the floor, consequently eliminating the main cause of trouble formerly experienced with the booths equipped with sliding doors.
5. **Non-Interference with Doors of Adjacent Booths.** The Folding Door folds within the booth; consequently, there is no interference with adjacent doors when two or more booths are in compartment formation.

Code No.	Material	Finish	Description
2A	Plain oak	Medium oak	2 glasses in door, 2 glasses in left side, 1 glass in right side
2B	Birch	Dark mahogany	2 glasses in door, 2 glasses in left side, 1 glass in right side
2C	Birch	Light mahogany	3 glasses in door, 2 glasses in left side, 1 glass in right side
2G	Plain oak	Medium oak	2 glass panels in door only
2H	Birch	Dark mahogany	2 glass panels in door only
2J	Birch	Light mahogany	2 glass panels in door only

Note. The above Code No. listings of No. 2 type booths does not include seats, locks, keys and lighting equipment, therefore, if any of this material is required it must be specified separately on the order in addition to the type of booth selected.

EQUIPMENT

Interior. Sides, back and ceiling lined with sheet metal. **Floor.** Hardwood flooring.

Threshold. Protected with safety tread. **Door.** Always hinged on right-hand side (facing booth). **Shelf.** Furnished with each booth. Shelf is intended only as an elbow rest.

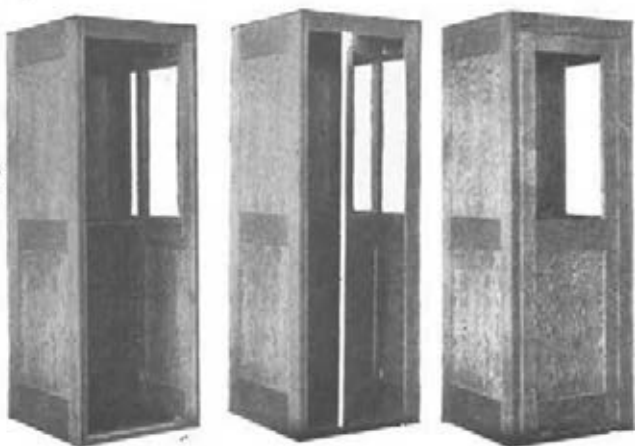
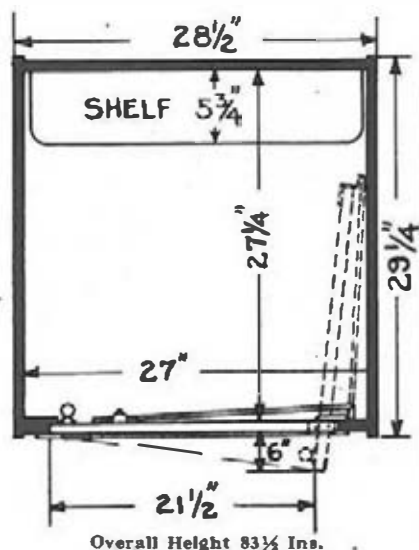
Wiring. Space between ceiling and roof (27 1/4 inches wide, 27 1/8 inches deep, 4 1/4 inches high) is provided as a wiring chamber, and as a housing for electric light relay or door switch equipment. A wiring slot is provided back of inside corner moulding.

Electric Light. Ceiling of booth is bored for electric light fixture. (Hole is equipped with a wooden plug.)

Door Switch. Ceiling of each booth is bored to receive a door switch designed to operate an electric light by movement of the door. (The hole is equipped with a wooden plug.)

Seat. Made of oak or birch. **Lock.** Designed especially for Folding Door booths. Furnished only when specified.

BOOTHS—TELEPHONE



No. 3 Booth Open No. 3 Booth Semi-closed No. 3 Booth Closed
No. 3A Type Telephone Booth

No. 3 "Churchill" Type Receding Door Telephone Booth

The Churchill No. 3 type receding (or sliding) door telephone booth is built as a single unit and is especially characteristic in its design. It is made throughout of genuine kiln dried selected plain white oak (with medium oak finish) or birch (with light or dark mahogany finish), and equipped with a reinforced back panel for mounting a wall telephone or coin collector set. It also has a writing-shelf which may be used with a desk telephone.

This receding door booth construction makes these booths especially desirable for use in narrow hallways or passages as the door only extends a maximum of six inches beyond the front surface of the booth when open.

The No. 3 type has no grooves in the floor where dirt can accumulate and interfere with the operation of the door and it is provided with mechanical devices to permit the door being opened and closed in a smooth and easy manner.

To enter or leave this booth, when the door is in closed position, it is only necessary to push on the right-hand side of the door. This feature from a user's standpoint is important.

Several of these booths may be placed adjoining each other to form a group or battery, such booths being ordered without glass panels in sides.

The cuts above show three positions of the receding door and illustrate the operation.

Outside Dimensions (Booth assembled). 83½ inches high, 28½ inches wide and 29¼ inches deep.

Inside Dimensions. 80½ inches high, 27 inches wide and 27¼ inches deep.

Door Opening. 77½ inches high, 23 inches wide.

Door Equipment. The door is equipped with patented steel, nickel-plated hardware consisting of 1 swivel roller guide and track on top of door, and 1 sliding guide on bottom of door which operates on outside edge of tread.

2 roller hinges on back edge of door which operate on tracks fastened to side of cabinet.

1 handle for inside of door.

1 lead aluminum tread at front edge of bottom.

Finish. The booth is thoroughly finished inside and out in following manner:

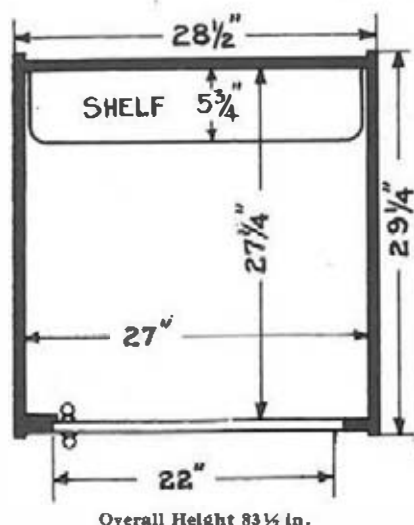
The sides and front are stained, filled, then given one coat of shellac and a final coat of flat varnish, producing a smooth satin finish. The back and top are stained, filled and given one coat of varnish. The floor is thoroughly oiled.

Shipping. The booths are shipped "knocked down" in a substantial crate, ready for assembly, upon receipt at destination.

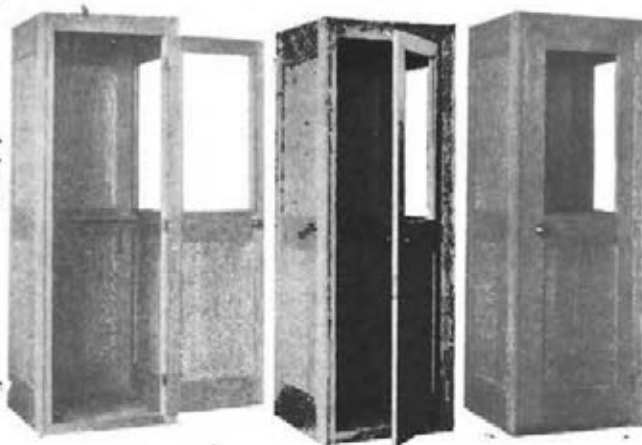
Orders for this type of booth should specify the following code and descriptive information (state "Churchill type").

Code No.	Material	Finish	Description
3A	Plain oak	Medium oak	1 glass panel in door, and 1 glass in right side.
3B	Birch	Dark mahogany	1 glass panel in door, and 1 glass in right side.
3C	Birch	Light mahogany	1 glass panel in door, and 1 glass in right side.
3D	Plain oak	Medium oak	1 glass in door, 1 glass in right side, 1 glass in left side.
3E	Birch	Dark mahogany	1 glass in door, 1 glass in right side, 1 glass in left side.
3F	Birch	Light mahogany	1 glass in door, 1 glass in right side, 1 glass in left side.
3G	Plain oak	Medium oak	1 glass panel in door only.
3H	Birch	Dark mahogany	1 glass panel in door only.
3I	Birch	Light mahogany	1 glass panel in door only.

BOOTHS—TELEPHONE



Overall Height 83 1/2 in.



No. 4 Booth—Open

No. 4 Booth—Semi-Closed

No. 4 Booth—Closed

No. 4A Type Telephone Booth

No. 4 "Churchill" Type Swinging Door Telephone Booths

Booth Construction. The No. 4 type telephone booth is made throughout of genuine kiln dried plain white oak (with medium oak finish) or birch (with a light or dark mahogany finish). All sides are framed and paneled 3-ply. The door is equipped with a glass upper panel. The right or left sides of the booth are interchangeable and can also be equipped with glass upper panel if desired.

This booth is equipped with a reinforced back for mounting either a wall telephone or coin collector set. A writing-shelf 5 1/4 inches wide is also supplied which affords means for mounting a desk telephone.

Outside Dimensions (Booth assembled). 83 1/2 inches high, 28 1/2 inches wide and 29 1/4 inches deep.

Inside Dimensions. 80 1/2 inches high, 27 inches wide and 27 1/4 inches deep.

Door Opening. 77 inches high and 23 inches wide.

Door Equipment. The door is attached to the door-frame with three substantial hinges, finished in black japan and the mortise lock with knob on each side is finished in japan.

A lead aluminum door tread is supplied on this booth.

Finish. The booth is thoroughly finished inside and out in the following manner:

The sides and front are stained, filled, then given one coat of first coat shellac and finished in flat varnish producing a smooth satin finish. The back and top are stained, filled, and then given one coat of varnish.

The floor is thoroughly oiled.

Shipping. The booth is shipped "knocked down" in a substantial crate, ready for assembly upon receipt at destination. A card giving full instructions for the assembly of the booth is packed with each unit.

Orders for this type of booth should specify the following Code and Descriptive information (state "Churchill Type").

Code	Material	Finish	Description
4A	Plain oak	Medium oak	1 glass panel in door, 1 glass in right side.
4B	Birch	Dark mahogany	1 glass panel in door, 1 glass in right side.
4C	Birch	Light mahogany	1 glass panel in door, 1 glass in right side.
4D	Plain oak	Medium oak	1 glass in door, 1 glass in right side, 1 glass in left side.
4E	Birch	Dark mahogany	1 glass in door, 1 glass in right side, 1 glass in left side.
4F	Birch	Light mahogany	1 glass in door, 1 glass in right side, 1 glass in left side.
4G	Plain oak	Medium oak	1 glass in door only.
4H	Birch	Dark mahogany	1 glass in door only.
4J	Birch	Light mahogany	1 glass in door only.

CABLE—TELEPHONE

Lead Covered Telephone Cable



The outside plant is a very important part of any telephone system. Unless satisfactory material is used in its construction, it is impossible for a telephone company to furnish satisfactory service even though the central office and sub-station equipment is of the best. Lead covered cable represents not only a large part of the capital invested in the outside plant, but also a most important part of the construction due to its function of being the transmitting medium for telephone messages.

There are certain characteristics which lead covered cable must possess in order to properly and efficiently function in a telephone system:—

1. It must be so constructed that it will have long life and thereby reduce depreciation to a minimum.
2. It must be designed to transmit telephone messages with a minimum transmission loss.

The Western Electric Company manufactures cable designed to conform to the above requirements and by virtue of the fact that its experience in this field covers the entire period since the first successful installation of lead cable for telephone use, its product is as nearly perfect as present day knowledge of the telephone art permits.

The Western Electric Company occupies an important position in the manufacture of lead covered cable for telephone use by virtue of the following facts:

1. It is the largest manufacturer of this commodity.
2. It has specialized on, and developed this product since its origin.
3. It manufactures for the largest users.
4. It is responsible for practically every important development and improvement.
5. Conscientious careful inspection and testing make sure that specifications are rigidly adhered to.
6. The design and development work is done by the largest force of telephone experts in the world.

experts in the world.

Cable for aerial and underground telephone use is composed of copper conductors, insulated with paper, twisted into pairs and enclosed in a lead sheath. In general, cable with single wrapped conductors is recommended, since its electrical and mechanical characteristics are perfectly satisfactory for most conditions, and the cost is less than cable with double wrapped conductors.

Cable for interior construction usually has the conductors insulated with two servings of silk and one of cotton.

The sheath is made of pure lead, lead antimony alloy or lead tin alloy. Experience has shown that while either lead antimony or lead tin is satisfactory for aerial or underground cable, the former alloy, being somewhat cheaper, is more generally used. While pure lead cannot be recommended where the cable is subjected to vibration, it is satisfactory for use within buildings.

Extra Pairs

Extra pairs are placed in all cables containing conductors smaller than No. 16 to take care of any pairs which may become defective in manufacture. In the majority of cables all or part of the extra pairs will often be found good and may be used for additional circuits. All pairs of No. 16 A.W.G. and larger except in submarine cable are guaranteed to meet the specification requirements when the cable leaves our factory.

The coding of all cables is on the basis of the actual number of pairs. Actual and guaranteed number of pairs in the various sizes of standard cables containing conductors smaller than No. 16 A. W. G. are as follows:

Actual Pairs	Guaranteed Pairs
6 to 121	Actual pairs less one
152 to 242	Actual pairs less two
253 to 333	Actual pairs less three
364 to 444	Actual pairs less four
485 to 505	Actual pairs less five
606	Actual pairs less six
909	Actual pairs less nine
1212	Actual pairs less twelve

Transmission

The transmitting efficiency of telephone cable, considered as a separate unit, depends principally upon its electrostatic capacity and conductor resistance. When telephone cable forms a portion of a completed telephone connection, the transmitting efficiency of the cable portion is modified somewhat by its relative position in that circuit and also by the type of the other construction to which it is connected.

The following data is based upon average standard conditions and may be used for approximate calculations. In the case of circuits involving several different types of construction and considerable investigation, we recommend consulting our engineers.

As a measure of transmission efficiency, standard No. 19 A. W. G. cable, having a loop resistance of 88 ohms and a mutual electrostatic capacity of .054 M.F. per mile is used as a basis.

CABLE—TELEPHONE**Lead Covered Telephone Cable****Transmission—Continued**

Thirty miles of this cable is considered the maximum distance over which commercial transmission can be secured. One mile of this cable is approximately equivalent to the following:

- 3.3 miles of No. 12 B.W.G.-B.B. galvanized iron circuit
- 4.1 miles of No. 10 B.W.G.-B.B. galvanized iron circuit
- 8.0 miles of No. 14 N.B.S. or 12 A.W.G. hard drawn bare copper circuit
- 12.7 miles of No. 12 N.B.S. or hard drawn bare copper circuit

It then follows that 99 miles is the theoretical commercial limit for No. 12 B.W.G.-B.B. galvanized iron wire circuit.

Under each listing is given the respective transmission equivalent in terms of standard No. 19 A.W.G. cable.

Electrostatic Capacity

Consideration of capacity is a measure of that property possessed by a conductor of storing a greater or lesser charge of electricity, important, because it determines to a large extent the length of cable through which it is possible to transmit speech. For subscribers' cables not more than two miles in length it is generally considered economical to use fairly high capacity cable, since the decrease in transmission, due to the capacity, will be only a small percentage of the total loss in the circuit. For long lengths of cable or for those carrying important toll lines, lower capacity is usually specified.

The electrostatic capacity may be specified either as "mutual," that is, the capacity between two wires of a pair, or as "grounded," that is, the capacity between a wire and all the other wires and the sheath. Mutual capacity is a better criterion of the quality of the cable for telephone transmission, since the conductors are used in pairs as a metallic circuit and seldom, if ever, singly as grounded lines. The ratio of mutual to grounded capacity is approximately 1.16, but this ratio varies somewhat for different cables.

Electrostatic capacity may be measured by means of alternating current or direct current. The Western Electric Co. recommends the use of the alternating current method of determining the mutual capacities of telephone cable conductors since by its use true capacities at telephonic frequencies are determined. This is important as the efficiency of the cable for telephone purposes is based on that mutual capacity. For this reason the Alternating Current Method is superior to either the Direct Current Charge Method or the Direct Current Discharge Method. With the Direct Current Discharge Method improper manipulation of the testing equipment can be made to produce untrue capacity values indicating lower capacities than the conductors actually possess.

We strongly advise the specifying of the capacity requirements a given cable shall meet, including the testing method to be employed in making the tests and whether the rating shall apply to single conductors as grounded capacity or to pairs as mutual capacity. Unless otherwise specified in the order, all cables will be tested for mutual capacities by means of alternating current.

The purchaser, when requesting prices, should always mention the type of cable wanted or give a full description.

Special Cables

Special conditions often require cables with different characteristics from those which have been standardized and coded. If your condition necessitates special cable including any of the special types briefly outlined below write our nearest house giving full details and information and price will be furnished.

Submarine Cables

Paper insulated submarine telephone cable may be divided into three general classes, depending upon the use for which they are intended.

1. High dielectric strength, tight core cable, designed for use in comparatively long lengths, where the cost of repairing a break in the cable will be less than the cost of an entirely new cable.
2. High dielectric strength, loose core cable, designed for use in comparatively short lengths, where high transmission efficiency and high dielectric strength are of importance; for example: a short river crossing cable connecting important open wire lines.
3. Single paper insulated loose core cable designed for use in comparatively short lengths where so high a dielectric strength is not necessary; for example: a short river crossing cable connecting land cables.

Either single or double armored cable can be furnished. In many cases, single armor gives sufficient mechanical protection. Double armor is used only in cases of extremely severe mechanical requirements. In still water with a mud bottom, single armor will be sufficient. With a rocky or uneven bottom, or with strong tides or currents, double armor should be considered.

CABLE—TELEPHONE

Lead Covered Telephone Cable

Type "NM" Cable - No. 24 A. W. G.

For Aerial or Underground Use

Conductors No. 24 A.W.G., Single Dry Paper Tape Insulation, With Color Groups Depending Upon Size.
Lead-antimony Sheath

Characteristics per Mile of Cable

Mutual Electrostatic capacity not greater than (A. C. Testing)..... 075 microfarad
Approximate equivalent grounded capacity..... 125 microfarad
Insulation resistances not less than..... 500 megohms
Dielectric strength. Insulation capable of withstanding a test potential up to..... 500 volts A.C.

Transmission is equivalent to 1.94 miles of standard No. 19 A.W.G. cable having a mutual electrostatic capacity of .054 microfarad, and 88 ohms resistance, per mile.

Code No. and No. of Pairs	No. of Pairs Guaranteed	Thickness of Sheath, Ins.	Mean Outside Diameter, Ins.	Approximate Wt. per Ft., Lbs.	Convenient No. of Ft. on Reels
NM- 11	10	.070	.44	.43	3500
NM- 16	15	.070	.48	.50	3500
NM- 21	20	.070	.53	.57	3500
NM- 26	25	.070	.56	.61	3500
NM- 31	30	.070	.61	.68	3500
NM- 41	40	.075	.68	.83	2400
NM- 51	50	.075	.73	.92	2400
NM- 56	55	.075	.76	.97	1900
NM- 61	60	.075	.79	1.02	1900
NM- 76	75	.080	.86	1.20	1900
NM- 91	90	.080	.93	1.33	1900
NM-101	100	.080	.97	1.42	1900
NM-111	110	.080	1.00	1.49	1200
NM-121	120	.085	1.05	1.64	1200
NM-152	150	.085	1.15	1.88	1200
NM-182	180	.090	1.24	2.17	1200
NM-202	200	.090	1.31	2.32	1000
NM-222	220	.095	1.38	2.57	1000
NM-242	240	.095	1.41	2.68	1000
NM-303	300	.105	1.59	3.34	900
NM-333	330	.105	1.65	3.53	900
NM-364	360	.105	1.71	3.73	900
NM-404	400	.105	1.77	3.97	700
NM-444	440	.105	1.87	4.23	700
NM-485	480	.115	1.95	4.76	600
NM-505	500	.115	1.98	4.88	600
NM-606	600	.115	2.14	5.94	600

Type "SM" Cable - No. 24 A. W. G.

For Underground Use

Conductors No. 24 A.W.G., Single Dry Paper Tape Insulation, With Color Groups Depending Upon Size
Lead-antimony Sheath

Characteristics per Mile of Cable

Mutual Electrostatic capacity not greater than (A. C. Testing)..... .085 microfarad
Approximate equivalent grounded capacity..... .135 microfarad
Insulation resistances not less than..... 500 megohms
Dielectric strength. Insulation capable of withstanding a test potential up to..... 500 volts D.C.

Transmission is equivalent to 2.10 miles of standard No. 19 A.W.G. cable having a mutual electrostatic capacity of .054 microfarad, and 88 ohms resistance, per mile.

Code No. and No. of Pairs	No. of Pairs Guaranteed	Thickness of Sheath, ins.	Mean Outside Diameter Ins.	Approximate Wt. per Ft., Lbs.	Convenient No. of Ft. on Reels
SM- 909	900	.115	2.23	6.38	600
SM-1212	1200	.125	2.63	8.46	600

CABLE—TELEPHONE

Lead Covered Telephone Cable

Type "NR" Cable—No. 22 A. W. G.

For Aerial or Underground Use

Conductors No. 22 A.W.G., Single Dry Paper Tape Insulation, Covering on Pairs Colored Red and Gray.
Lead-antimony Sheath.

Characteristics per Mile of Cable

Mutual Electrostatic capacity not greater than (A. C. Testing)..... .095 microfarad
Approximate equivalent grounded capacity..... .155 microfarad
Insulation resistance not less than..... 500 megohms
Dielectric strength. Insulation capable of withstanding a test potential up to..... 500 volts D.C.
Transmission is equivalent to 1.70 miles of standard No. 19 A.W.G. cable having a mutual electrostatic capacity of .054 microfarad and 88 ohms resistance, per mile.

Code No. and Pairs	No. of Pairs Guaranteed	Thickness of Sheath, Ins.	Mean Outside Diameter, Ins.	Approximate Wt. per Ft., Lbs.	No. of Ft. on Reels
NR- 6	5	☆	3/8	.388	2500
NR- 11	10	☆☆	1/2	.523	2500
NR- 16	15	☆☆	5/8	.584	2500
NR- 21	20	☆☆	3/4	.644	2500
NR- 26	25	☆☆	7/8	.742	2500
NR- 31	30	☆☆	1	.803	2500
NR- 41	40	☆☆	1 1/8	.924	2000
NR- 51	50	☆☆	1 1/4	1.046	2000
NR- 61	60	☆☆	1 1/2	1.129	1500
NR- 76	75	☆☆	1 3/4	1.312	1500
NR-101	100	☆☆	1 7/8	1.776	1500
NR-152	150	☆☆	2 1/8	2.281	1200
NR-177	175	☆☆	2 1/4	2.486	1200
NR-202	200	☆☆	2 3/8	2.691	1000
NR-253	250	☆☆	2 7/8	3.106	1000
NR-303	300	☆☆	3 1/8	4.286	800
NR-404	400	☆☆	3 3/4	5.173	700

Type "NP" Cable

Same as Type "NR" cable except double instead of single paper insulation.

Code No. and Pairs	No. of Pairs Guaranteed	Thickness of Sheath, Ins.	Mean Outside Diameter, Ins.	Approximate Wt. per Ft., Lbs.	No. of Ft. on Reels
NP- 6	5	☆☆	3/8	.426	2500
NP- 11	10	☆☆	1/2	.525	2500
NP- 16	15	☆☆	5/8	.624	2500
NP- 21	20	☆☆	3/4	.685	2500
NP- 26	25	☆☆	7/8	.746	2500
NP- 31	30	☆☆	1	.847	2500
NP- 41	40	☆☆	1 1/8	.970	2000
NP- 51	50	☆☆	1 1/4	1.093	2000
NP- 61	60	☆☆	1 1/2	1.177	1500
NP- 76	75	☆☆	1 3/4	1.362	1500
NP-101	100	☆☆	1 7/8	1.839	1500
NP-152	150	☆☆	2 1/8	2.353	1200
NP-177	175	☆☆	2 1/4	2.562	1200
NP-202	200	☆☆	2 3/8	2.817	1000
NP-253	250	☆☆	2 7/8	3.241	1000
NP-303	300	☆☆	3 1/8	4.458	800
NP-404	400	☆☆	3 3/4	5.364	700

Types "G" and "U" Cables

For Inside Construction

Conductors No. 22 A.W.G. double silk and single cotton insulation, using standard color scheme.
Pure Lead Sheath

Insulation resistance..... 100 megohms

Code No. and Pairs	No. of Pairs Guaranteed	Mean Outside Diameter, Ins.	Thickness of Sheath, Ins.	Approximate Wt., Per Ft., Lbs.	Convenient No. of Ft. on Reels
G- 6	5	3/8	☆	.272	2500
G-11	10	1/2	☆☆	.343	2500
G-16	15	5/8	☆☆	.414	2500
G-21	20	3/4	☆☆	.485	2500
G-26	25	7/8	☆☆	.533	2500
G-31	30	1	☆☆	.582	2500
G-41	40	1 1/8	☆☆	.701	2000
G-51	50	1 1/4	☆☆	.991	2000
				1.080	2000

Type "U" cable is the same as type "G" except that it has an impregnated core instead of a dry core.

CABLE-TELEPHONE

Lead Covered Telephone Cable

Type "ANA" Cable - No. 22 A. W. G.

For Aerial or Underground Use

Conductors No. 22 A.W.G., Single Dry Paper Tape Insulation, With Color Groups Depending Upon Size.
Lead-antimony Sheath.

Characteristics per Mile of Cable

Mutual electrostatic capacity not greater than (A. C. Testing)..... .079 microfarad
Approximate equivalent grounded capacity..... .130 microfarad
Insulation resistance not less than..... 500 megohms
Dielectric strength. Insulation capable of withstanding a test potential up to..... 700 volts A.C.
Transmission is equivalent to 1.60 miles of standard No. 19 A.W.G. cable having a mutual electrostatic capacity of .054 microfarad, and 88 ohms resistance per mile.

Code No. and No. of Pairs	No. of Pairs Guaranteed	Thickness of Sheath, Ins.	Mean Outside Diameter, Ins.	Approximate Wt. per Ft., Lbs.	Convenient No. of Ft. on Reels
ANA- 11	10	.070	.45	.47	2500
ANA- 16	15	.070	.52	.56	2500
ANA- 26	25	.070	.61	.70	2500
ANA- 31	30	.070	.64	.76	2500
ANA- 41	40	.075	.71	.93	2000
ANA- 51	50	.075	.78	1.05	2000
ANA- 56	55	.075	.81	1.11	1500
ANA- 61	60	.080	.85	1.23	1500
ANA- 76	75	.080	.94	1.42	1500
ANA- 91	90	.080	1.00	1.56	1500
ANA-101	100	.085	1.05	1.73	1500
ANA-111	110	.085	1.08	1.81	1200
ANA-121	120	.085	1.14	1.94	1200
ANA-152	150	.090	1.24	2.30	1200
ANA-182	180	.090	1.34	2.57	1200
ANA-202	200	.095	1.41	2.86	1000
ANA-222	220	.095	1.47	3.04	1000
ANA-242	240	.095	1.53	3.23	1000
ANA-303	300	.105	1.71	4.00	800
ANA-333	330	.105	1.77	4.24	800
ANA-364	360	.105	1.84	4.48	800
ANA-404	400	.115	1.95	5.12	700
ANA-444	440	.115	2.04	5.47	700
ANA-455	450	.115	2.07	5.57	700
ANA-485	480	.115	2.11	5.77	600
ANA-505	500	.115	2.14	5.92	600
ANA-606	600	.125	2.34	7.09	600

Type "ASA" Cable - No. 22 A. W. G.

For Underground Use

Conductors No. 22 A.W.G., Single Dry Paper Tape Insulation With Color Groups Depending Upon Size.
Lead-antimony Sheath

Characteristics per Mile of Cable

Mutual electrostatic capacity not greater than (A. C. Testing)..... .089 microfarad
Approximate equivalent grounded capacity..... .140 microfarad
Insulation resistance not less than..... 500 megohms
Dielectric strength. Insulation capable of withstanding a test potential up to..... 500 volts D.C.
Transmission is equivalent to 1.71 miles of standard No. 19 A.W.G. cable having a mutual electrostatic capacity of .054 microfarad and 88 ohms resistance per mile.

Code No. and No. of Pairs	No. of Pairs Guaranteed	Thickness of Sheath, Ins.	Mean Outside Diameter, Ins.	Approximate Wt. per Ft., Lbs.	Convenient No. of Ft. on Reels
ASA-404	400	.105	1.80	4.53	700
ASA-444	440	.105	1.87	4.81	700
ASA-485	480	.115	1.98	5.45	600
ASA-505	500	.115	2.01	5.60	600
ASA-606	600	.115	2.16	6.32	600
ASA-909	900	.125	2.63	8.87	600

CABLE—TELEPHONE

Lead Covered Telephone Cable

Type "F" Cable—No. 22 A. W. G.

For Inside Construction

Conductors No. 22 A.W.G., Double Silk and Single Cotton Insulation, Covering on each Pair Colored White and Red White.

Pure Lead Sheath

Characteristics per Mile of Cable

Insulation resistance.....100 megohms					
Code No. and No. of Pairs	No. of Pairs Guaranteed	Mean Outside Diameter, Ins.	Thickness of Sheath, Ins.	Approximate Wt., Per Ft., Lbs.	Convenient No. of Ft. on Reels
F- 6	5	$\frac{3}{16}$	$\frac{1}{16}$	.272	2500
F- 11	10	$\frac{1}{8}$	$\frac{1}{16}$	.343	2500
F- 16	15	$\frac{1}{8}$	$\frac{1}{16}$	.414	2500
F- 21	20	$\frac{1}{8}$	$\frac{1}{16}$	.490	2500
F- 26	25	$\frac{1}{8}$	$\frac{1}{16}$	.533	2500
F- 31	30	$\frac{5}{16}$	$\frac{1}{16}$	.582	2500
F- 41	40	$\frac{11}{16}$	$\frac{1}{16}$	.701	2000
F- 51	50	$\frac{11}{16}$	$\frac{1}{16}$	.991	2000
F- 56	55	$\frac{11}{16}$	$\frac{1}{16}$	1.050	1500
F- 61	60	$\frac{11}{16}$	$\frac{1}{16}$	1.102	1500
F- 76	75	$\frac{11}{16}$	$\frac{1}{16}$	1.240	1500
F- 91	90	1 $\frac{1}{16}$	$\frac{1}{16}$	1.410	1500
F-101	100	1 $\frac{1}{16}$	$\frac{1}{16}$	1.491	1500
F-111	110	1 $\frac{1}{16}$	$\frac{1}{16}$	1.610	1200
F-121	120	1 $\frac{1}{16}$	$\frac{1}{16}$	1.685	1200
F-152	150	1 $\frac{1}{16}$	$\frac{1}{16}$	1.968	1200
F-182	180	1 $\frac{1}{16}$	$\frac{1}{16}$	2.220	1200
F-202	200	1 $\frac{1}{16}$	$\frac{1}{16}$	3.140	1000
F-222	220	1 $\frac{1}{16}$	$\frac{1}{16}$	3.300	1000
F-242	240	1 $\frac{1}{16}$	$\frac{1}{16}$	3.501	1000
F-253	250	1 $\frac{1}{16}$	$\frac{1}{16}$	3.636	1000
F-303	300	1 $\frac{1}{16}$	$\frac{1}{8}$	4.985	800

Type "ANB" Cable—No. 19 A. W. G.

For Aerial or Underground Use

Conductors No. 19 A.W.G., Single Dry Paper Tape Insulation, With Color Groups Depending Upon Size Lead-antimony Sheath.

Characteristics per Mile of Cable

Mutual Electrostatic capacity not greater than (A. C. Testing)..... .072 microfarad
 Approximate equivalent grounded capacity..... .120 microfarad
 Insulation resistance not less than..... 500 megohms
 Dielectric strength. Insulation capable of withstanding a test potential up to..... 500 volts D.C.
 Transmission is equivalent to 1.13 miles of standard No. 19 A.W.G. cable having a mutual electrostatic capacity of .054 microfarad, and 88 ohms resistance, per mile.

Code No. and No. of Pairs	No. of Pairs Guaranteed	Thickness of Sheath, Ins.	Mean Outside Diameter, Ins.	Approximate Wt. per Ft., Lbs.	Convenient No. of Ft. on Reels
ANB- 6	5	.070	.48	.50	2500
ANB- 11	10	.070	.61	.69	2500
ANB- 16	15	.075	.71	.89	2500
ANB- 26	25	.080	.85	1.19	2000
ANB- 31	30	.080	.91	1.31	1500
ANB- 41	40	.085	1.05	1.64	1500
ANB- 51	50	.085	1.14	1.85	1500
ANB- 56	55	.085	1.17	1.94	1200
ANB- 61	60	.090	1.21	2.12	1200
ANB- 76	75	.090	1.34	2.43	1200
ANB- 91	90	.095	1.47	2.86	1200
ANB-101	100	.095	1.53	3.04	900
ANB-111	110	.105	1.62	3.47	900
ANB-121	120	.105	1.68	3.66	900
ANB-152	150	.105	1.84	4.20	900
ANB-182	180	.115	2.01	5.04	900
ANB-202	200	.115	2.11	5.39	700
ANB-222	220	.115	2.20	5.74	700
ANB-242	240	.125	2.31	6.45	700
ANB-303	300	.125	2.53	7.44	600

CABLE—TELEPHONE

Lead Covered Telephone Cable

Type "BNB" Cable—No. 19 A. W. G.

For Underground Use

Conductors No. 19 A.W.G., Single Dry Paper Tape Insulation, with Color Groups, Lead-Antimony Sheath.

Characteristics per Mile of Cable

Mutual Electrostatic capacity not greater than A.C. Testing..... .090 microfarad
 Approximate equivalent grounded capacity..... .144 microfarad
 Insulation resistance not less than..... 500 megohms
 Dielectric strength. Insulation capable of withstanding a test potential up to..... 700 volts A.C.
 Transmission is equivalent to 1.21 miles of standard 19 A.W.G. cable having a mutual electrostatic capacity of .054 microfarad, and 88 ohms resistance, per mile.

Code No. and No. of Pairs	No. of Pairs Guaranteed	Thickness of Sheath, Ins.	Mean Outside Diameter, Ins.	Approximate Wt., per Ft., Lbs.	Convenient No. of Ft. on Reels
BNB-455	450	.125	2 $\frac{5}{8}$	8.90	600

Type "TH" Cable—No. 16 A. W. G.

For Long Aerial and Underground Lines

Conductors No. 16 A.W.G., Single Dry Paper Tape Insulation, Covering on Pairs Colored Blue, Green and Red Paired With Orange.

Two tracer pairs in each length of cable—one near the center and one in the outside layer. Colors of insulation orange and gray.

Lead-antimony Sheath.

Characteristics per Mile of Cable

Mutual Electrostatic capacity not greater than (A. C. Testing)..... .071 microfarad
 Approximate equivalent grounded capacity..... .115 microfarad
 Insulation resistance not less than..... 500 megohms
 Dielectric strength. Insulation capable of withstanding a test potential up to..... 500 volts D.C.
 Transmission is equivalent to 0.78 mile of standard No. 19 A.W.G. cable having a mutual electrostatic capacity of .054 microfarad and 88 ohms resistance, per mile.

Code No. and Guaranteed No. of Pairs	Thickness of Sheath, Ins.	Mean Outside Diameter, Ins.	Approximate Wt., per Ft. Lbs.	Convenient No. of Ft. on Reels
TH- 11	$\frac{1}{8}$	1 $\frac{1}{4}$	1.77	2000
TH- 16	$\frac{1}{8}$	1 $\frac{1}{4}$	2.10	1500
TH- 21	$\frac{1}{8}$	1 $\frac{1}{4}$	2.38	1500
TH- 26	$\frac{1}{8}$	1 $\frac{1}{4}$	2.65	1500
TH- 31	$\frac{1}{8}$	1 $\frac{1}{4}$	2.92	1200
TH- 36	$\frac{1}{8}$	1 $\frac{1}{4}$	3.13	1200
TH- 51	$\frac{1}{8}$	1 $\frac{1}{4}$	3.77	1200
TH- 61	$\frac{1}{8}$	1 $\frac{1}{4}$	4.26	1000
TH-101	$\frac{1}{8}$	2 $\frac{1}{4}$	5.78	800
TH-111	$\frac{1}{8}$	2 $\frac{1}{4}$	6.14	600
TH-121	$\frac{1}{8}$	2 $\frac{3}{8}$	6.57	600
TH-152	$\frac{1}{8}$	2 $\frac{1}{2}$	7.46	600

Type "T J" Cable—No. 13 A. W. G.

For Long Aerial and Underground Lines

Conductors No. 13 A.W.G., Single Dry Paper Tape Insulation, Covering on Pairs Colored Blue, Green and Red paired with Gray. Two tracer pairs in each length of cable—one near the center and one in the outside layer. Colors of insulation orange and gray.

Lead-antimony Sheath

Characteristics per Mile of Cable

Mutual Electrostatic capacity not greater than (A. C. Testing)..... .071 microfarad
 Approximate equivalent grounded capacity..... .115 microfarad
 Insulation resistance not less than..... 500 megohms
 Dielectric strength. Insulation capable of withstanding a test potential up to..... 500 volts D.C.
 Transmission is equivalent to 0.55 miles of standard No. 19 A.W.G. cable having a mutual electrostatic capacity of .054 microfarad, and 88 ohms resistance, per mile.

Code No.	Thickness of Sheath, Ins.	Mean Outside Diameter, Ins.	Approximate Wt., per Ft. Lbs.	Convenient No. of Ft. on Reels
TJ-11	$\frac{1}{8}$	1 $\frac{1}{4}$	2.452	1500
TJ-16	$\frac{1}{8}$	1 $\frac{1}{4}$	3.937	1200
TJ-26	$\frac{1}{8}$	1 $\frac{1}{4}$	3.906	1200
TJ-31	$\frac{1}{8}$	1 $\frac{1}{4}$	4.400	900
TJ-36	$\frac{1}{8}$	1 $\frac{1}{4}$	4.74	900
TJ-41	$\frac{1}{8}$	2	5.10	900
TJ-51	$\frac{1}{8}$	2 $\frac{1}{8}$	5.86	900
TJ-71	$\frac{1}{8}$	2 $\frac{1}{8}$	7.33	600
TJ-76	$\frac{1}{8}$	2 $\frac{3}{8}$	7.63	600

CABLE—SWITCHBOARD

Switchboard Cable



No. 6084

The Western Electric switchboard cable having black enamel insulated conductors represents the highest developments in the art of switchboard cable manufacture. The cables listed below are made up of copper conductors which are tinned then black enamel insulated.

One of the chief features of black enamel is that it will fuse with the solder at a high temperature and result in reliable soldered connections.

Switchboard cable (employing black enamel insulated conductors) is divided into two classes, depending upon the type of outer insulation.

1. The 1000 and 1100 coded series in which the conductors

are provided with a double silk and single cotton insulation.

2. The 6000 coded series in which conductors are covered with two servings of cotton.

In all types of switchboard cable, the outer insulation on each of the conductors is colored according to the code, so that they may be identified by color.

Each cable contains one spare-pair and one spare single wire in addition to the specified number of wires as outlined below.

DRY CORE—LEAD TAPED—BRAIDED—BLACK ENAMELED CONDUCTORS

Code No.	No. of Pairs B. & S. Gauge	No. of Singles B. & S. Gauge	Approximate Dimensions (In Ins.)	Code No.	No. of Pairs B. & S. Gauge	No. of Singles B. & S. Gauge	Approximate Dimensions (In Ins.)
Double Silk and Single Cotton Insulation							
1016	20-No. 22	20-No. 22	$\frac{1}{8} \times \frac{1}{8}$	1116	20-No. 19	.....	$\frac{7}{8} \times \frac{3}{8}$
1024	20-No. 22	.....	$\frac{1}{8} \times \frac{1}{8}$	1117	{ 20-No. 19 20-No. 22 }	.....	$\frac{1}{8} \times \frac{1}{2}$
1035	25-No. 22	.....	$\frac{3}{4} \times \frac{1}{8}$	1121	{ 10-No. 19 10-No. 22 }	10-No. 22	$\frac{3}{4} \times \frac{1}{8}$
1050	10-No. 22	10-No. 22	$\frac{1}{8} \times \frac{1}{8}$	1125	10-No. 19	.....	$\frac{1}{8} \times \frac{1}{8}$
1060	36-No. 22	.....	$\frac{1}{8} \times \frac{1}{8}$	1126	{ 10-No. 22 10-No. 19 }	.....	$\frac{3}{4} \times \frac{3}{8}$
1062	30-No. 22	.....	$\frac{3}{8} \times \frac{1}{8}$	1127	10-No. 19	10-No. 22	$\frac{1}{8} \times \frac{3}{8}$
1070	40-No. 22	.....	$\frac{7}{8} \times \frac{1}{8}$	1186	3-No. 16	.....	$\frac{1}{8} \times \frac{1}{8}$
*1074	.....	20-No. 22	$\frac{3}{8}$	1187	6-No. 16	.....	$\frac{1}{8} \times \frac{1}{8}$
1079	10-No. 22	.....	$\frac{1}{2} \times \frac{1}{8}$	1188	8-No. 16	.....	$\frac{5}{8} \times \frac{3}{8}$
1084	20-No. 22	20-No. 22	$1 \frac{1}{8} \times \frac{1}{8}$	1200	6-No. 19	.....	$\frac{7}{8} \times \frac{1}{8}$
1098	64-No. 22	32-No. 22	$1 \frac{1}{4} \times \frac{3}{4}$				
1107	39-No. 22	{ 19-No. 22 4-No. 16 }	$1 \frac{1}{2} \times \frac{1}{8}$				
1115	20-No. 19	20-No. 22	$\frac{1}{8} \times \frac{1}{8}$				
Double Cotton Insulation							
6016	20-No. 22	20-No. 22	$\frac{1}{8} \times \frac{1}{8}$	*6122	{ 10-No. 22 1-No. 14 }	.....	$\frac{1}{8}$
6024	20-No. 22	.....	$\frac{1}{8} \times \frac{1}{8}$	*6123	{ 20-No. 22 1-No. 14 }	.....	$\frac{1}{8}$
6035	25-No. 22	.....	$\frac{3}{4} \times \frac{1}{8}$	*6124	{ 30-No. 22 1-No. 14 }	.....	$\frac{3}{8}$
6050	10-No. 22	10-No. 22	$\frac{1}{8} \times \frac{1}{8}$	6125	10-No. 19	.....	$\frac{1}{8} \times \frac{1}{8}$
6060	36-No. 22	.....	$\frac{1}{8} \times \frac{1}{8}$	6126	{ 10-No. 19 10-No. 22 }	.....	$\frac{3}{8} \times \frac{3}{4}$
6062	30-No. 22	.....	$\frac{3}{8} \times \frac{1}{8}$	6127	10-No. 19	10-No. 22	$\frac{3}{8} \times \frac{1}{8}$
*6066	50-No. 22	.....	$\frac{1}{2}$	*6128	40-No. 18	.....	$\frac{1}{8}$
*6069	100-No. 22	.....	$1 \frac{1}{8}$	*6166	3-No. 20	.....	$\frac{1}{8}$
6070	40-No. 22	.....	$\frac{3}{8} \times \frac{1}{8}$	*6178	102-No. 22	.....	$1 \frac{1}{8}$
*6072	10-No. 19	.....	$\frac{1}{8}$	*6179	6-No. 20	.....	$\frac{1}{8}$
*6074	.....	20-No. 22	$\frac{3}{8}$	*6180	8-No. 20	.....	$\frac{1}{8}$
6079	10-No. 22	.....	$\frac{1}{2} \times \frac{1}{8}$	6181	11-No. 20	.....	$\frac{1}{8}$
6084	20-No. 22	20-No. 22	$1 \frac{1}{8} \times \frac{1}{8}$	6182	6-No. 22	.....	$\frac{1}{8} \times \frac{1}{8}$
6087	16-No. 22	.....	$\frac{1}{8} \times \frac{1}{8}$	6183	20-No. 22	10-No. 22	$\frac{3}{4} \times \frac{1}{8}$
6097	64-No. 22	.....	$1 \frac{1}{4} \times \frac{3}{8}$	6184	{ 10-No. 19 20-No. 22 }	.....	$\frac{1}{2} \times \frac{1}{8}$
6098	64-No. 22	32-No. 22	$1 \frac{1}{4} \times \frac{3}{4}$	6189	{ 20-No. 19 20-No. 22 }	20-No. 22	$\frac{1}{8} \times 1$
6100	40-No. 24	.....	$\frac{1}{8} \times \frac{1}{8}$	6191	30-No. 22	30-No. 22	$\frac{1}{8} \times \frac{1}{2}$
6102	40-No. 24	20-No. 24	$\frac{1}{2} \times \frac{1}{8}$	6192	35-No. 22	{ 17-No. 22 4-No. 16 }	$1 \frac{1}{2} \times \frac{1}{8}$
6103	20-No. 24	.....	$\frac{3}{8} \times \frac{1}{8}$	6193	15-No. 22	15-No. 22	$\frac{3}{8} \times \frac{1}{8}$
6106	40-No. 22	20-No. 22	$1 \times \frac{1}{8}$	6217	5-No. 19	34-No. 22	.....
6107	39-No. 22	{ 23-No. 22 4-No. 16 }	$1 \frac{1}{2} \times \frac{1}{8}$	6218	5-No. 19	27-No. 22	.....
6115	20-No. 19	20-No. 22	$\frac{1}{8} \times \frac{1}{8}$	6219	40-No. 22	30-No. 22	$1 \frac{1}{8} \times \frac{1}{8}$
6116	20-No. 19	.....	$\frac{3}{8} \times \frac{1}{8}$				
6117	{ 20-No. 19 20-No. 22 }	.....	$\frac{1}{2} \times \frac{1}{8}$				
6119	50-No. 19	.....	$\frac{3}{4} \times 1 \frac{1}{8}$				
6120	20-No. 24	20-No. 24	$\frac{3}{8} \times \frac{1}{8}$				
6121	{ 10-No. 19 10-No. 22 }	10-No. 22	$\frac{1}{8} \times \frac{3}{4}$				

*Round shaped cables all other cables are oval shaped.

CABLE—SWITCHBOARD AND INTER-PHONE

Switchboard Cables

(Continued)

WAXED CORE—NOT LEAD TAPED—BLACK ENAMELED CONDUCTORS

The following cables are different from the others in the 6000 series in that they have waxed cores instead of dry core and are not protected by the lead tape. The construction is somewhat different in that instead of pairs of singles they have in some of the types triples and quads. The various combinations, as in the other type of cables, have a definite color scheme to aid identification. The outer braid is of glazed black cotton.

Code No.	No. of Pairs B. & S. Gauge	No. of Singles B. & S. Gauge	Triples and Quads	Shape	Approximate Dimensions (In Ins.)
6143	20—No. 22	.....	.....	Oval	$\frac{1}{8}$ x $\frac{1}{8}$
6144	30—No. 22	.....	.....	Oval	$\frac{1}{8}$ x $\frac{1}{8}$
6145	50—No. 22	.....	.....	Round	$\frac{3}{4}$
6146	100—No. 22	.....	.....	Round	$1\frac{1}{8}$
6147	40—No. 22	.....	.....	Oval	$\frac{1}{2}$ x $\frac{1}{8}$
6177	55—No. 22	.....	.....	Round	$\frac{1}{8}$
6208	3—No. 20	2—No. 20	3 Triples 20	Round	$\frac{1}{8}$
6209	3—No. 20	2—No. 20	4 Quads 20	Round	$\frac{1}{8}$
6210	3—No. 20	.....	1 Quad 20	Round	$\frac{1}{8}$
.....	.....	.....	2 Triples 20	.....	.....
6211	5—No. 20	1—No. 20	1 Quad 20	Round	$\frac{1}{8}$
.....	.....	.....	2 Triples 20	.....	.....
6212	9—No. 20	2—No. 20	.....	.....	$\frac{1}{8}$
6213	12—No. 20	2—No. 20	.....	.....	$\frac{1}{8}$
6214	9—No. 20	.....	.....	.....	$\frac{1}{8}$
6223	10—No. 20	.....	.....	Round	$\frac{1}{8}$

Inter-phone Cable



Cable for Interior Use



Cable for Outside Use

The conductors are provided with single silk and single cotton insulation which is colored in such a way that each pair and each single wire can be identified. The cable is then impregnated with a wax compound and is covered with servings of paper and a heavy braiding, which is given a heavy coat of fireproofing paint.

Lead-covered cables are not listed with separate Code Nos. Any fireproofed type of cable may be ordered with a lead sheath. Each cable contains two spare pairs of No. 22 gauge conductors.

Code No.	Conductors (B. & S. Gauge)		Covering	Approximate Outside Diam., Ins.
	No. 22	No. 18		
185B	4 singles	.....	Fireproofed braid	$\frac{1}{4}$
161B	8 singles	.....	Fireproofed braid	$\frac{1}{8}$
161B (Lead)	8 singles	.....	Lead sheath	$\frac{1}{8}$
142B	8 singles	.....	Green cotton braid	$\frac{1}{8}$
162B	12 singles	.....	Fireproofed braid	$\frac{1}{8}$
162B (Lead)	12 singles	.....	Lead sheath	$\frac{3}{8}$
164B	6 singles	2 pair	Fireproofed braid	$\frac{1}{8}$
164B (Lead)	6 singles	2 pair	Lead sheath	$\frac{1}{8}$
134B	6 pair	2 pair	Fireproofed braid	$\frac{1}{8}$
134B (Lead)	6 pair	2 pair	Lead sheath	$\frac{1}{8}$
155B	6 pair	2 pair	Green cotton braid	$\frac{1}{8}$
141B	12 pair	2 pair	Fireproofed braid	$\frac{1}{8}$
141B (Lead)	12 pair	2 pair	Lead sheath	$\frac{1}{2}$
156B	12 pair	2 pair	Green cotton braid	$\frac{1}{8}$
157B	16 pair	2 pair	Fireproofed braid	$\frac{1}{8}$
157B (Lead)	16 pair	2 pair	Lead sheath	$\frac{1}{8}$
158B	20 pair	2 pair	Fireproofed braid	$\frac{1}{8}$
158B (Lead)	20 pair	2 pair	Lead sheath	$\frac{1}{8}$
136B	24 pair	2 pair	Fireproofed braid	$\frac{1}{8}$
136B (Lead)	24 pair	2 pair	Lead sheath	$\frac{5}{8}$
140B	31 pair	2 pair	Fireproofed braid	$\frac{5}{8}$
140B (Lead)	31 pair	2 pair	Lead sheath	$\frac{1}{2}$

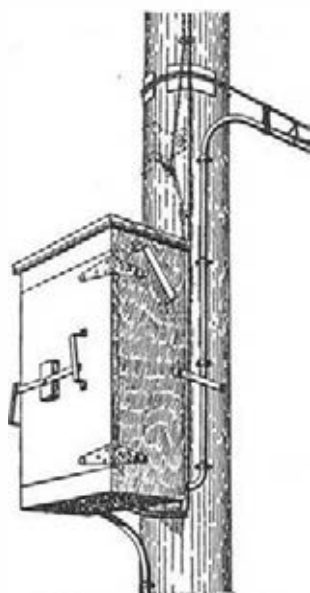
CABLE TERMINALS

General

Cable terminals used out-of-doors should include a means of effectively sealing the cable end in such a manner as to prevent the entrance of moisture into the cable core. Experience indicates that the most satisfactory results are obtained by the use of terminating chambers in which cable stubs are connected and sealed at the factory. It is then only necessary to splice the cable stub to the cable in the field and the usual rubber-covered wire pothead is avoided, thereby eliminating an expensive field operation. By this method, the connecting and potheading is accomplished in the factory with every facility for producing a perfect product and the best electrical and mechanical qualities are obtained.

Several styles of Western Electric cable terminals for out-door use may be obtained with cable stubs of No. 22 B. & S. gauge cable of suitable length, connected and potheaded in the terminals.

The selection of cable terminals for use at various points in the outside plant involves the provision of suitable protection against lightning and crosses with neighboring light and power circuits. Proper cross-connecting facilities should be provided where required and provision made for future changes and additions. The terminals described in the succeeding pages offer these features in a number of combinations.



"B" Type Cable Terminal

Type "B" Cable Terminal consists of a heavily built wooden box arranged to mount two (or more) iron terminating chambers, one of which (the binding post chamber) may be used for aerial cable and the other (the fuse chamber) for underground cable. A cable stub is attached to each chamber and space is provided in the bottom of the box for splicing to the connecting cables. No. 7-T (7 ampere) fuses are mounted directly upon the fuse chamber; considerable space formerly taken up by a fuse mounting is saved by this method of construction. Bridle or drop wires enter through holes in the bottom of the box, a No. 83-A protector mounting being installed, where necessary, for supplying lightning protection on the lines so connected.

This type of terminal may be obtained partially or fully equipped, as desired. They offer the advantage of a single type of box having great flexibility of application and may be readily adapted for other than the service for which they are originally ordered by adding to the parts already installed. The reliable method used in connecting and potheading, the substantial character of their construction, and their high electrical qualities, make "B" type terminals suitable for economical maintenance and a high grade of telephone service. Their compact design, and the resulting small size, make them particularly acceptable in appearance.

No. 18 Type Cable Terminal is equipped with fuses and carbon block protectors and is similar in general external appearance to the No. 8 type. The Nos. 8, 14 and 18 Type Cable Terminals are used for connecting drop or service wires to cable and do not include cross-connection features; they are, therefore, not suitable for use at the juncture of underground and aerial cable or at other points where the greatest flexibility of connection is required. For these cases, the "B" cable terminals, providing such flexibility, should be used. Western Electric cable terminals are fully described and illustrated on the succeeding pages.

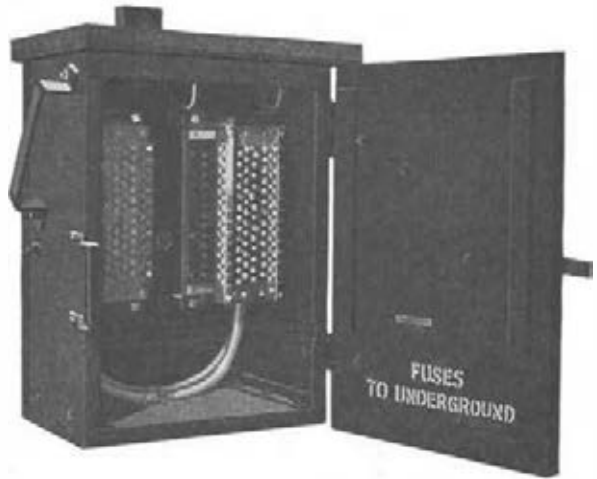
In a local building cable system the No. 12 and No. 19 terminals are adaptable at many points. The No. 19 type is widely used in interphone systems.

CABLE TERMINALS

(Continued)



B-26 Cable Terminal



B-26 Cable Terminal

Type "B" Cable Terminals (Protected)

"B" cable terminals have been designed to supply a flexible form of terminal, adaptable for use at many points in a cable system, and having the highest electrical and mechanical qualities. Potting in the field is eliminated through their use.

Each complete "B" cable terminal consists of a "B" cable terminal box in which are assembled a cast iron "B" fuse chamber and a cast iron "B" binding post chamber. These two items are fully described in connection with their separate listing. A cable stub is connected and potheaded in each chamber.

The boxes are substantially constructed of wood with a sheet zinc covering on the top and are finished with green pole paint. The bottom of the box is removable. Suitable space is provided in the lower part of the boxes for the splicing of the terminating cables to the cable stubs which are attached to the sealed chambers. Holes in the bottom of the terminal box permit bridge wires or drop to be connected to the cable terminal and, where necessary, the No. 83A protector mounting may be mounted nearby to supply lightning protection for these lines.

"B Cable Terminal Boxes" are obtainable without equipment.

The "B" type cable terminal, complete or partially equipped, may be used to meet the following varied classes of service:

1. At the junction of underground and aerial cable; no potheading in the field is required with a complete "B" cable terminal. This terminal is designed for cross-connecting and provides fuse mountings.
2. Where underground and aerial cable are joined, and open or drop wires are also connected to the cable lines, a "B" cable terminal may be used for cross-connecting the cables and No. 83A protector mountings placed on the pole to provide open space cut-outs for the separate lines.
3. When open or drop wires are connected to an underground cable, a partially equipped "B" cable terminal box having a fuse chamber may be used and open space cut-outs inserted in the lines by means of the No. 83A protector mounting placed on the pole.
4. Aerial cable may be joined to open or drop lines by means of a "B Cable Terminal Box" in which either a fuse chamber or a binding post chamber is used, the choice depending upon whether or not protection against abnormal current is desired at this point. Lightning protection may be provided, if needed, by the use of a No. 83A protector mounting mounted on the pole.
5. When it is desired to place a cross-connecting terminal at the point where aerial cable branches, or to cross-connect long sections of aerial cable, a "B Cable Terminal Box" may be used and equipped with two "B" binding post chambers.
6. If it is not convenient to place fuses for central office protection in the building, they may be located in a "B Cable Terminal" placed on a pole just outside.

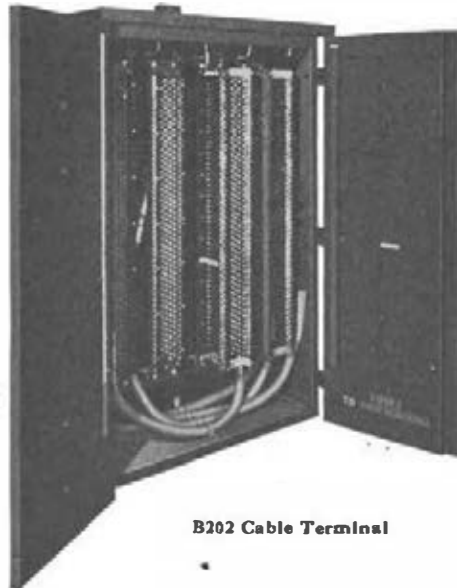
The listing of type "B" cable terminals complete includes a terminal box, equipped with fuse chambers and binding post chambers, each of which is supplied with a cable stub attached and potheaded, but do not include the No. 7T fuses, two of which are needed for each pair of wires and they should be ordered separately. Binding post chambers and fuse chambers may be ordered as separate items and are listed and described under their proper headings.

CABLE TERMINALS

(Continued)



B 202 Cable Terminal



B202 Cable Terminal

Type "B" Cable Terminals

The B-26 Cable Terminal will terminate both a 26 pair underground cable and a 26 pair aerial cable and provides for cross-connection. The other sizes have similar capacity ratings. Pole seats may be used with the two smaller sizes of "B Cable Terminals" and these together with platforms for the large terminals are listed elsewhere.

Code No.	Capacity Pairs	Cable Terminal Box No.	Includes	
			Equipped With	
B-26	26	B-26	1 B-26 A Fuse Chamber & 1 B-26A	Binding Post Chamber
B-51	51	B-51	1 B-51A Fuse Chamber & 1 B-51A	Binding Post Chamber
B-76	76	B-76	1 B-76A Fuse Chamber & 1 B-76A	Binding Post Chamber
B-101	101	B-101	1 B-101A Fuse Chamber & 1 B-101A	Binding Post Chamber
B-152	152	B-152	2 B-76B Fuse Chamber & 2 B-76B	Binding Post Chamber
B-202	202	B-202	2 B-101B Fuse Chamber & 2 B-101B	Binding Post Chamber
B-304	304	B-304	2 B-76B Fuse Chamber & 2 B-76B	Binding Post Chamber
B-404	404	B-404	2 B-76C Fuse Chamber & 2 B-76C	Binding Post Chamber
			2 B-101B Fuse Chamber & 2 B-101B	Binding Post Chamber
			2 B-101C Fuse Chamber & 2 B-101C	Bin ing Post Chamber

Note. "B Fuse Chambers" do not include the No. 7-T fuses which must be ordered separately. See description of "B Fuse Chambers."

Cable Terminal Boxes

Code No.	Used With Type "B" Cable Terminals	Height	Width	Depth
		Ins.	Ins.	Ins.
B-26	B-26	28 $\frac{1}{2}$	21 $\frac{3}{4}$	15 $\frac{1}{4}$
B-51	B-51	36 $\frac{1}{2}$	22 $\frac{3}{4}$	15 $\frac{1}{4}$
B-76	B-76	45 $\frac{1}{2}$	22 $\frac{3}{4}$	15 $\frac{1}{4}$
B-101	B-101	54 $\frac{1}{2}$	22 $\frac{3}{4}$	15 $\frac{1}{4}$
B-152	B-152	46 $\frac{1}{2}$	36 $\frac{3}{4}$	15 $\frac{1}{4}$
B-202	B-202	55 $\frac{1}{2}$	36 $\frac{3}{4}$	15 $\frac{1}{4}$
B-304	B-304	91 $\frac{1}{2}$	38 $\frac{1}{4}$	15 $\frac{1}{4}$
B-404	B-404	109 $\frac{1}{4}$	38 $\frac{3}{4}$	15 $\frac{1}{4}$

CABLE TERMINALS

"B" Binding Post Chambers

These sealed cable terminating chambers are designed primarily for use in the "B" type cable terminal for terminating aerial cable, and consists in each case of a cast iron case having a hard rubber face plate in which binding posts are mounted. Fanning strips are provided upon the hard rubber face plate for leading off the cross-connecting wires. The iron case is finished in black and is supplied with a No. 22 B. & S. gauge cable stub, which is connected in the chamber and pot-headed.

Code No.		Length of Cable Stub, Inches	Used with Type "B" Terminal
B-26A	Binding post chamber.....	25	B-26
B-51A	Binding post chamber.....	33	B-51
B-76A	Binding post chamber.....	36	B-76
B-76B	Binding post chamber.....	50	B-152 and B-304 (lower)
B-76C	Binding post chamber.....	88	B-304 (upper)
B-101A	Binding post chamber.....	42	B-101
B-101B	Binding post chamber.....	55	B-202 and B-404 (lower)
B-101C	Binding post chamber.....	100	B-404 (upper)

"B" Fuse Chambers

Primarily for use in the Type "B" cable terminals for terminating underground cable. These chambers consist of a cast iron box, finished black and having a hard rubber face plate provided with threaded posts. Fuses are mounted by screwing one end of the fuse to the binding posts on the chamber face and are held in place at their outer ends by means of a suitable drilled supporting plate of insulating material. This construction affects a substantial saving in the box space required for the installation of the fuse equipment. Fanning strips are mounted on the fuse support plate.

The code numbers given in the table below include the iron fuse chamber complete with threaded posts, fuse support, fanning strips and with a 22 B. & S. Gauge Cable Stub connected and pot-headed.

Code No.		Length of Cable Stub, Inches	Used with Type "B" Terminal
B-26A	Fuse chamber.....	25	B-26
B-51A	Fuse chamber.....	33	B-51
B-76A	Fuse chamber.....	36	B-76
B-76B	Fuse chamber.....	50	B-152 and B-304 (lower)
B-76C	Fuse chamber.....	88	B-304 (upper)
B-101A	Fuse chamber.....	42	B-101
B-101B	Fuse chamber.....	55	B-202 and B-404 (lower)
B-101C	Fuse chamber.....	100	B-404 (upper)

Note. The "B" type fuse chambers do not include the fuses, two of which are required for each line. For example, the B-26 fuse chamber requires 52 No. 7T fuses, the B-51 fuse chamber 102 No. 7T fuses, etc. The required number of fuses should be ordered separately.

Pole Seats

Special Pole Seats for use with the 26 and 51 pair sizes of "B" Cable Terminal Boxes may be obtained, specifying Pole Seats per Drawing 135A-97.

Cable Balconies

Balconies have been specially designed for use with the "B" Type Cable Terminal Boxes and the boxes as furnished are drilled for attaching these balconies. They should be ordered as follows:

For 101, 152 or 202 pair Cable Terminals order "C" Cable Balcony per Drawing 137A-97.

For 304 or 404 pair Cable Terminals order "B" Cable Balcony per Drawing 139A-96.



B-101 "B" Binding Post Chamber



B-101 "B" Fuse Chamber
(with No. 7T Fuses in place) 139A-96.

CABLE TERMINALS

(Continued)



No. 18E Cable Terminal, Open



No. 18E Cable Terminal, Closed

No. 18 Type Cable Terminal (Protected)

This is a protected terminal for open wire distribution from underground or aerial cable. The heavy base is slotted at the back, forming a bracket suitable for either pole or wall mounting and both the base and the metal hood are protected from corrosion by galvanizing. A spring device holds the cover when it is raised to the top of the terminal; a chain attached to the base prevents it being dropped or mislaid when removed.

Locknut spun wire binding posts for the line connections are mounted directly on the sides of the sealed chamber and extensions of the walls of the chamber provide fanning strips. This construction is compact and strong. Each cable terminal is provided with a heavy, binding post locknut for connecting the ground wire of the protectors.

The fuses and open space protectors provided are designed for protection against lightning and crosses with light and power circuits and represent the most modern design.

The fuses make contact with the terminals by means of a screw connection at one end and a locknut at the other. The line connections can be changed without removing the fuses.

The terminals, as furnished, are equipped with:

No. 7A fuses (7 ampere, unless otherwise specified).

No. 1 Protector blocks.

No. 2 Protector blocks.

No. 3 Protector mica.

A six-foot cable stub of No. 22 B. & S. gauge cable will be furnished properly connected and potheaded within the terminal unless otherwise specified.

Code No.	Capacity (Pairs)	Length (Inches)	Diameter of Hood (Inches)
18A	10	19 $\frac{3}{4}$	8 $\frac{1}{16}$
18B	15	22 $\frac{3}{4}$	8 $\frac{1}{16}$
18C	25	28 $\frac{1}{2}$	8 $\frac{1}{16}$
18D	30	33 $\frac{1}{4}$	8 $\frac{1}{16}$
18E	50	46 $\frac{1}{2}$	8 $\frac{1}{16}$
18F	60	53 $\frac{1}{4}$	8 $\frac{1}{16}$

CABLE TERMINALS

(Continued)

No. 8 Type—
Cable Terminal
Open

Closed



No. 14C—Cable Terminal

Open

No. 8 Type Cable Terminal (Unprotected)

The No. 8 type is an unprotected terminal for terminating lead covered cables and connecting to short subscribers' lines.

The hood is attached to the base by a chain. Both hood and base are galvanized.

Binding posts are provided for the line connections and the binding posts are spun over to prevent the loss of the locknuts. The terminal strips and fanning strips are of specially treated wood. The base and bracket are cast in one piece and a groove at the back permits the mounting of the terminal on either a flat surface or a pole. Four widely spaced holes in the supporting bracket provide a means for securely fastening the terminals in place.

A six foot cable stub of No. 22 B. & S. gauge cable will be furnished properly connected and potheaded within the terminal, unless otherwise ordered.

Code No.	Capacity Pairs	Overall Height (Less Cable Stub)	Diameter of Hood Ins.
8A	10	15 $\frac{1}{2}$	6 $\frac{1}{4}$
8B	16	15 $\frac{1}{2}$	6 $\frac{1}{4}$
8C	26	19 $\frac{1}{2}$	6 $\frac{1}{4}$
8D	31	19 $\frac{1}{2}$	6 $\frac{1}{4}$
8E	51	28 $\frac{1}{2}$	6 $\frac{1}{4}$

No. 14 Type Cable Terminal (Unprotected)

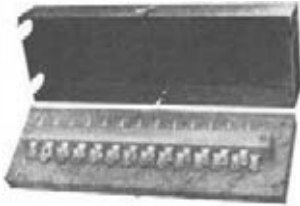
This terminal consists of a cast iron box with hinged cover, containing a porcelain terminal block with binding posts for the line connections. It is neat and attractive in appearance and its small size and rectangular shape make it especially suitable for use in residential districts for the distribution of subscribers' drops. It mounts upon either pole or wall by means of four screws, two holes being provided in a lug at the top of the box and two at the bottom.

The cover is arranged for charting the pairs on its inner surface. The cable can be brought in at either the top or bottom as desired. A six foot No. 22 B. & S. cable stub will be attached through the bottom unless otherwise ordered and the cable terminating chamber filled with waterproof pothead compound.

Code No.	Capacity Pairs	Length Including Nipples	Width of Cover Ins.
14B	11	10 $\frac{1}{2}$	7 $\frac{1}{2}$
14C	16	12 $\frac{1}{2}$	7 $\frac{1}{2}$
14D	26	17 $\frac{1}{2}$	7 $\frac{1}{2}$

CABLE TERMINALS, CHAIRS AND CIRCUIT BREAKERS

(CABLE TERMINALS CONTINUED)



No. 12A. Cable Terminal



No. 19B. Cable Terminal

NO. 12 AND 19 TYPE CABLE TERMINALS (UNPROTECTED)

The No. 12 type cable terminal is for interior distribution, and consists of a wooden base and a black finished metal cover. They are equipped with terminals having soldering connections at one end and screw connections at the other. Cable forms may be brought in from either end.

Code No.	Capacity Pairs	Length	Dimensions, Ins.	
			Width	Depth
12A	13	11 $\frac{1}{4}$	4 $\frac{1}{4}$	1 $\frac{1}{4}$
12B	23	11 $\frac{1}{4}$	4 $\frac{1}{4}$	2 $\frac{1}{4}$
12C	33	11 $\frac{1}{4}$	4 $\frac{1}{4}$	3 $\frac{1}{4}$

The No. 19 type terminal can be used with as many as four cables and is admirably suited to interior distribution work or for interphone service. Fanning strips are provided in these terminals so that the wires may be connected from an unformed cable and brackets are provided for holding the cables or wires in place.

The terminal is small and compact yet every wire is readily accessible and may be quickly and easily removed for changes. Each connector is plainly numbered and has two screw connections.

The base is substantially built of hard maple and is provided with a black finished cover.

Code No.	Capacity Pairs	Length	Dimensions, Ins.	
			Width	Depth
19A	14	8	5 $\frac{1}{8}$	2 $\frac{1}{2}$
19B	26	14	5 $\frac{1}{8}$	2 $\frac{1}{2}$

Chairs

Telephone switchboard operators' chairs are furnished in oak and also birch with mahogany finish. Seats are provided of closely woven cane or of leather over closely woven cane.

The heights given below indicate the distance of the seat from the floor when it is in the lowest position.

When ordering specify chair height, finish, and type of seat desired.



Operator's Chair

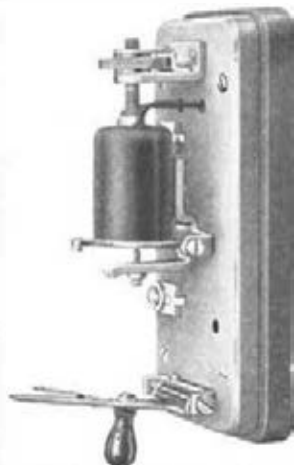
Height	Height Adjustment	Height	Height Adjustment
Ins.	Ins.	Ins.	Ins.
18	4	24	7
20	4	28	7

Code No.

2A

Circuit Breakers

A small overload circuit breaker with 2 $\frac{1}{2}$ x 5 $\frac{3}{8}$ inch slate base, to be mounted vertically. The adjusting nut varies the current value at which it will operate. It will safely carry .2 amperes but, as supplied, is adjusted to carry .3 ampere continuously under actual service conditions and to operate on .6 ampere. It acts quicker than a fuse and can be reset.

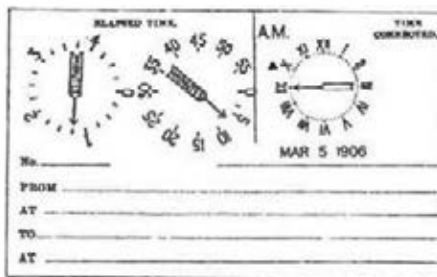


No. 2A Circuit Breaker

CALCULAGRAPHS AND TIME RECORDERS



Style B



Style C

Calculagraphs

The calculagraph is an elapsed time recorder. The machine is provided with two levers; by operating one when a connection is established, and the other when the conversation is finished, a card record is obtained similar to that shown above. Two models are made; the No. 6 calculates and prints the elapsed time in minutes and quarter minutes, and records the time of day. The No. 6X, in addition, prints the day of the month and the year.

The card reproduced here is from Model 6X and shows a case in which a connection lasting six and one-quarter minutes was made at 9.45 A.M. on March 5, 1906. The size of the card used is 3 x 5 inches.

Each model is supplied in three styles as illustrated. Calculagraph shelves or sections can be supplied for mounting these instruments at either the left or right hand ends of switchboards in cases where it is not convenient to use Style A on a pedestal, or to mount Style B or C on the key shelf.

Style A
On Pedestal

Model No.	Description
6	Style A B or C (state which is desired)
6X	Style A B or C (state which is desired)
...	Pedestal for use with Style A (adjustable height 26-40 inches).
...	Ribbon for calculagraph (furnished in blue unless otherwise ordered).



Chronoscope

Chronoscope

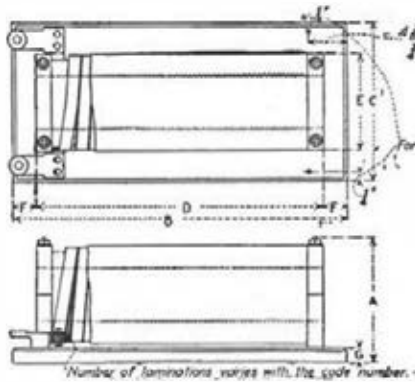
The chronoscope is a convenient and inexpensive instrument for measuring toll or other timed telephone service. It is $3\frac{1}{2}$ inches in diameter at the base and has a six-minute clock dial face. The case is of metal with an oxidized finish.

The lever at the top is used when starting and stopping the timing of the call, which may be continuous or a total of several periods. The lever at the right hand side of the device returns the hand to zero. In the model listed below, a bell is automatically rung when the hand passes the three-minute mark and again at the end of six minutes.

When so desired, an instrument giving a warning signal a few seconds before the expiration of one and three minute periods, can be supplied without additional cost.

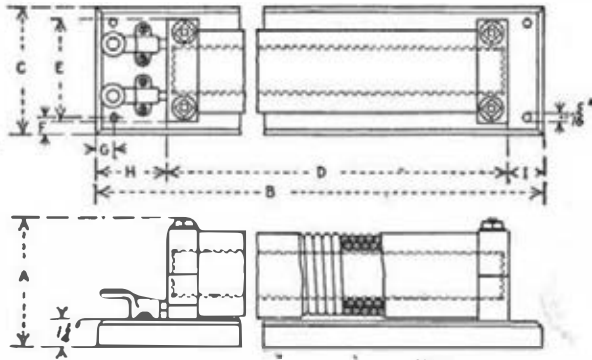
Code No.	Description
99 $\frac{1}{2}$	Signals at 3 and 6 minutes

CHOKE COILS



No. 2 Type

*Others have no mounting holes



No. 1 Type

Choke Coils

These choke coils are intended for use with battery charging machines when necessary to choke out noises (from getting to the talking circuits) while charging. They have wooden bases.

Terminals, if desired, must be ordered separately and the size of cable for which they are to be drilled specified.

No. 1 TYPE

Code No.	Approximate Dimensions in Feet and Inches				Approximate Resistance, Ohms	Capacity, Amperes	Wt., Lbs.
	A	B	C	D			
1-A	5 $\frac{7}{8}$	23 $\frac{7}{8}$	5 $\frac{3}{4}$	19 $\frac{1}{8}$	.0058	25	40
1-B	5 $\frac{7}{8}$	23 $\frac{7}{8}$	5 $\frac{3}{4}$	19 $\frac{1}{8}$	.00435	50	40
1-C	7 $\frac{7}{8}$	24	6 $\frac{3}{4}$	20 $\frac{3}{4}$	.0034	100	75

No. 2 TYPE

2A	9	26 $\frac{1}{4}$	11 $\frac{1}{2}$	22 $\frac{3}{4}$	.00235	175	175
2B	10	26 $\frac{1}{4}$	12 $\frac{3}{4}$	22 $\frac{3}{4}$	.0022	225	250
2C	15 $\frac{3}{4}$	3 ft. 7 $\frac{1}{2}$	17 $\frac{3}{4}$	3 ft. 3 $\frac{3}{4}$	.00081	600	865
2D	8 $\frac{1}{4}$	3 ft. 1	13 $\frac{1}{8}$	2 ft. 9 $\frac{1}{2}$	.00167	300	265
2E	10	3 ft. 6	14 $\frac{3}{8}$	3 ft. 2 $\frac{1}{2}$	.00135	400	380
2F	19	3 ft. 7 $\frac{1}{2}$	21 $\frac{1}{8}$	3 ft. 3 $\frac{3}{4}$	.00062	800	1550
2G	21 $\frac{1}{2}$	4 ft. 4 $\frac{1}{2}$	23	4 ft. $\frac{3}{4}$	.00048	1000	2950

No. 6 TYPE

6A	4 $\frac{3}{8}$	23 $\frac{7}{8}$	4 $\frac{1}{2}$	18	.0601	10	19
6B	4 $\frac{3}{8}$	23 $\frac{7}{8}$	4 $\frac{1}{2}$	18	.0426	15	20
6C	5 $\frac{1}{8}$	26 $\frac{3}{4}$	5 $\frac{3}{8}$	20 $\frac{3}{4}$	.0240	20	28
6D	5 $\frac{1}{8}$	30 $\frac{3}{8}$	5 $\frac{3}{4}$	24	.0192	30	45
6E	5 $\frac{1}{8}$	31 $\frac{1}{4}$	5 $\frac{3}{4}$	25 $\frac{1}{4}$	.0120	40	50
6F	7 $\frac{1}{8}$	33 $\frac{3}{8}$	6 $\frac{3}{4}$	27 $\frac{3}{4}$	.0062	70	87
6G	7 $\frac{1}{8}$	35 $\frac{3}{8}$	6 $\frac{3}{4}$	29 $\frac{3}{4}$	.0060	100	97.5

Western Electric. CODE SIGNALING SYSTEMS



10 Call
Signal Call Unit



Signal Gong
4", 6", 8", 10", 12"



Duplex Horn Signal



Signal Call Unit
Showing Unit Arrangement
for 10-20-40 or
60 Calls

Signal Call

SIGNAL CALL Service is primarily an addition to telephone service providing an efficient means of completing telephone calls by promptly locating all important members of an organization regardless of their whereabouts—calling them to the nearest branch telephone.

At the same time is provided a Code Signal System for broadcasting special messages.

To illustrate: In a certain publishing house, the broadcasting of numbers starting with two, such as two, twenty-one, twenty-two, etc., carries these definite messages to the Superintendent:

Two—Wanted on the nearest branch telephone.

Twenty-one—Come to General Manager's office.

Twenty-two—Wanted in the press room, etc., etc.

The brain of the system is shown above. Any message in code may be broadcast throughout the entire plant on the line of signal devices—by pressing a button.

The Signal Call is usually placed on the switchboard. Pressing one of the keys starts the mechanism, operating the code number corresponding on signal devices distributed so as to be heard anywhere on the premises.

The Operating Unit is a magnetic movement (no motor) with jeweled bearings and centralized make and break.

The Signal Call sending station may be furnished with sectional key units giving either 10, 20, 40 or 60 code numbers.

The Unit System of design makes possible the changing from 10 to 20 code numbers and additions of units of 20 numbers with the same ease as in adding units to a sectional bookcase.

The designated "call" sound three times and automatically stops, allowing the maximum number of "calls" in a given time. The red jeweled lamp remains lighted while a call is being sounded.

The case is of solid brass, finished in black enamel. (Special finish upon request.)

Voltages—24, 110 or 220 A.C. or D.C.

Size—10 and 20 call—7¼ inches long by 7½ inches deep by 6½ inches high; 40 call—7½ inches high; 60 call—9½ inches high.

In ordering—state number of code numbers; voltage; if A.C., number of cycles.

Signals

All bells are of the under-dome type, equipped with special hot pressed alloy steel gongs having a black rust-resisting finish.

Special bell-metal gongs with polished brass finish furnished when specified, at a small additional charge.

All coils are form wound and moisture proof.

Single stroke bells and chimes have neither springs, contact points nor moving parts other than the plunger.

Universal Outlet Box is furnished with all Signals for mounting (flush or non-flush) all bells regardless of size or type—with the exception of Waterproof types. Half inch knockouts on all four sides. Installation convenient and simple. Subsequent changes easily made. A great convenience, especially in buildings where flush mounting is desired, allowing completion of all wiring regardless of size or type of bells to be mounted later.

Freedom from adjustments or maintenance of any kind—thorough dependability.

Voltages 24, 110, 220 A.C. and D.C.

Standard finish for all bells—black enamel—special finish upon request.

In ordering state type, size, voltage, and if A.C., the number of cycles.

Complete instructions for installing furnished with each system.

COIN COLLECTORS

Electrically Operated—For Central Battery Service Only

No. 7 Type Coin Collector



No. 7J

specially ordered. This is operated when the coin box is unlocked and may be arranged to operate an alarm bell or buzzer located adjacent to the coin collector.

Code	For	Length	Width	Depth		Code	For	Length	Width	Depth
7J	Nickels	8 $\frac{1}{4}$ "	5 $\frac{5}{8}$ "	4 $\frac{1}{4}$"	||	7K	Nickels	11 $\frac{1}{4}$ "	5 $\frac{1}{4}$ "	4 $\frac{1}{4}$ "

No. 50 Type Coin Collector

These coin collectors are normally arranged for "pre-payment" service, but may be readily arranged for "post-payment" service. (See description under No. 7 type.) Coins dropped into the coin slots strike a gong or chime and then fall into an electrically controlled coin hopper. By means of keys associated with a specially arranged cord circuit, the central office operator may cause the coin hopper to deposit the coins into the coin box or return them to the calling party. If the charge is greater than the amount dropped to signal the operator, the coin is returned by the operator to the calling party with the request that he drop the proper amount. In the case of a call involving a charge amounting to the denomination of the coin dropped to signal the operator, it may be deposited in the coin box by the operator at the close of the conversation. The switchboard cord circuits must be equipped with special keys and circuits for controlling the operation of these coin collectors. A transmitter, receiver, receiver cord and a coin receptacle are necessary for a complete telephone station equipment. These items are not included with the coin collector and must be ordered separately. These coin collectors are arranged for wall mounting but may be mounted on a desk or shelf by means of the No. 139A backboard. All current-carrying parts are insulated from the case. The lock furnished on the coin box door requires the use of keys differing from those furnished on the housing. A burglar alarm switch is provided, which is operated when the coin compartment is unlocked. This may be arranged to operate a local bell or other alarm device. These coin collectors are arranged so that they may be equipped with a dial for machine switching service. When used for manual service the opening for the dial is covered by a No. 50C apparatus blank, which serves as an instruction card holder as well.



No. 50G Equipped With
50C Apparatus Blank

Code No.	Arranged For	Dimensions Ins.
50G (Equipped with 50C apparatus blank)	Nickels, Dimes and Quarters	18 $\frac{1}{4}$ x 7 x 6

METHOD OF ORDERING No. 50G COIN COLLECTOR

For Manual Service

No. 50G coin collector equipped with
No. (*) coin receptacle
No. 50C apparatus blank
No. 323BW Transmitter
No. 143AW Receiver
No. 521 Receiver Cord

For Machine Switching Service

No. 50G coin collector equipped with
**No. 2 type dial (see dial listings elsewhere)
No. (*) coin receptacle
No. 595B dial cord
No. 323BW Transmitter
No. 143AW Receiver
No. 521 Receiver Cord

*Specify No. 2A coin receptacle (non-locking) or No. 6001A coin receptacle (comprising complete set of parts for self-locking).

**No. 2 type dials and No. 595B cords must be ordered separately and assembled to coin collector after delivery.

COIN COLLECTORS

No. 7 Mounted on a
Central Battery TelephoneNo. 11 Mounted on a
No. 1317 Wall TelephoneNo. 14 Mounted with a
No. 1020 Desk Stand

Gray Telephone Pay Stations and Mounting Devices

Non-Electrical—For Local or Central Battery Service

The operation of these pay stations is accomplished without the aid of moving parts or electrical connections, the signals being produced by the coins striking gongs or chimes, the sound of which is transmitted to the central office operator through the transmitter of the telephone at which the pay station is located. In view of the simplicity and reliability of these pay stations, their maintenance cost is extremely low.

(These pay stations cannot be used for "pre-payment" service, as the coin is not under the control of the central office operator, as in the Western Electric No. 7 and No. 50 type Coin collectors.)

Gray Code No.	Type of Telephone Used on	Coins Arranged for	Approx. Size Ins.
7	Wall Telephone	Nickels, Dimes and Quarters	9 x 4½ x 3

This will be drilled to take standard types of transmitter arms, as specified in the order.

8A	Wall Telephone	Nickels	7 x 3¾ x 3½
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This pay station will not be provided with a mounting bracket unless specifically so ordered. See next item.

Bracket for No. 8A Pay Station

In ordering this bracket, specify the make and code number of the telephone on which the pay station is to be used in order that the proper form of bracket may be furnished.

11	Wall Telephone	Nickels, Dimes and Quarters	9 x 4½ x 3
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A mounting plate is included with this pay station for mounting it at the side of a telephone, as shown in the cut.

13A	Desk Telephone	Nickels	9½ x 3½ x 3¼
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This is equipped with two clamps of such size as to fit the stem of a standard desk telephone. In ordering, specify the type and make of desk telephone with which it is intended for use.

14	Desk Telephone	Nickels, Dimes and Quarters	11 x 4½ x 3½
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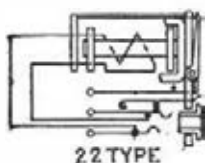
Fittings will be furnished with this pay station to permit of attachment to standard types of desk telephones. In ordering, specify the type and make of desk telephone with which it is intended for use.

20	Desk Telephone	Nickels, Dimes and Quarters	10¾ x 4¼ x 3¼
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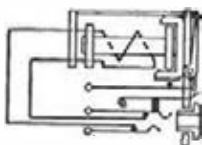
This pay station will be equipped with fittings to permit of its being attached to a standard type of desk telephone. Fittings are arranged so that the unit thus formed may be fastened to a counter or telephone booth shelf. In ordering, specify the type and make of desk telephone with which it is intended for use.

The above code numbers cover pay station boxes only and do not include telephone instruments.

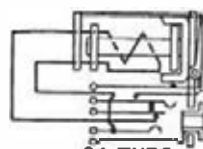
COMBINED JACK AND SIGNALS

No. 22 Type on No. 92B Mounting
Signal OperatedNo. 22 Type on No. 92B Mounting
Signal Restored

22 TYPE



23 TYPE



24 TYPE

Shutter Type

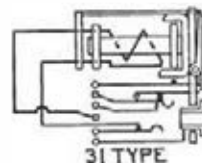
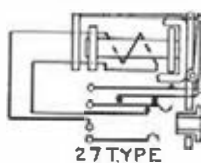
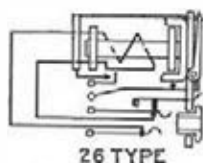
The shutter type combined jack and signals are used as mag eto line signals in switchboards where it is desirable to have the jack closely associated with its signal. This arrangement increases the ease and rapidity of operating. The signal is electrically operated and automatically restored by mechanical means when the plug is inserted into the jack by the operator.

These signals are simple and strong in construction, and are carefully made. The code number of the mounting desired should be given in the order (see Signal Mountings). The signals will be furnished unnumbered unless otherwise specified. Metal number plates (P-113032) may be ordered numbered from 0 to 499; they will be supplied mounted when so desired.

Code No.	Approximate Resistance (Ohms)	Used with Plug No.	Description	Ordinarily Used with Mountings No.
22C	330	47	{ Equipped with night bell contact, which is closed when shutter is in operated position. Has single cut-off jack and is intended for use with Non-Multiple Magneto Switchboards. When plug is inserted, one end of coil winding is disconnected from the line..... }	89B or 92B
23C	330	47	{ Same as the No. 22 type, except has double cut-off jacks. Intended for use with Non-Multiple Magneto Switchboards. When plug is inserted, both ends of coil winding are disconnected from the line..... }	89B or 92B
24C	330	110	{ Has night bell contact, same as the No. 22 type. Jack arranged with local contact for cutting off signal and is intended for use with Multiple Magneto Switchboards. When plug is inserted, one end of coil winding is disconnected from the line..... }	89C 92C or 101C

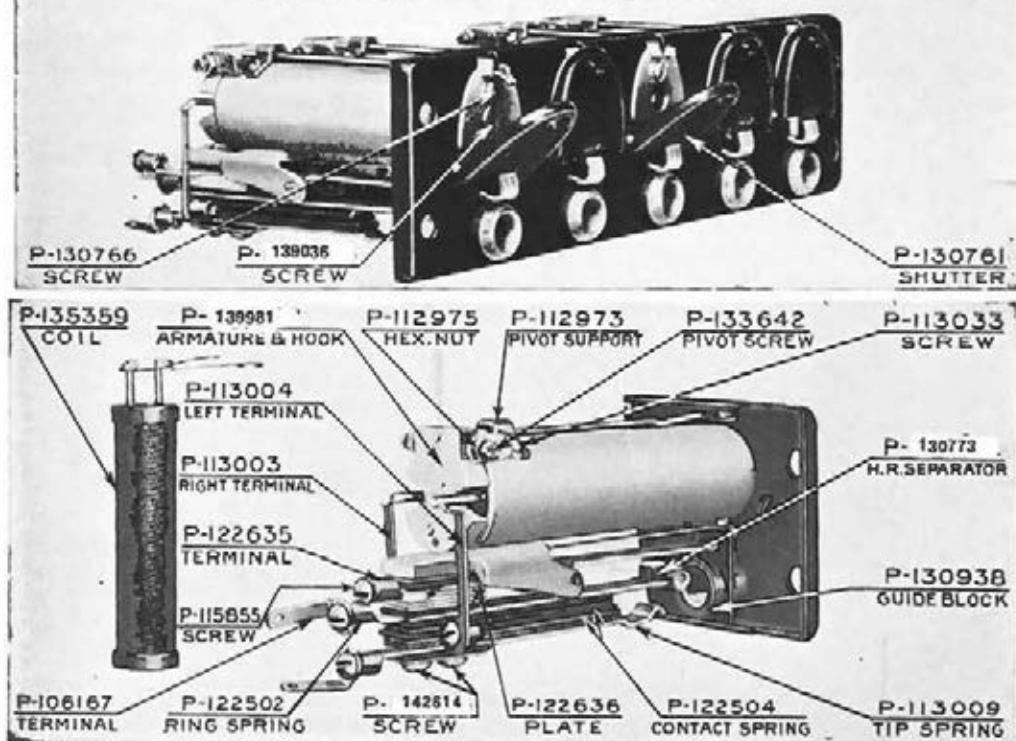
COMBINED JACKS AND SIGNALS

(Continued)



Code No.	Approximate Resistance (Ohms)	Used with Plug No.	Description	Ordinarily Used with Mountings No.
26C	330	47	Same as No. 22 type, except that it has on its armature a relay contact, which is made only during the time ringing current flows through the coil. This permits of code signals being received by a bell or buzzer wired in series with the contact. Has a single cut-off jack. Intended for use with Non-Multiple Magneto Switchboards. When plug is inserted, one end of coil winding is disconnected from the line.	89B or 92B
27C	330	47	Intended for use with Non-Multiple Magneto party lines, where Selective Central Office Signalling is desired. One side or signal winding is brought out to separate terminal for connecting to ground. Has a single cut-off jack. When plug is inserted one end of coil winding is disconnected from the line.	89B or 92B
31C	330	110	Equipped with night bell contact. Has double cut-off jacks. Intended for use with Multiple, Non-Multiple Magneto or Convertible Switchboards. When plug is inserted, both ends of coil winding are disconnected from the line. Sleeve is brought out to terminal in rear.	89C or 92C or 101C

No. 22-C COMBINED JACKS & SIGNALS



CONDENSERS

Western Electric telephone condensers are of the tinfoil and paper type. The paper dielectric used in separating the tinfoil plates is prepared under rigid specifications from specially selected stock and its high and uniform quality contributes materially to the excellence of the product obtained. The following features of these condensers should be noted:

1 **High and Constant Insulation Resistance.** Not only are the tinfoil and paper units treated with a high grade paraffin wax, but the case in which the units are assembled is entirely filled with water proofing compound and sealed, thus effectively preventing the entrance of moisture.

2 **High Dielectric Strength.** Each individual condenser is tested to the voltage given in the table below.

3 **Standard in Size and Shape.** As all these condensers are rectangular in shape, they may be readily mounted occupying a minimum amount of space.

4. **Durable Terminals.** The terminal lugs are mounted on insulating bases, which, when assembled in the condenser a completely covered with moisture-proofing compound. The tinfoil plates are connected to the terminals by annealed flat leads which are also immersed in compound. Bending and heating of the terminals, such as may occur in installing and wiring, will not lose the connection at the plate.

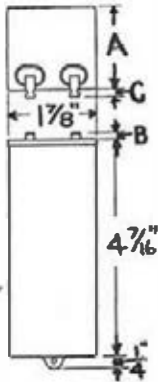


Fig. 1
Bent Terminals



No. 21D



No. 21J

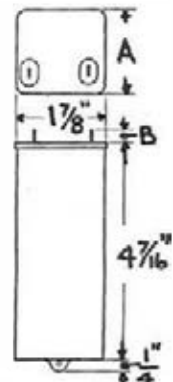


Fig. 2
Straight Terminals

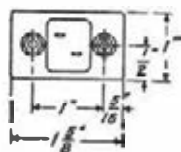
Condensers—Unmounted

Code No.	Capacity Microfarads	Fig. No.	Dimensions (Inches)			Voltage Tested On	Use
			A	B	C		
21D	2.0	1	1 1/4	1/8	1/4	500 D.C.	Telephone Sets
21E	2.0	2	1 1/8	1/8	1/4	500 D.C.	General
21F	1.0	1	1	1/8	1/4	500 D.C.	Telephone Set
21H	0.1	1	1	1/8	1/4	1200 D.C.	Interrupters
21J	0.3 & 0.3	2	1	1/8	1/4	500 A.C.	Railway Sets
21K	1.0	2	1 1/4	1/8	1/4	500 D.C.	General
21L	2.0	2	1 1/4	1/8	1/4	500 D.C.	Coil Racks
21N	1.0 & 0.5	2	1 1/4	1/8	1/4	500 D.C.	Coil Racks
21R	0.1	2	1 1/4	1/8	1/4	500 D.C.	General
21S	.125, .25 & .5	2	1	1/8	1/4	500 D.C.	Railway Sets
21U	0.05	2	1	1/8	1/4	1200 A.C.	Railway Sets
21W	0.8	1	1	1/8	1/4	350 D.C.	Magneto Receiving
21Y	0.25	1	1	1/8	1/4	1200 A.C.	Telegraph
21AA	1.0	1	1 1/4	1/8	1/4	1000 A.C.	Railway Sets
21AB	.125, .25 & .5	2	1	1/8	1/4	1000 A.C.	Telegraph
21AC	0.5	2	1 1/4	1/8	1/4	500 D.C.	General
21AD	1.0 & 1.0	2	1 1/4	1/8	1/4	500 D.C.	Railway Sets
21AH	{ Max. .031 Min. .019 }	2	1 1/4	1/8	1/4	500 D.C.	4 Terminals
21AK	0.5	1	1	1/8	1/4	1000 A.C.	Telegraph
21AM	{ Max. 1.18 Min. 1.06 }	1	1 1/4	1/8	1/4	500 D.C.	General
21BA	0.01	1	1 1/4	1/8	1/4	1000 A.C.	General
21BE	{ Max. 2.24 Min. 2.16 }	2	1 5/8	1/8	1/4	500 D.C.	General
21BJ	{ Max. 2.512 Min. 2.488 }	2	1 1/4	1/8	1/4	500 D.C.	Gener l
21BW	1.0	2	1 1/4	1/8	1/4	500 D.C.	General

Condenser Straps

- P-43065 A straight galvanized iron strap, overall dimensions 4 1/4 x 1/2 inches.
P-43121 A galvanized iron clamp, overall dimensions 5 1/4 x 1/4 inches.
P-48022 A straight galvanized iron strap for mounting two condensers, 9 1/2 x 1/2 inches.

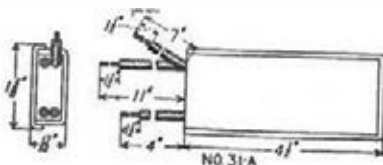
CONDENSERS



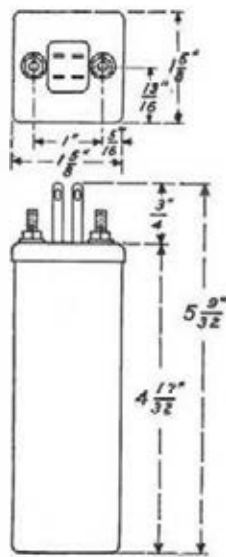
No. 89A



No. 33A



No. 31A



No. 90A

CONDENSERS—UNMOUNTED TYPE

(Continued)

Code No.	Capacity Micro-farads	Tested On Voltage	Use	Code No.	Capacity Micro-farads	Tested On Voltage	Use
23A	1	1000 A.C.	Railway (see 27B)	31A	0.05	500 D.C.	General (see cut)

CONDENSERS—MOUNTED TYPE

The following condensers are composed of standard units mounted upon wooden bases as illustrated. The No. 33 type mounts on a coil rack. These condensers are tested to 500 volts, direct current.

Code No.	Condensers Used	Capacity, Each	Overall Dimensions (inches)	Code No.	Condensers Used	Capacity, Each	Overall Dimensions, inches
27B	1 No. 23A	1	10 3/4 x 7 1/4 x 2 1/8	33F	1 No. 21AC	0.5	10 3/4 x 1 7/8 x 1 7/8
33A	2 No. 21L	2 (ea.)	10 3/4 x 1 7/8 x 2 3/8	33G	2 No. 21AD	{ 1.0 } (ea.)	10 3/4 x 1 7/8 x 2 3/8
33-B	1 No. 21L	2	10 3/4 x 1 7/8 x 2 3/8	33H	4 No. 21L	2 (ea.)	10 3/4 x 1 7/8 x 4 1/8
33-C	2 No. 21BW	1 (ea.)	10 3/4 x 1 7/8 x 1 1/8	33L	2 No. 21AC	0.5 (ea.)	10 3/4 x 1 7/8 x 1 1/8
33-D	1 No. 21BW	1	10 3/4 x 1 7/8 x 1 1/8				
33-E	2 No. 21N	0.5 & 1.0 (ea.)	10 3/4 x 1 7/8 x 1 1/8				

When it is necessary that condensers be held to close limits of capacity value, as when they are placed in balanced pairs or groups in certain telephone circuits, the No. 33Q type condensers are used.

The overall dimensions of the mounted condensers listed below are the same as those given for the No. 33E condenser. Each condenser is wired to two separate terminals on one end of the base.

Code No.	Condensers Used	Capacity—Microfarads		Code No.	Condensers Used	Capacity—Microfarads	
		Minimum	Maximum			Minimum	Maximum
33QD	2-21QD	2.10	2.14	33QG	2-21QG	2.16	2.20
33QE	2-21QE	2.12	2.16	33QH	2-21QH	2.18	2.22
33QF	2-21QF	2.14	2.18				

CONDENSERS—MOUNTING PLATE TYPE

The following condensers are for use on relay type mounting plates, as listed under "Mounting Plates." These condensers are tested to 500 volts direct current.

The No. 89 type condensers are arranged to mount on 1 1/4 in. horizontal and 1 3/4 in. vertical centers. The No. 90 type condensers are arranged to mount on 1 3/4 in. horizontal and vertical centers.

Two nuts and washers are furnished with each condenser for mounting.

Code No.	Capacity M. F.		Dimensions "B" (See Cut)	Code No.	Capacity M. F.		Dimensions "B" (See Cut)
	Max.	Min.			Max.	Min.	
89A	.031	.019	2 1/4	89J	*	.30	4 1/4
89C	.06	.04	2 1/4	90A	*	1.00 & 1.00	....
89E	*	.25	2 1/4	90B	*	2.00	....
89F	*	.50	4 1/4	90C	2.18	2.14	....
89H	*	1.00	4 1/4				

*Where only the minimum capacity is shown the maximum variation is plus 35%.

CONNECTING BLOCKS



No. 1A—Connecting Block



No. 8A—Connecting Block



No. 10A—Connecting Block

No. 3
Test ConnectorNo. 11A—
Connecting Block

No. 6D—Connecting Block

Connecting Blocks

Code No.	No. of Connectors	Type of Connector	Size of Base, Ins.			Material—Base
			Length	Width	Thickness	
1A	3	Binding posts having lock nuts, with posts spun over to prevent loss of lock nuts	2 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	Composition
6B	22		8 $\frac{3}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{2}$	Composition
6C	32		12 $\frac{3}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{2}$	Composition
6D	42		16 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{2}$	Composition
6E	52		19 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{2}$	Composition
6F	26		10 $\frac{3}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{2}$	Composition
6G	12		4 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{2}$	Composition
8A	6	One screw and cord tip terminal on each connector.....	5	1	$\frac{3}{8}$	Ebonized wood
8G	8	Bridge Type connectors same as used in No. 19 Cable Terminal.....	5 $\frac{3}{8}$	1 $\frac{3}{8}$	$\frac{3}{8}$	{ Wood-Maple Black Finish
8H			8 $\frac{3}{8}$	1 $\frac{3}{8}$	$\frac{5}{8}$	
10A	14	Each connector has one lock nut binding post and one soldering terminal, brought out on the side.....	4 $\frac{1}{2}$	1 $\frac{1}{8}$	1 $\frac{1}{2}$	Composition
10B	22		6 $\frac{3}{4}$	1 $\frac{1}{8}$	1 $\frac{1}{2}$	Composition
10C	32		9 $\frac{1}{4}$	1 $\frac{1}{8}$	1 $\frac{1}{2}$	Composition
10D	42		12 $\frac{3}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{2}$	Composition
10E	52		15 $\frac{1}{4}$	1 $\frac{1}{8}$	1 $\frac{1}{2}$	Composition
11A	2	Two screw terminals on each connector.....	1 $\frac{1}{8}$	1 $\frac{1}{8}$	$\frac{1}{8}$	Composition
11B	2		1 $\frac{1}{8}$	1 $\frac{1}{8}$	$\frac{1}{8}$	Composition

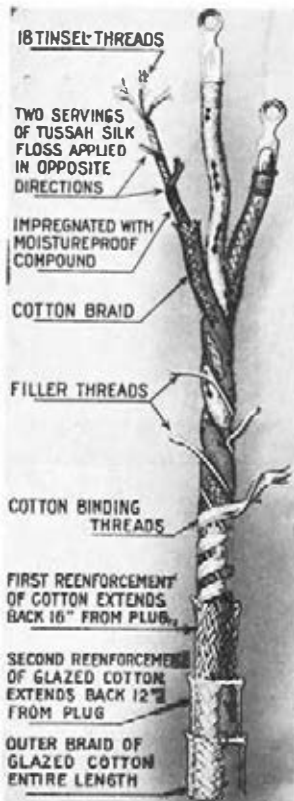
(The No. 11B is the same as No. 11A, except that it is equipped with a black finished metal cover.)

12A	3	Two screw terminals on each connector.....	1 $\frac{1}{4}$	1 $\frac{1}{4}$	$\frac{1}{4}$	Composition
12B	3		1 $\frac{1}{4}$	1 $\frac{1}{4}$	$\frac{1}{4}$	Composition

(The No. 12B is the same as No. 12A, except that it is equipped with a black finished metal cover.)

Connectors (Bridging Test)

Code No.	Description	Slotted to Receive
1	Brass Bolt	No. 17 or 18 B. & S. Wire
2	Brass Bolt	No. 12 B. & S. or No. 14 N. B. S. wire
3	Brass Bolt	No. 10 B. & S. or No. 12 N. B. S. wire
4	Galvanized Iron Bolt	No. 12 B. W.G. galvanized iron wire
6	Steel Brass Bolt	Copper drop wire to No. 12 B.W.G. galvanized iron wire



Steps in the Construction of a Western Electric Tinsel Switchboard Cord

CORDS

General

Western Electric telephone cords are the result of more than fifty years' experience in the manufacture of telephone apparatus. They are of the same high quality that has characterized all Western Electric telephone equipment and caused it to be recognized as standard by the leading telephone authorities throughout the world.

These cords are all of the tinsel type and will be found to have exceptional strength and wearing qualities. They stand up longer in service than any other cords.

There is a Western Electric cord to fit every make and style of telephone and switchboard.

Switchboard Cords

Construction

The description of the steps taken in the manufacture of these tinsel cords which is given below, will show the care exercised in producing superior cords which are suitable for all classes of switchboard service. These steps are as follows:

1. Six tinsel threads, each consisting of a metal ribbon wound around a strong cotton thread, are twisted together to form a strand. The tinsel thread used is of special manufacture and made under the Western Electric Company's own rigid specifications. The characteristic most strongly emphasized is freedom from noise after long service.
2. Three of the above strands are twisted together to form a conductor. It will be noted, therefore, that each conductor contains eighteen threads. The flexibility of these strands is remarkable.
3. Each conductor is covered with two heavy servings (wrappings) of Tussah Floss Silk for the purpose of insulation.
4. These silk insulated conductors are then impregnated with an asphaltic moisture proofing compound. This compound is flexible, does not harden with age, and minimizes corrosion.
5. After this moisture proofing is applied each conductor is further insulated and protected by means of a heavy cotton braiding.
6. Two or three of these conductors are then twisted together to form the body of the cord.
7. In order that the external surface of the cord may be smooth, the spaces between the twisted conductors are filled with cotton twine.
8. The body of the cord is then given a tight serving of cotton to hold the conductors firmly in place.
9. The plug end of the cord is suitably reinforced to allow for the severe bending and handling which occurs at this point.
10. An outside braiding of glazed cotton is then applied over the entire length of the cord.

It will be noted that in the construction of these cords the individual tinsel threads are first twisted together into strands of six threads each; that three of these strands are twisted together to form a conductor; and that the conductors after being insulated are then twisted together to form the completed cord.

This is a process similar to that followed in the manufacture of manila rope. Long experience in actual service has shown that it is the most satisfactory method of cord construction yet devised, not only as regards strength and wearing qualities, but also as to electrical and operating features.

CORDS

Switchboard Cords—Continued

Advantages

Under actual service conditions the following features of this type of cord have been proven conclusively:

1. The life is longer than any other cord manufactured.
2. The moisture-proofing feature makes their use possible in damp and humid climates for long periods without the necessity of making frequent changes.

Dampness from the operator's hands has practically no effect on these cords.

3. They are easier to replug than steel conductor cords.

4. The resistance of each conductor is approximately 1 ohm (6 ft. cord) as compared with an average of 2 to 10 ohms per conductor for steel conductor cords.

5. The efficiency of the operating force is increased, due to the fact that this type of cord is much more flexible than a steel cord.

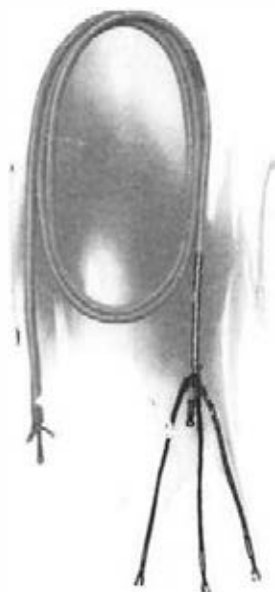
6. The current carrying capacity of each conductor is 3 amperes which is much greater than is ever necessary in telephone service.

7. The same cord can be used interchangeably for either toll or local service. It is not necessary to maintain two stocks of cords.

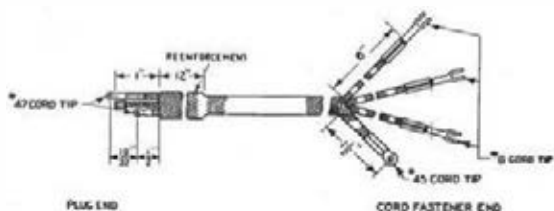
Cords having either white, red, green or black braiding can be supplied. If no color is specified, however, white cords will be furnished.

In ordering cords be sure to specify length, observing standard stock lengths as listed.

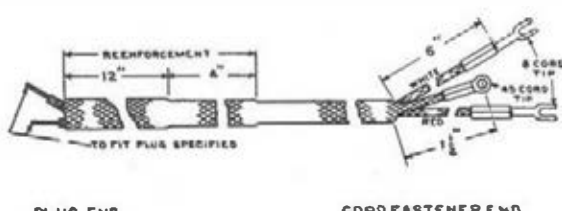
If cords are desired equipped with plugs, that fact should be mentioned in the order and the Code No. of plug desired should be specified.



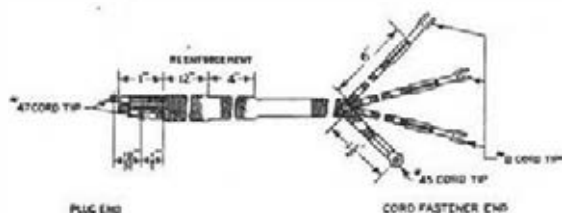
No. 447 Cord



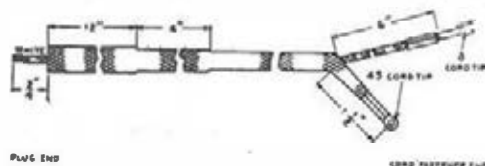
No. 447



No. 493



No. 448

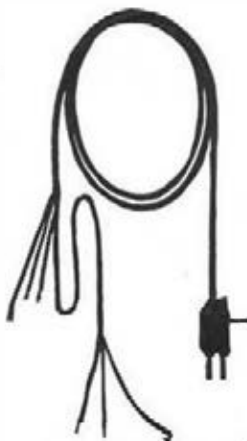
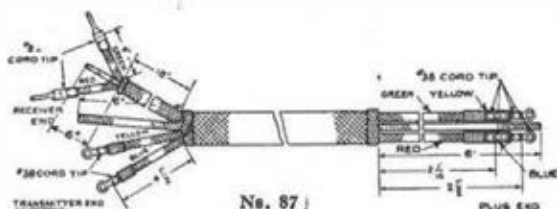


No. 511

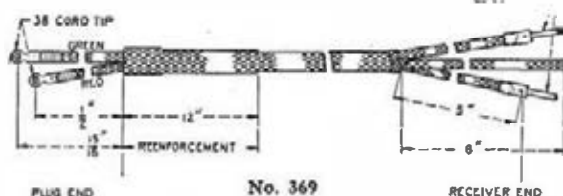
Code No.	Conductors	For W. E. Plug No.	Outer Braid	Cord Tips		Regular	As Specified
				Plug End	Fastener End		
447	3	109	White	47	8	6 Ft. 3 In.	8 Ft.
448	3	110	White	47	8	6 Ft. 3 In.	4, 5 & 8 Ft.
493	2	47	White	38	8	6 Ft. 3 In.	4 & 8 Ft.
511	1	116	White	75	8	6 Ft. 3 In.	4 Ft.
635	2	110	White	47	8	6 Ft. 3 In.	4 & 8 Ft.
723	1	110	White	47	8	6 Ft. 3 In.	*****

CORDS

Switchboard Cords—Continued

No. 87 Cord with
No. 137 Plug

No. 87



No. 369

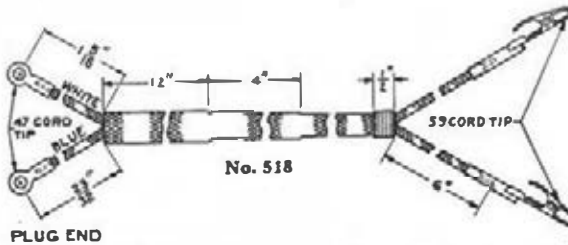
OPERATORS' TELEPHONE CORDS

These cords are designed for use in connection with switchboard operators' transmitter and receiver equipment.

Standard tinsel cords with cotton and brown silk insulation.

Code No.	Use	Conduc-tors	For W. E. Plug No.	Cord Tips		Standard Lengths
				Plug End	Set End	
11	Head receiver on magneto switchboards.....	3	...	62	29	5 Ft. 2 In.
87	Single head receiver and breast transmitter (see No. 848)....	4	137	38 & 77	29 & 38	6 Ft.
254	No. 128 receivers on No. 9 and 105 switchboards.....	2	137	38 & 77	29	4 Ft. 1 In.
330	Transmitter cord on P.B.X. switchboards.....	1	...	56	62	6 Ft.
369	No. 128 receiver on 1200 type switchboards.....	2	136	38	29	5 Ft. 7 In.
371	Double head receiver and breast transmitter.....	4	137	38	29	6 Ft.
437	Suspended or swinging type switchboard transmitter....	1	...	29	62	6 Ft.
528	Receiver cord on 20AH desk stand in exchange.....	2	...	29	62	2 Ft. 6 In.
529	Desk stand cord 20AH in exchange service.....	4	...	55	62	6 Ft.
538	Head receivers on multiple magneto switchboards.....	3	148	38	29	5 Ft. 6 In.
539	Wire Chief and Chief operator's head receiver.....	2	148	38	29	Ft. 5 6 In.
562	No. 1 service observing desk-series double head receiver...	4	137	38	29	6 Ft.
748	Head set and transmitter cord on 550-C and 600 P.B.X. switchboards.....	4	137	38	29	6 Ft.
749	Receiver cord on 550-C P. B. X. suspended transmitter.....	2	137	38	29	4 Ft. 1 In.
848	Head receiver and breast transmitter.....	4	137	38 & 80	77 & 38	6 Ft.

CORDS Switchboard Cords Continued



PLUG END

In ordering, specify length, observing standard stock lengths as listed.

Miscellaneous Central Office Cords

Code No.	Use	Con-ductors	For W. E. Plug	Outer Braid	Cord Tips		Standard Lengths Ft.
					Plug End	Set End	
513	Patching.....	1	1 No. 116	White	75	62	2
510	Patching.....	1	2 No. 116	White	2 No. 75		2
515	Patching.....	2	110	Green	4 No. 47		3
516	Patching.....	2	47	Red	4 No. 38		3
517	Service (Observing) ...	3	110 & 143	Green	{ 4 No. 47 } { 1 No. 59 }		10
518	Service	2	110	Green	47 & 59		10
519	No. 2 Test Boards.....	1	116	White	75 & 68		3
524	Service.....	1	144	Green	59		20
557	Main Frame Test.....	2	.....	Green	62 & 50		19½
570	Main Frame Test.....	2	47	Green	38 & 50		9½
579	Main Frame Test.....	2	152	Green	38, 77 & 8		9½
637	Patching.....	1	47	White	2 No. 38		2
638	Patching.....	2	43	White	.....		3
694	No. 4 Test Boards.....	3	141	Green	50		10
708	Service Observing.....	4	137	Green	38		19½
716	Main Frame Test.....	4	206 & 225	Green	47 & 62		19½
726	Patching.....	1	2 No. 110	Green	2 No. 47		2
728	Switchboard.....	3	2 No. 110	White	4 No. 47		6
733	Main Frame Test.....	4	152 & 206 & 225	Green	47, 77 & 38		9½
855	Patching.....	2	2 No. 141	White	.....		3
761	Patching.....	3	2 No. 141	Red	.....		3
857	Patching.....	2	47 & 141	White	38		3

CORDS

Telephone Set Cords

STANDARD TINSEL CORDS

These cords are standard for all regular telephones, and include desk stand cords, receiver cords, and transmitter cords for all types of equipment.

The conductors are composed of a high grade of tinsel, each conductor consisting of 18 threads, 3 strands of 6 threads each being twisted together to form one conductor.

There are two general types of this cord, which differ only in the kind of insulating and braiding material used. They are commonly known as silk cords and worsted cords, as listed on the following pages.

The silk cord has the individual conductors insulated with a braiding of cotton and over this a braiding of silk, after which the required number of conductors are covered with a final braiding of brown silk.

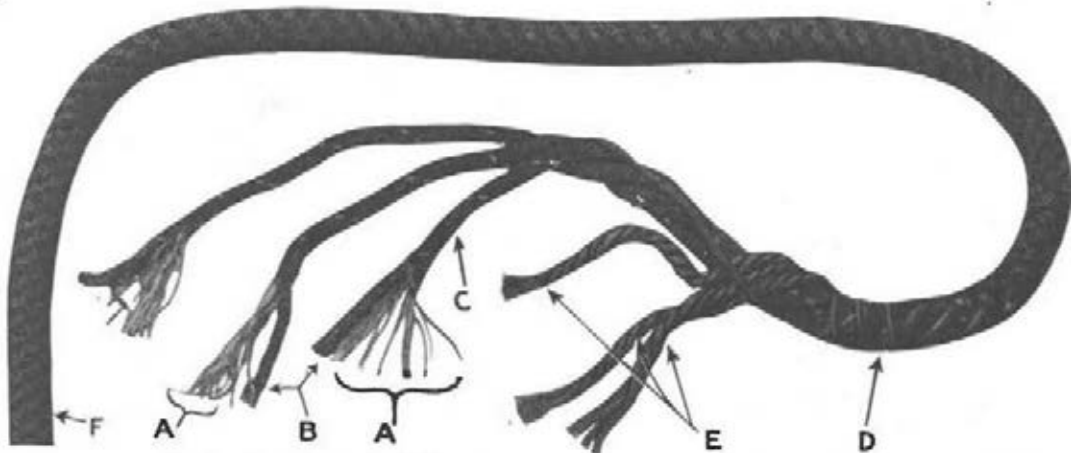
The worsted cord has its individual conductors insulated with a serving of cotton, a braiding of cotton and a braiding of worsted. The required number of conductors are then covered with a final braiding of brown worsted.

Colored tracer threads are woven into the braiding of the individual conductors, so that each conductor may be easily identified.

MOISTURE-PROOFED CORDS

This line of cords was originally designed for railway telephone service where cords are subjected to more severe service conditions than are usually met with in ordinary telephone service. The line, however, has been improved and enlarged until we are now prepared to furnish moisture-proofed cords for practically all classes of telephone service. These cords may be distinguished by their black and maroon braiding.

As in the case of all Western Electric products, these cords were subjected to the most thorough tests in our laboratory and also given long and severe tests under actual service conditions before they were offered for sale.



Construction of a Typical Three Conductor Moisture-proofed Telephone Cord

(a) Each tinsel thread consists of a metallic ribbon wound around a strong cotton thread. Each conductor is made up of 18 strands of tinsel, 3 strands of six strands each, being twisted together to form one conductor.

(b) The 18 strand conductor is wrapped with a worsted serving and then treated with an asphaltic moisture-proofing compound that remains flexible throughout the life of the cord.

(c) The moisture-proofed conductor is next covered with a braiding of mercerized cotton, tracer threads being woven into this braid to permit of the conductors being readily identified.

(d) The completed conductors are next twisted together so as to form a rope.

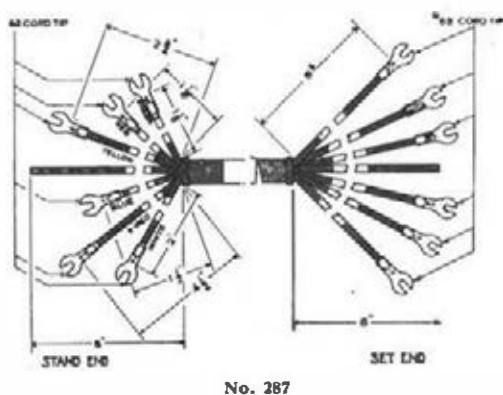
(e) The spaces between the conductors are filled with twine to make the cord round.

(f) The cord is bound with a cotton binding over which a final braiding of very high grade black and maroon mercerized cotton is applied.

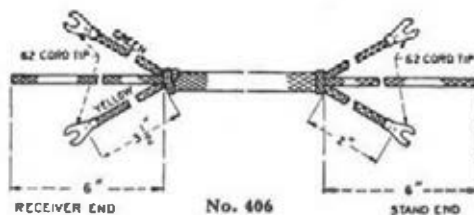
WATER-PROOFED CORDS

These cords have the individual tinsel conductors with a double serving of cotton to keep the rubber away from the tinsel conductors. These conductors are covered with a high grade of rubber and afterward the braiding is applied. They are designed for use in connection with mine telephones, portable telephones, or other equipment used out-of-doors, underground, or wherever considerable moisture, dampness, or gaseous fumes are present. These cords have a black cotton braiding.

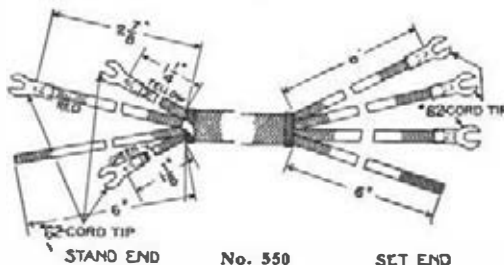
CORDS

Telephone Set Cords
(Continued)

No. 287



No. 406



No. 550

Note: The length of receiver, desk stand and telephone arm cord is measured between the points where the conductors emerge from the external braiding.

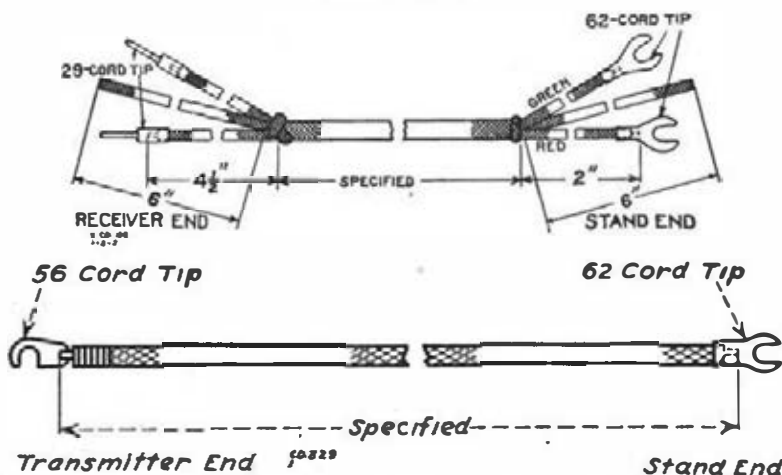
Desk Stand and Telephone Arm Connecting Cords

Code No.	Type Cord	Used With		Conduc-tors	Cord Tips		Tracer Colors	Standard Length ft.
		Desk Stand	Telephone Arm		Trans. End	Set End		
287	Tinsel Silk	{ 20AN CH & CN }	{ 48BA & 48BC }	6	62	62	.....	5½
355	Tinsel Silk	20CN	48	5	62	62	.....	5½
406	Tinsel Cotton	{ 20AG 20AH 20AM }	48	2	62	62	Gr., Yl.	5½
409	Moistureproofed	{ 20AB 20DSP }	48D	3	62	62	Rd., Gr., Yl.	6
416	Moistureproofed	20BR	{ 20E 48G }	4	62	62	{ Rd., Gr. Bl., Yl. }	6
461	Moistureproofed	20	.....	3	62	29	Rd., Gr., Yl.	5½
534	Tinsel Cotton	20BE, BG, BJ	.....	4	62	62	Rd., Gr., Bl., Yl.	5½
541	Waterproofed	20	48	3	62	62	Rd., Gr., Yl.	5½
543	Waterproofed	20	48	4	62	62	Rd., Gr., Bl., Yl.	5½
550	Tinsel Silk	{ 20AL CM, AP, SC, P }	{ 48A, B, C & 20C, AC }	3	62	62	Rd., Gr., Yl.	5½
551	Tinsel Silk	{ 20BS, BU & 20CF }	48	4	62	62	Rd., Gr., Yl., Bl.	5½
563	Tinsel Cotton	20AT	.....	11	62	62	.....	5½
718	Moistureproofed	20BU	48	5	62	62	.....	5½
777	Tinsel Silk	20BG	.....	3	62	62	Rd., Gr., Yl.	5½
564	Tinsel Cotton	20AS	.....	7	62	62	.....	5½

CORDS

Telephone Set Cords

(Continued)



Note. The length of receiver cords is measured between the points where the conductors emerge from the external braiding.

DESK STAND AND TELEPHONE ARM RECEIVER CORDS

Double Conductor Cords

Code No.	Type Cord	Used With		Cord Tips		Colors Tracer	Standard Length
		Desk Stand	Telephone Arm	Trans. End	Set End		
196	Tinsel Silk.....	20AN	48	29	62	Green	2 1/2 ft.
376	Tinsel Silk.....	20CN	48D	29	62	Red	2 1/2 ft.
408	Moistureproofed..	20BE & BF	..	29	62	Red & Green	2 1/2 ft.
412	Tinsel Silk.....	20DSP	&20C	29	85	White	2 1/2 ft.
535	Tinsel.....	20CN	..	62	62	Green	2 1/2 ft.
542	Cotton	20U	..	62	62	Green	2 1/2 ft.
549	Waterproofed	20AH	48	29	62	Red	2 1/2 ft.
549B	Tinsel.....	20AS	..	29	62	..	2 1/2 ft.
554	Tinsel Silk.....	20AT	48	30	62	White	2 1/2 ft.
571	Silk.....	20	48	29	62	Green	2 1/2 ft.
582	Moistureproofed	20	..	29	85	White	2 1/2 ft.
582	Moistureproofed	50	..	29	85	Green	2 1/2 ft.
582	Moistureproofed	20AB	20E	69	62	White	2 1/2 ft.
582	Moistureproofed	(Using 186 & 189 Rec.)	48D & G	69	62	Green	2 1/2 ft.
582	Moistureproofed	&20BR	..	69	62	White	5 1/2 ft.
582	Moistureproofed	20	..	69	62	Green	5 1/2 ft.
582	Moistureproofed	(Using 190W Rec.)	..	69	62	..	5 1/2 ft.

DESK STAND AND TELEPHONE ARM TRANSMITTER CORDS

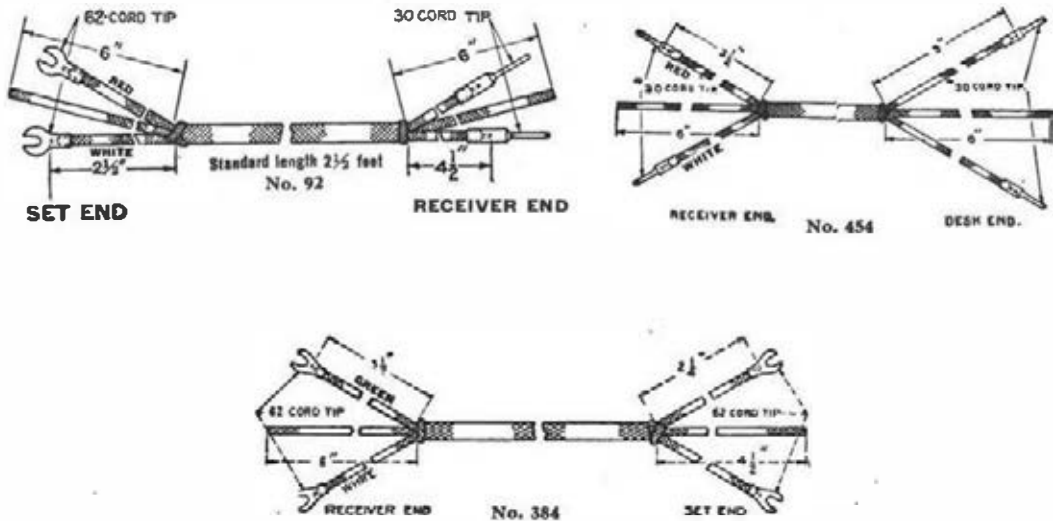
(Single Conductor Cords)

243	Tinsel Silk.....	1420BG	..	62	62	..	8 in.
329	Tinsel Silk.....	20P	..	56	62	..	9 1/8 in.
330	Tinsel Silk	20AM	20C & 48G	56	62	Yellow	6 ft.
423	Tinsel Wool.....	20	48	61	62	..	9 1/2 in.
426	Tinsel Cotton....	20A & BR	20E & 48D	56	62	Yellow	9 1/8 in.
427	Tinsel Cotton....	DSP	..	..	..	..	..
463	Tinsel Cotton....	20A & B	20E & 48D	56	62	Double Yellow	9 1/8 in.
494	Moistureproofed	DSP	..	..	..	..	..
547	Tinsel Cotton....	20	..	56	62	..	9 1/8 in.
547B	Moistureproofed	20	..	56	62	..	9 1/8 in.
548	Tinsel Cotton....	1020AS & AT	..	56	62	..	9 1/2 in.
582	Tinsel Cotton....	20	20CC	56	62	Double Orange	9 1/8 in.
582	Tinsel Cotton....	50	20CC	56	85	Double Orange	6-8-12 in.
582	Tinsel Cotton....	20	20CC	55	62	Double Orange	9 1/8 in.
582	Tinsel Cotton	..	20CC	56	62	Yellow	1 ft.

CORDS

Telephone Set Cords

(Continued)



Note. The length of receiver, desk stand and telephone arm cords is measured between the points where the conductors emerge from the external braiding as shown in the cut of No. 92 cord.

WALL TELEPHONE RECEIVER CORDS

(Double Conductor Cords)

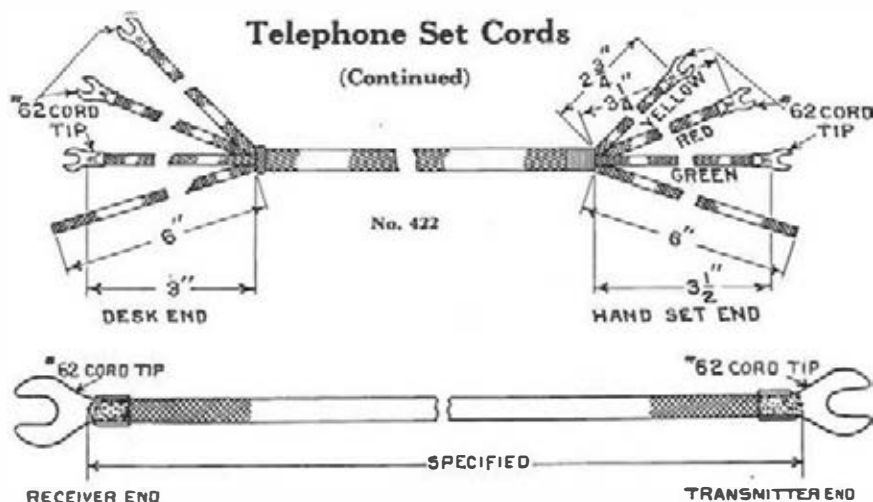
Code No.	Type	Used With	Cord Tips		Tracer Colors	Standard Length
			Rec. or Trans. End	Set End		
10	Tinsel Silk.....	Exposed Binding Posts Receivers.....	29	62	Red	2½ ft.
92	Tinsel Worsted.....	Exposed Binding Post Receivers.....	30	62	{ White Green }	2½ ft.
357	Moistureproofed....	No. 1320A Police Telephone.....	29	29	{ White Green }	1 ft. 3 in.
384	Waterproofed.....	No. 1336 Mine Telephones.....	62	62	{ White Green }	10½ in.
408	Moistureproofed....	Headband Receivers on Wall Telephones.....	29 & 76	62	{ White Green }	2½ ft.
446	Moistureproofed..	{ 1317W & AD..... 1305AC, 1293AD, AK... }	29 & 76	62	..	2 ft. 6 in.
454	Tinsel Worsted....	Exposed Binding Post Receivers.....	30	30	{ Red White }	2¼ ft.
521	Tinsel Worsted....	Concealed Binding Post Receivers.....	62	62	{ White Green }	2½ ft.

WALL TELEPHONE TRANSMITTER CORDS

(Single Conductor Cords)

385	Weatherproofed....	Mine Telephones, etc...	56	62	..	7 in.
547	Tinsel.....	Insulated Transmitters..	56	62	Double Yellow	9¾ in.
548	Tinsel.....	Insulated Transmitters..	55	62	Yellow	9¾ in.

CORDS



No 243

HAND SET CONNECTING CORDS

Code No.	Type Cord	Used With Hand Set	Conductors	Cord Tips		Tracer Colors	Standard Lengths
				Handset End	Set End		
318	Tinsel Silk.....	1002AC	3	56	62	Rd., Yel., Gr.	4 ft.
366	Waterproofed....	1001C	3	62	62	Rd., Yel., Gr.	6 ft.
384	Waterproofed....	1001K	2	62	62	Gr., Wh.	4 ft. 6 in.
398	Tinsel Cotton....	1001E	5	62	62	.....	6 ft.
422	Waterproofed....	1001H	3	62	62	Rd., Yel., Gr.	6 ft.
429	Tinsel Cotton....	1002D	4	56	62	Bl., Yl., Gr., Rd.	4 ft. 6 in.
430	Tinsel Cotton....	1002E	2	56	62	Rd., Gr.	4 ft. 6 in.
477	Tinsel Cotton....	1003D & K	2	..	..	Rd., Gr.	3 ft.
478	Tinsel Cotton....	1003F & G	2	..	..	Rd., Bk.	3 ft.
480	Tinsel Cotton....	1003J	3	..	..	Rd., Gr., Yl.	3 ft.
502	Tinsel Silk.....	1001J	4	..	..	Bl., Rd., Yl., Gr.	6 ft.
574	Waterproofed....	1001A	1	62	Special	.....	3 ft.

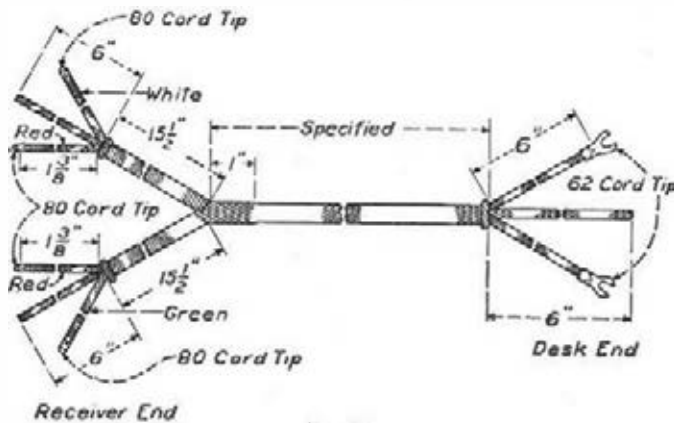
HAND SET TRANSMITTER AND RECEIVER CORDS

243	Tinsel Silk.....	1001A	1	62	62	Green	8 in.
336	Tinsel Silk.....	1002 D & E	1	56	Loop	.....	4 1/2 in. or 14 in.
483	Tinsel Cotton....	1003P	4	..	..	Bl., Rd., Yl., Gr.	3 ft.
507	Tinsel Cotton....	1003E	2	..	..	Rd., Bl.	3 ft.
775	Tinsel Silk.....	1003AB	3	56	62	Rd., Gr., Yl.	3 ft.
776	Tinsel Silk.....	1003AA	3	56	56	Yl., Bl., Gr.	3 ft.
402	Tinsel Silk.....	1002D & F	1	56	56	.....	8 1/2 in.
414	Tinsel Silk.....	1002AC	1	56	Loop	.....	4 1/4 in.
415	Tinsel Silk.....	1002AC	1	56	56	.....	9 1/2 in.
475	Tinsel Cotton....	1003	1	..	..	Red	9 1/2 in.
476	Tinsel Cotton....	1003	1	..	..	Yellow	5 in.
506	Tinsel Cotton....	1003C	3	..	..	Rd., Gr., Yl.	.....

CORDS

Telephone Set Cords

(Continued)



No. 696

HEAD SET AND LOUD SPEAKING TELEPHONE RECEIVER CORDS

Code No.	Type Cord	Used With	Conductors	Cord Tips		Tracer Colors	Standard Length
				Rec. End	Set End		
584	Waterproofed	Two No. 528 Receivers with 19 Test Set	2	80	30	Red, Gr., White	4 ft. 3 in.
696	Tinsel Silk	Two No. 528BW Receivers	2	80	62	Red, Gr., White	4 ft. 3 in.
762	Tinsel Cotton	No. 521 & No. 522 Loud Speaking Receiver	2	80	29	Red and Green	5 ft.
763	Tinsel Cotton	No. 1002 Type Head Sets	2	80	29	Red, Gr., White	3 ft. 6 in.
767	Tinsel Cotton	518W Loud Speaking Receiver	2	62	29	Red, Green	5 ft.
768	Tinsel Cotton	For No. 1002F Head Set with 47B Plug	2	80	38	Rd., Gr., White	3 ft. 6 in.
862	Tinsel Silk	540AW Receiver	2	62	29	.....	6 ft.

MISCELLANEOUS TEST SET AND TELEPHONE CORDS

267	Waterproofed	314A Sub Set with Rail Clamp	1	62	30	.....	10 ft.
509	Waterproofed	With 146 Plug on 1330 & 1331 Sets	2	62	22	.....	6 ft.
523	Waterproofed	1017 Test Sets Receiver Cord 145W Receiver	2	30	30	Red, White	2½ ft.
537	Waterproofed	Receiver Cord 19A Test Set	2	30	30	Red, White	4 ft.
540	Moistureproofed	Dry Cells	1	..	..	.....	.....
545	Tinsel Silk	No. 148 Plug and Portable Set	2	38	62	Green, Red	6 ft.
572	Waterproofed	189W Receiver Cord on 1017 Test Set	2	78	30	.....	2 ft.
584	Waterproofed	Two No. 528 and Rec. on 19 Test Set	2	80	30	Rd., Gr., White	4 ft. 3 in.
674	Waterproofed	Test Cord 152 Plug	4	50	38	.....	6 ft.
735	Moistureproofed	Restaurant and 148 Plug Portable Sets	3	62	38	Red, Gr., Yellow	5½ ft.
736	Waterproofed	No. 1017 Test Set	2	62	62 & 24	.....	6 ft.
744	Waterproofed	Testing Lines at connecting boxes	2	38 & 30	—No. 2538— Frankel	.....	2½ ft.
747	Waterproofed	528 Receiver 186 Plug on 19C Test Set	2	80	30	White, Red	4 ft.

Western Electric

CORD ACCESSORIES

Cord Fasteners



No. 9



No. 3



No. 5



No. 7A, 3 per strip

Code
No.

9 Made of brass, tinned. The screw end is spun over. Used on cord shelves with all types of switchboard cords.

Description

Cord Hooks

Code
No.

No. 3 Type

Description

3 Bright iron wire screw hook; overall length, $1\frac{5}{8}$ inches.
5 Brass; overall length $1\frac{1}{4}$ inches.
6 Brass screw hook similar to No. 5 except hook end is bent out.

No. 7 Type

The No. 7 Cord Hook is designed for placing on the rear edge of cord shelves, and consists of a flat strip of brass $\frac{1}{8}$ inch thick by $\frac{3}{4}$ inch wide, the hooks being punched out and formed at various spacings as listed in the following tables.

Hooks of this type are strong and efficient, present a neat appearance, and occupy a minimum amount of space.

The mounting holes are located $\frac{1}{8}$ inch from the top and bottom edge alternately at convenient distances apart, according to the length. When only two holes per strip are ordered the mounting holes are located one above the other. Furnished complete with mounting screws.

Code No.	Spacing of Hooks Ins.	Max. No. of Hooks per Strip
7A	$\frac{1}{4}$	14
7B	$\frac{1}{2}$	24
7C	$\frac{3}{4}$	16
7D	$\frac{1}{2}$	29
7E	$\frac{3}{8}$	19
7F	$\frac{1}{2}$	27
7G	$\frac{1}{2}$	22
7H	$1\frac{1}{8}$	10
7J	$\frac{3}{8}$	32

To Obtain Overall Length in Ins.

{	Multiply number of hooks per strip by spacing and subtract $\frac{1}{8}$ inch.
	Multiply spacing by number of hooks
	Multiply spacing by number of hooks and subtract $\frac{1}{8}$ inch.
	Multiply spacing by number of hooks

No. 7 type switch hooks are furnished with any number of hooks per strip from two up to the maximum indicated. The number of hooks per strip desired must be specified in the order.

9-A Black finished metal hook used for holding patching cords and operator's telephone sets when not in use.



No. 101 Cord Pulley



No. 106



No. 112 Cord Pulley

Cord Pulleys

All types listed may be used with either switchboard or telephone cords.

Code

No.

Description

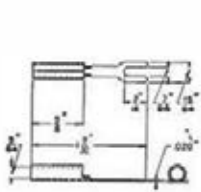
101 Brass frame with brass wheel $\frac{1}{2}$ inch wide; mounting lugs at end of frame. Overall dimensions, $2\frac{1}{8}$ x $2\frac{1}{4}$ inches. The wheel rim surface is a round groove.

106 Brass frame and wheel $\frac{1}{2}$ inch wide. The wheel rim surface is a sharp groove. The mounting lugs are at the side of the frame. Overall dimensions, mounting base, $\frac{1}{8}$ x $1\frac{1}{8}$ inches, height overall $1\frac{1}{2}$ inches.

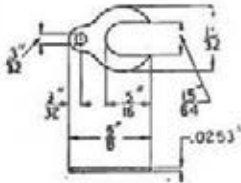
112 Steel frame and brass wheel. The rim of the wheel is a round groove. The rim surface is $\frac{1}{4}$ inch wide. The steel frame is galvanized and the mounting lugs are at the ends. Overall dimensions of the mounting surface are $2\frac{1}{4}$ x $\frac{5}{8}$ inches. The overall height is $2\frac{1}{4}$ inches.

CORD TIPS

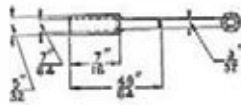
All cord tips are made of brass.



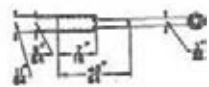
No. 8
Tinned



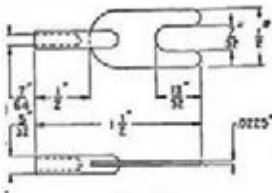
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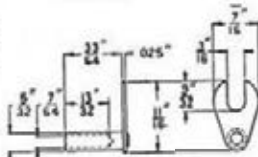
No. 29
Nickel Dipped



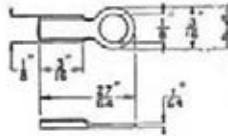
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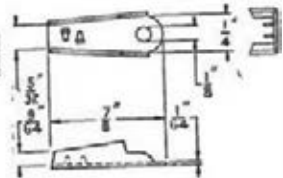
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Nickel Dipped



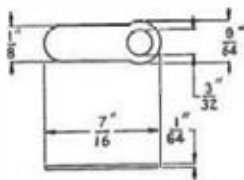
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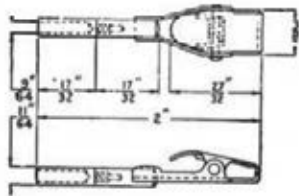
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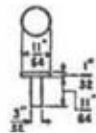
No. 45
Brass



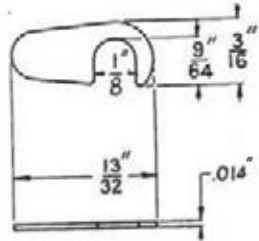
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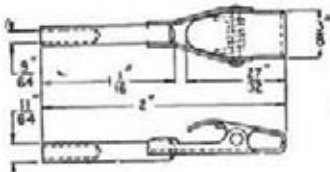
No. 50
Nickel Plated



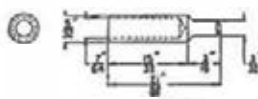
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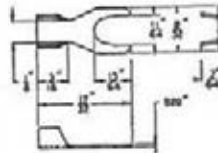
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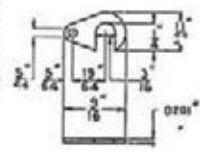
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Nickel Plated



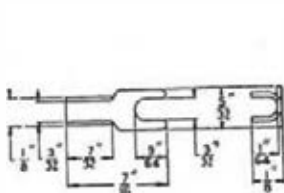
No. 61
Nickel Dipped



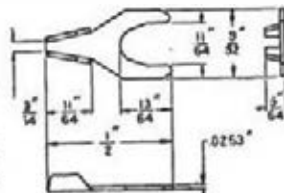
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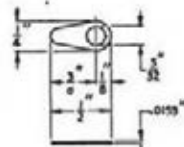
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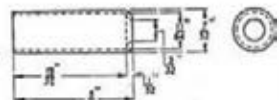
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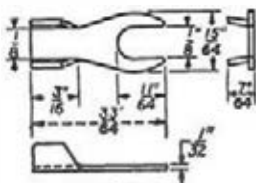
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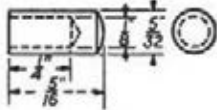
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Tinned



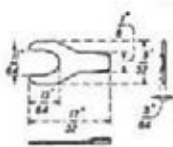
No. 76
Rubber



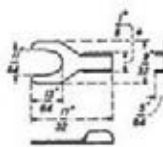
No. 79
Tinned



No. 80
Nickel Dipped



No. 85
Tinned



No. 86
Tinned



No. 87
Tinned

CORD WEIGHTS AND CUT-IN STATIONS



No. 103



No. 117



No. 118



No. 119

Cord Weights

Code No.	Description	Used
103	14 ounce, single pulley, brass weight pulley; face $11/32$ inches wide; diameter 1 inch and overall length, 4 inches.	In connection with suspended transmitters.
117	18 ounce, single pulley, brass weight. Pulley face $11/32$ inches wide. Overall dimensions, $5/8 \times 2\frac{1}{4} \times 4$ inches.	General use.
118	29½ ounce, double pulley, iron weight galvanized finish. Pulley face is $1/4$ inch wide; wheels spaced $2\frac{3}{4}$ inch centers. Overall dimensions, $1\frac{1}{2} \times 4\frac{1}{4} \times 7\frac{3}{4}$ inches.	In switchboards when double length cord is required.
119	9½ ounce, single pulley, cast iron weight with galvanized finish. Pulley face is $1/4$ inch wide, overall dimensions are $1\frac{1}{4} \times 2\frac{1}{2} \times 4\frac{1}{4}$ inches. Replaces the No. 116 cord weight.	No. 1240, No. 1962, No. 1948 and other types of switchboards.

Cut-In Stations

For Magneto Bridging Service



No. 319 Type

Used at an intermediate station in a toll line for the reception of signals and to cut off the line in either direction.

The No. 319 type cut-in station, as listed below, is used with a separate local battery telephone which is wired to the plug. When the plug is not in any of the three jacks, the bell in the cut-in station box is bridged across the toll line and receives signals.

By inserting the plug in the middle jack, the operator places the telephone set in the "bridged" position and disconnects the ringer from the line. The direction from which the call is coming may then be ascertained and the plug removed from the center jack and inserted in either the right or left hand jack as desired. With the plug in the right hand or left hand jack, the telephone set is connected to the line in that direction and cuts off the line in the other direction, at the same time placing the ringer across the disconnected portion of the circuit. A conversation may thus be held over the line in either direction and signals received from the end of the line not in the talking circuit.

Unbiased ringers are used in these sets.

The overall dimensions are: base, $7\frac{1}{2}$ inch square and depth through bells, approximately 6 inches. Woodwork, oak; gongs, black.

Code No.	Description	Code No.	Description	Code No.	Description
319E	1000 ohm ringer	319F	1600 ohm ringer	319G	2500 ohm ringer

DESIGNATION STRIPS



Wood Type With Metal Face



Wood Type with Rubber Face



Wood Type with Celluloid Face



Metal Face

WOODEN TYPE WITH METAL FACE

These consist of a wooden mounting strip with a black finished No. 8 type designation or retaining trip attached to the face, and are for use in designating outgoing trunk jacks, etc.

Code No.	Width of Face, Ins.	Length, Ins.	Face	Jack Mountings Used with
No.		Overall		
1C	$\frac{1}{8}$	$9\frac{1}{8}$	$9\frac{1}{8}$	Nos. 1, 2, 3, 21, 22, 34, 36, 46, 47, 62, 63, 75, 77, 84, 85, 117, 118, 119, 120, 127,
1D	$\frac{1}{8}$			
*1C	$\frac{1}{2}$			
6F	$\frac{3}{8}$			
*6J	$\frac{1}{8}$	$8\frac{1}{8}$	$7\frac{1}{8}$	Nos. 18, 19, 20, 83, 102, 113
*54C	$\frac{1}{8}$			
10E	$\frac{1}{8}$			
51A	1	$11\frac{1}{8}$	$10\frac{1}{2}$	Nos. 4, 5, 6, 7, 8, 35, 37, 45, 89, 115
53 A	$\frac{1}{8}$	$11\frac{1}{8}$	$11\frac{1}{8}$	Nos. 108, 109, 110, 112
61A	1	$8\frac{1}{8}$	$5\frac{1}{8}$	Used on No. 105B Magneto Switchboard
62A	1	$8\frac{1}{8}$	$7\frac{1}{8}$	Nos. 18, 19, 20, 83, 102, 113
		$9\frac{1}{8}$	$9\frac{1}{8}$	Nos. 1, 2, 3, 21, 22, 34, 46, 47, 62, 63, 75

WOODEN TYPE WITH RUBBER FACE

These consist of a wooden mounting strip with a hard rubber face which is milled and drilled for 20 number plates.

2C	$\frac{1}{8}$	$9\frac{1}{8}$	$9\frac{1}{8}$	Nos. 31, 32 and 50	Nos. 1, 2, 21, 22, 34, 77, 84, 118, 119
14A	$\frac{1}{8}$	$8\frac{1}{8}$	$7\frac{1}{8}$	No. 30 or 60	Nos. 18, 19, 20, 83, 102, 113
50A	$\frac{1}{8}$	$11\frac{1}{8}$	$11\frac{1}{8}$	No. 31, 32 or 59	Nos. 108, 109, 110, 112
50B	Same as No. 50A, except equipped with a $\frac{1}{8}$ in. holly strip				Nos. 108, 109, 110, 112
54A	$\frac{1}{8}$	$8\frac{1}{8}$	$7\frac{1}{8}$	No. 30 or 60	
57A	$\frac{1}{4}$	$9\frac{1}{8}$	$9\frac{1}{8}$	20 No. 17	Nos. 1, 2, 21, 22, 34, 77, 84, 118, 119

WOODEN TYPE WITH CELLULOID FACE

These consist of wooden mounting strips with transparent celluloid face strips which are intended to cover a strip of printed figures.

7A	$\frac{1}{8}$	$9\frac{1}{8}$	$9\frac{1}{8}$	Nos. 1, 2, 3, 21, 22, 34, 36, 46, 47, 62, 63, 75, 77, 84, 85, 117, 118, 119, 120, 127
7B	$\frac{1}{4}$			
*7C	$\frac{1}{2}$			
13A	$\frac{3}{8}$			
*13B	$\frac{1}{8}$	$8\frac{1}{8}$	$7\frac{1}{8}$	Nos. 18, 19, 20, 83, 102, 113
*13D	$\frac{1}{8}$			
13E	$\frac{1}{8}$			
24A	$\frac{1}{8}$	$11\frac{1}{8}$	$10\frac{1}{2}$	Nos. 6, 7, 8, 35, 37, 45, 89
54C	$\frac{1}{8}$	$8\frac{1}{8}$	$7\frac{1}{8}$	Nos. 18, 19, 20, 83, 102, 113
55A	$\frac{1}{8}$	$11\frac{1}{8}$	$11\frac{1}{8}$	Nos. 108, 109, 110, 112
55B	$\frac{1}{8}$			
56A	$\frac{1}{2}$	$9\frac{1}{8}$	$9\frac{1}{8}$	Nos. 1, 2, 3, 21, 22, 34, 36, 46, 47, 62, 63, 75, 77, 78, 85, 114
54E	$8\frac{1}{4}$	$8\frac{1}{8}$	$7\frac{1}{8}$	Nos. 18, 19, 20, 83, 102, 113

METAL TYPE

These consist of a black finish metal retaining strip. The No. 8 also has a transparent celluloid strip for protecting a strip of printed figures. Mounting screws are furnished.

The No. 90A is intended to mount on Nos. 184 and 185 jack mountings and No. 262 lamp socket mountings and arranged to accommodate a designation card for each pair of jacks or lamps.

The No. 90B is intended to mount on Nos. 128 and 129 jack mountings.

Code No.	Width, Ins.	Length	Code No.	Width, Ins.	Length	Code No.	Width, Ins.	Length
8G	$\frac{1}{8}$	Specify	8N	$\frac{1}{8}$	21 $\frac{1}{8}$ in.	43B	$\frac{1}{8}$	1 $\frac{1}{2}$ ins.
8H	$\frac{1}{8}$	Specify	8P	$\frac{1}{8}$	22 $\frac{1}{8}$ in.	43C	$\frac{1}{8}$	1 $\frac{1}{4}$ ins.
8K	$\frac{1}{8}$	6 $\frac{1}{8}$ in.	8R	$\frac{1}{8}$	27 $\frac{1}{8}$ in.	43D	$\frac{3}{4}$	1 $\frac{1}{4}$ ins.
8L	$\frac{1}{8}$	Specify	8S	$\frac{1}{8}$	19 $\frac{1}{8}$ in.	90A	$\frac{1}{8}$	15 $\frac{1}{8}$ ins.
8M	$\frac{1}{8}$	Specify	8U	$\frac{1}{8}$	Specify	90B	$\frac{1}{8}$	6 $\frac{1}{8}$ ins.

*Has a $\frac{1}{8}$ inch holly strip mounted on top. The width of face as given above included the holly strip.



DESK SET BOXES—MAGNETO

The following desk set boxes, with the exception of the No. 315J, are equipped with ringers to operate on alternating current for code ringing service between the central office and the telephones and for code ringing between the telephones. The No. 315J is equipped with a pulsating current type ringer for four-party selective signalling from the central office and is also arranged for signalling the central office only.

The Nos. 300 and 315 type desk set boxes may be used with the following apparatus or its equivalent:

1020AL	Desk stand.
1020CC	Transmitter Arm
1048	Type transmitter arms
1001C,	and H Hand sets
1002AC	Hand set

These desk set boxes form a part of the Nos. 6003 and 6004 type telephones described elsewhere.

Nos. 300 and 315 Type Desk Set Boxes

No. 300 and No. 315 Type Desk Set Boxes

No. 300 TYPE WITH No. 48 TYPE GENERATORS

Code No.	Generator No.	Composed of Ringer No.	Resistance	Condenser No.	For Ringing Service	Used on Lines as Regards Load
300K	48A	51BG	2500	****	Code	Heavily
300L	48A	51FG	1600	****	Code	Medium
300M	48A	51FG	1600	21W	Code	Medium
300N	48A	51BG	2500	21W	Code	Heavily

No. 300 TYPE WITH No. 50 TYPE GENERATORS

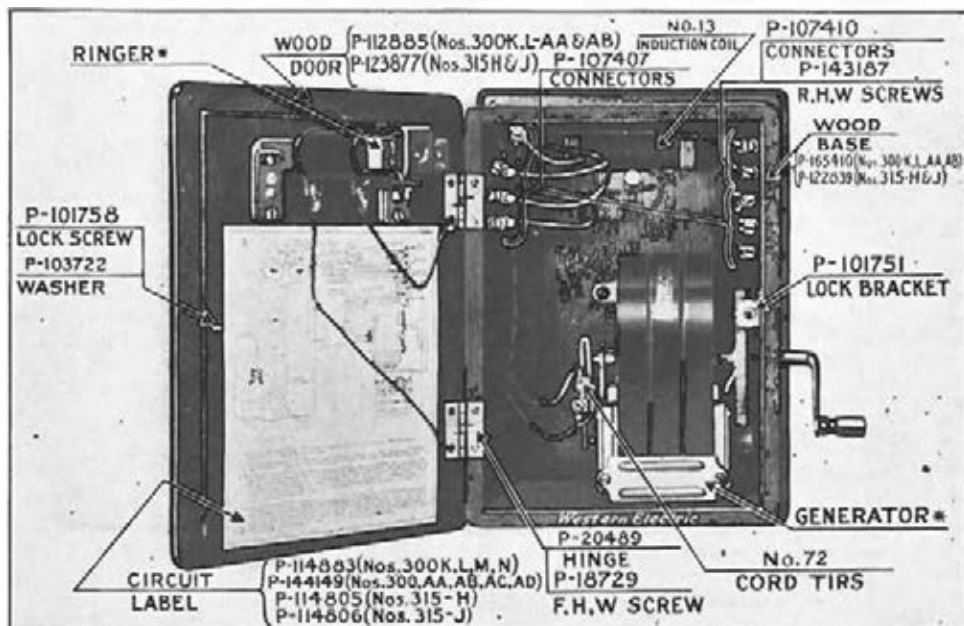
300AA	50A	51BG	2500	****	Code	Heavily
300AB	50A	51FG	1600	****	Code	Medium
300AC	50A	51BG	2500	21W	Code	Heavily
300AD	50A	51FG	1600	21W	Code	Medium

No. 315 TYPE WITH No. 22 TYPE GENERATORS

315H	22A	51AG	1000	****	Code	Lightly
315J	22E	49BG	2500	****	Four Party Selective	Lightly

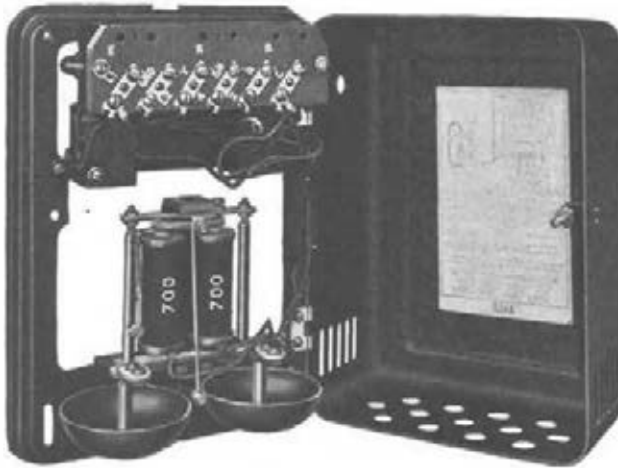
Note. In addition to the above apparatus all of these sets are equipped with No. 13 induction coils and No. 29A Ringer Gongs.

REPLACEMENT PARTS FOR Nos. 300 AND 315 TYPE DESK SET BOXES

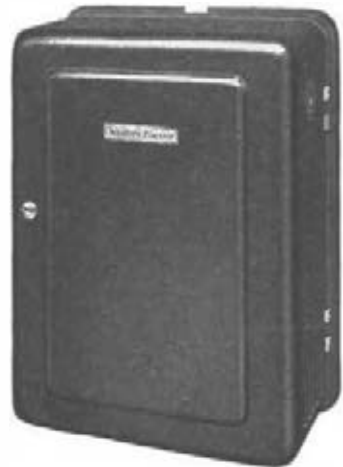


***Note.** The ringer, generator, etc., are given in the above code number listings and their repair parts are shown elsewhere under their respective headings.

DESK SET BOXES—CENTRAL BATTERY



No. 534 Desk Set Box—Open



No. 534 Desk Set Box—Closed

Central Battery—No. 534 Type

The No. 534 type desk set boxes, in conjunction with No. 1020 type desk stands, are coded as No. 6054 type telephones.

The telephone services for which these desk set boxes are used is described under the No. 6054 type telephones.

These desk set boxes may be used with desk stands here listed or with the following telephone arms or hand sets, which are their electrical equivalent.

Nos. 1020CC, 1048AA, AB and AC Telephone (Transmitter) Arms.

Nos. 1001C and H and 1002AC Hand Sets.

INDUCTION COIL TYPES

Code No.	Used with Desk Stand	Ringer No.	Desk Set Box Contains		Induction Coil	For Service
			Resistance	Condenser		
534A	1020AL	8AG	1400	21AP	46	Single and two-party selective A.C. Four-party selective. P.C. also equipped with No. 85J relay.
534AR	1020AL	42AG	1000 & 3000	21AP	46	

SERIES TYPE

534K	1020AH	8AG	1400	21F	..	Series C.B.
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HARMONIC RINGING TYPES

534E	1020AL	41SG	33 3/4 cycles	21F	46	} 4 or 8 party harmonic
534F	1020AL	41TG	50 cycles	21F	46	
534G	1020AL	41UG	66 3/4 cycles	21F	46	
534H	1020AL	41RG	16 3/4 cycles	21F	46	

LOCAL BATTERY TALKING TYPE

534Y	1020AL	8AG	1400	21AP	13	{ Local Battery Talking Central Battery Ringing
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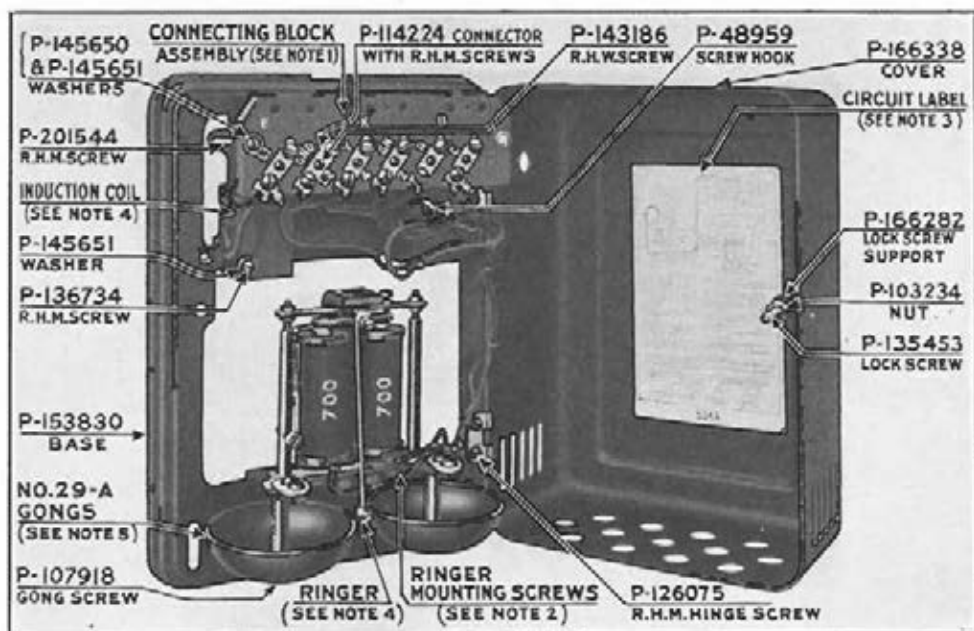
EXTENSION TYPES

534C	1020AL	No Ringer		21AP	46	{ Used as an extension set to an adjacent telephone Used as an extension bell
534D	None	8AG	1400	21AP	..	

HIGH IMPEDANCE RINGER TYPE

534R	1020AL	8JG	3500	21AP	46	{ Two-party selective or four-party semi-selective lines where inductive noises are encountered
------	--------	-----	------	------	----	---

DESK SET BOXES



Replacement Parts for No. 534 Type Desk Set Boxes

NOTE 1. Connecting Block Assembly for:

Code No.	Part No.	Code No.	Part No.
534A	P-203628	534C	P-203622
534AR	P-203625	534D	P-204243
534E, F, G, H	P-203628	534Y	P-203627
534K	P-203631	534R	P-203628

NOTE 2. Ringer Mounting Screws for:

Code No.	Part No.	Code No.	Part No.
534A, AR, K, Y, C, D, R	P-153832	534E, F, G, H	P-145368

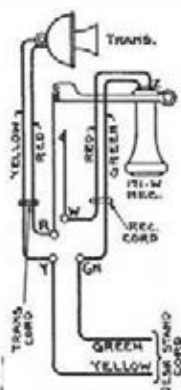
NOTE 3. Circuit Label for:

Code No.	Part No.	Code No.	Part No.
534A	P-144957	534Y	P-144965
534AR	P-244027	534C	P-144958
534K	P-144960	534D	P-144959
534E, F, G, H	P-144618	534R	P-144962

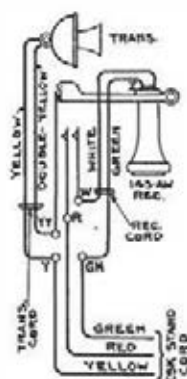
NOTE 4. These parts are shown with the code number listings. Replacement parts for the ringers are shown under "Ringers."

NOTE 5. The No. 29A gong is regularly furnished. If different tone gongs are required, the Nos. 31A, 32A or 33A gongs may be used. (See description of "Gongs.")

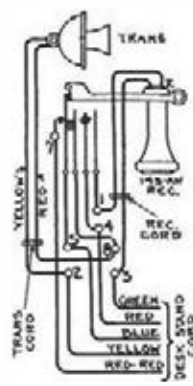
DESK STANDS



No. 1040AH



No. 1040AL



No. 1140CN

Desk Stands—Central and Local Battery Types

These are Bower-barff finished steel desk stands and represents the simplest form of desk stand that has ever been produced, there being but three principal units exclusive of the transmitter and receiver, namely: the terminal plate and switchhook assembly, the base and stem assembly and the base plate assembly. The switchhook lever acts directly upon the main spring of the switch, no intermediate parts being interposed to increase the chance of trouble. The entire terminal plate and switchhook assembly may be withdrawn from the stem and base assembly for inspection without disconnecting the cords or interrupting the service in any way. This is accomplished by merely removing one screw from the bottom of the base plate.

The bottom and edges of the base plate are covered with felt.

The contact springs are of nickel silver, backed up with stop springs.

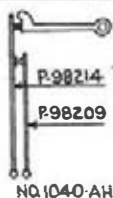
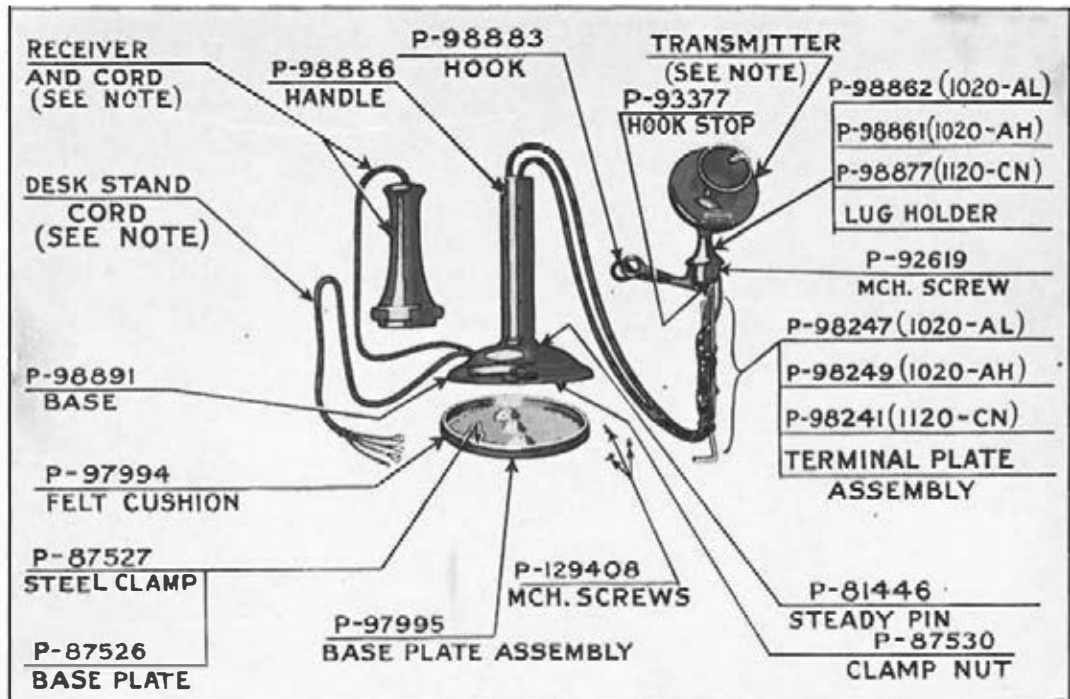
All current carrying parts are insulated from the frame.

Because of the simplicity of design and the high quality of the apparatus and materials used, the cost of maintaining Western Electric desk stands is practically nothing.

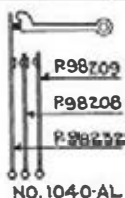
Code No.	Transmitter	Receiver	Cords		Desk Stand	Service
			Rec.	Trans.		
1040AL	323BW	143AW	{ No. 549 2½ ft. long	{ 2 No. 547 9¾ ins. long	{ No. 550 5½ ft. long	{ Standard desk stand for central battery and local battery service.
1040AH	323BW	171W (magnetless)	{ No. 535 2½ ft. long	{ No. 329 No. 330 9¾ ins. long	{ No. 406 5½ ft. long	{ Series central battery.
1140CN	323BW	143AW	{ No. 412 2½ ft. long	{ 2 No. 547 9¾ ins. long	{ No. 355 6½ ft. long	{ Special service requiring a back contact desk stand.

DESK STANDS

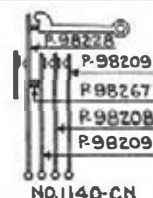
Desk Stands—Replacement Parts



NO. 1040-AH



NO. 1040-AL



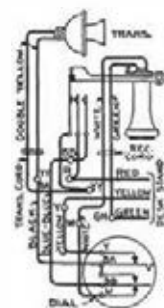
NO. 1140-CN

Replacement Parts for Contact Springs

Note. The receiver, transmitter, etc., are given in the code number listings of the desk stands.



No. 1051AL



No. 1051AL

Desk Stands—Machine Switching

Code No.	Finish	Transmitter	Transmitter Cords	Receiver	Receiver Cords	Desk Stand Cord	Dial	Cords (for Dial)
1051AL	Black	323BW	547	143AW	819	820	As Specified	816

DIALS—MACHINE SWITCHING



No. 2AA Calling Dial

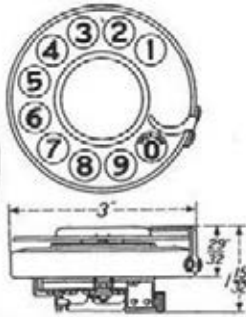
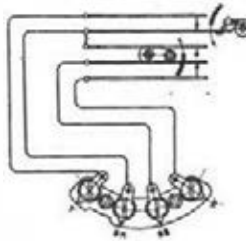
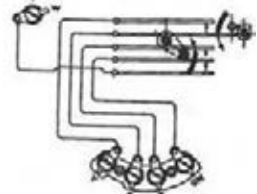


Diagram Nos. 2AA and 2EA, Dial Nos. 2AA and 2AB, Dials



Wiring of



Wiring of

Dials No. 2EA, 2EB and FB Dials

DIALS

Western Electric dials are reliable in operation and are designed to operate between very close speed limits.

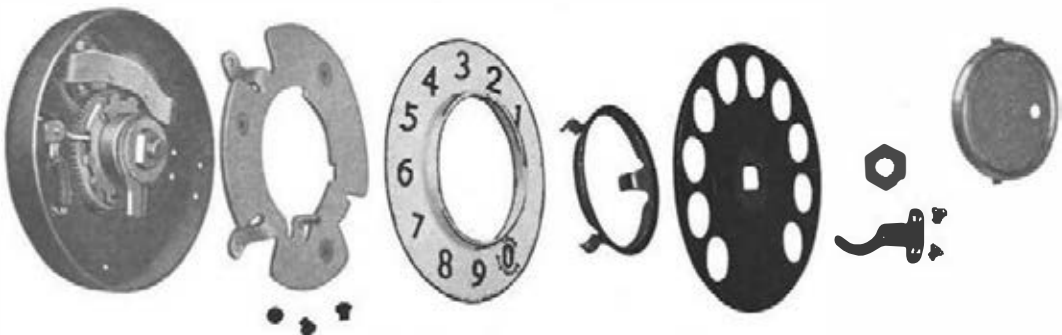
These dials are designed to mount on Western Electric machine switching desk stands and wall type telephones. Also in Western Electric Dial mountings.

The No. 2AA and 2AB dials are intended for use at telephone stations, private branch exchange switchboards and with repairman's hand sets.

The No. 2EA and 2EB dials are intended for use on switchman's desks, trouble desks and local test desks of manual offices, for connecting with machine switching offices. These differ from the No. 2AA and No. 2AB dials in that a wire from each of the five contact springs is brought out to an individual terminal.

The No. 2CB dial is intended for use with test man's hand sets. This differs from the No. 2AB dial in that it is adjusted to a somewhat higher speed.

Code Nos.	Number Plate	Color of Characters	
		Numerals	Letters
2AA	132A	Black	Black
2AB	132B	Red	Black
2EA	132A	Black	Black
2EB	132B	Red	Black
2CB	132B	Red	Black

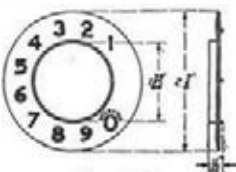


No. 2AA Dial Set—Exploded View

DIAL NUMBER PLATES

These number plates consist of a copper base coated with a vitreous white enamel. Small pins projecting from the back fit into holes in the dial frame, thereby insuring proper alignment of the number plate with regard to the finger wheel of the dial.

Code Nos.	Color of Characters	
	Numerals	Letters
132A	Black	Black
132B	Red	Black

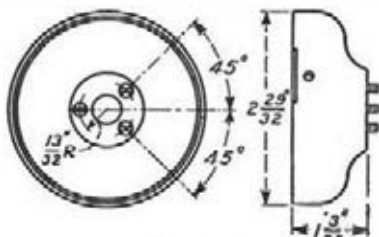


No. 132A

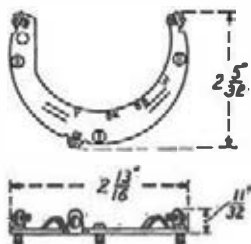


No. 132B

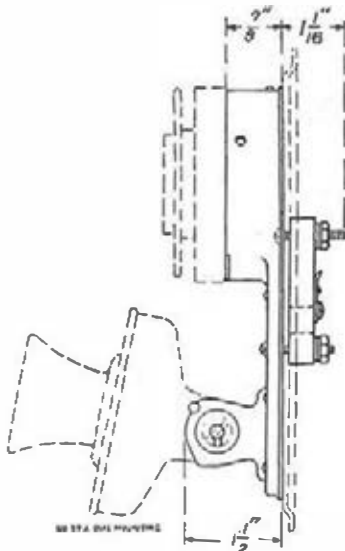
DIAL MOUNTINGS—MACHINE SWITCHING



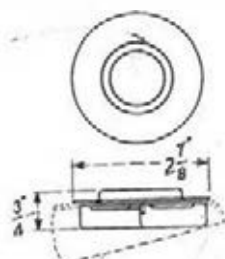
No. 30A



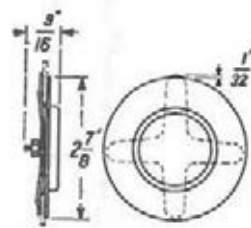
No. 52A



No. 37A



No. 50D



No. 50B

Dial Mountings

These dial mountings, in connection with the No. 52 type dial adapter, are designed for mounting Western Electric No. 2 type dials.

By the use of these mountings, manual telephones may be arranged for machine switching service. These mountings are made of metal and have a black finish.

Code No.	Principal Use	Description
30A	Intended to mount on wall type telephones.	3 machine screws are furnished. Woodscrews can be substituted if desired.
32A	Local test desk and P.B.X. switchboards.	Consists of the No. 30A dial mounting provided with a metal base. Intended primarily to mount in a vertical position.
33A	Intended to mount on walls adjacent to telephones or deskstands.	Consists of the No. 30A dial mounting provided with a metal base.
37A	Intended to mount a No. 323BW transmitter and a No. 2A dial to which a No. 52A dial adapter has been attached.	A black finished metal mounting used to convert manual telephone sets of the No. 1533 type for machine switching service cable, connecting block and mounting screws are furnished.
6000A	Unsupervised P.B.X. Switchboards.	Consists of a No. 34 Type Dial Mounting, No. 25A Connecting Block and No. 765 Cord. The connecting block can be permanently attached to the switchboard keyshelf. The cord is used to connect the dial to the springs of the No. 34 type dial mounting.
6000B	Supervised P.B.X. Switchboards.	

Dial Adapters

Dial adapters do not form a part of the dial mountings and must be ordered as separate items as follows:

Code No.	Use and Description
52A	For use with Nos. 2AA and 2AB dials. When used in connection with Nos. 30, 31, 32 and 33 or similar type dial mountings.
52B	For use with Nos. 2EA and 2EB dials. When used in connection with Nos. 30, 31, 32 and 33 or similar type dial mountings.

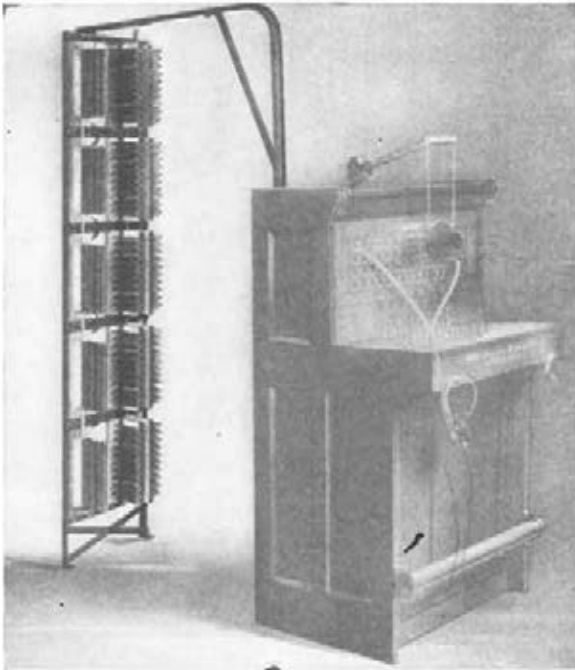
Dial Openings Apparatus Blanks

Code No.	Use and Description
50B	This is a metal cover equipped with an instruction card holder. It is used to cover dial opening on machine switching wall type telephones when used for manual service.
50D	This is used to cover the dial opening on No. 50 type deskstands when used for manual service. Consists of a metal cover provided with an instruction card holder, also a weight to compensate for the weight of the dial, thereby assisting in balancing the deskstand.

DISTRIBUTING FRAMES

These distributing frames have been designed to meet the requirements of small central offices where simple and compact protective equipment is desired.

No. 1430 and No. 1420 Types



No. 1430 Type Main Distributing Frame

These frames are built in units of two verticals, one vertical for mounting the terminal apparatus of the outside lines, and the other vertical for mounting the terminal apparatus of the inside lines.

Facilities for cross connection between the inside and outside lines are provided by the distributing rings on the back of each protector group. These frames are designed to be supported by the switchboard sections.

Each unit will accommodate 100 metallic telephone lines by using the protector groups described and illustrated under "Protector Groups." The protector group equipment desired should be specified on each order.

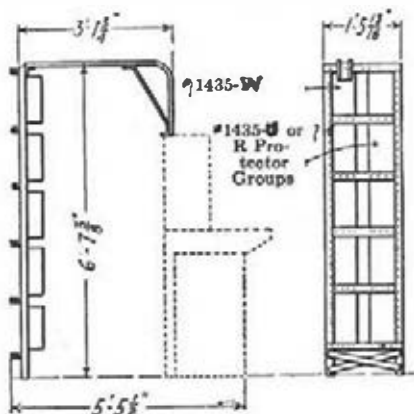
These frames have the following important features:

1. **Steel Framework.** The framework is of steel, forming a rigid support for the apparatus. A rust resisting finish is applied.
2. **Ease of Access.** The framework is so constructed that cross connections and inspections can be easily made.
3. **Unit Type.** The framework is built in 100 line units and is so arranged that several units may be lined up to form a frame of larger capacity. It is only necessary to purchase enough frame to handle your present requirements, and later increase your frame capacity as the number of lines increases.
4. **Universal Design.** All of the vertical mountings are arranged so that our standard protector groups can be mounted. By the addition of a small steel supporting bracket, the No. 1430 type frame can be converted into the No. 1420 wall type frame described later.
5. **Minimum Floor Space.** Due to their compact design, these frames occupy very little floor space.

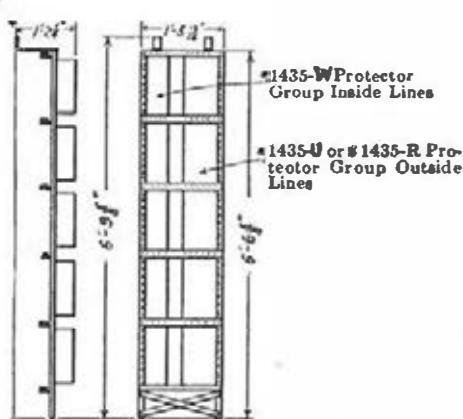
Code No.	Used with Switchboards	Capacity		Protective Groups Used	
		Inside Lines	Outside Lines	Inside Lines	Outside Lines
1430F	No. 1240D.....	100	100-125	1435W	1435U or R
1420B	Any non-multiple switchboard.....	100	100-125	1435W	1435U or R

DISTRIBUTING FRAMES

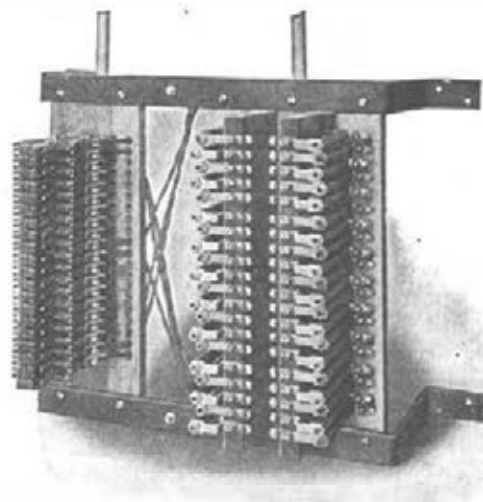
NOS. 1430 AND 1420 TYPES—Continued



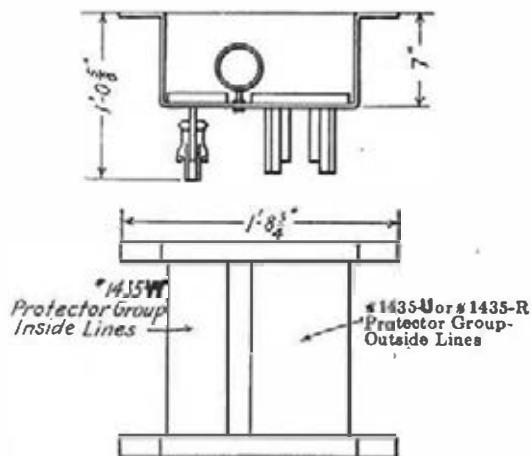
No. 1430F Distributing Frame



1420B Distributing Frame



No. 1431A 20 Line Main



NOS. 1431A 20 LINE FRAME

This frame has been designed to satisfy a demand for a small capacity, inexpensive, and yet sturdy distributing and protective equipment.

It is especially suitable for the small rural exchange owning and operating a No. 1800 or other switchboard, equipped for from 10 to 40 lines, with little prospect of immediate growth.

Where more than 20 lines are to be accommodated, two of these frames can be lined up, one above the other. Cross connection facilities are provided by rings on the back of the frame.

This frame is designed for mounting against the wall. The drilling is so arranged that our standard protector groups can be used.

In ordering this frame specify the protector groups desired. (See description of protector groups.)

Code No.	Used with	Capacity		Protector Groups Used	
		Inside Lines	Outside Lines	Inside Lines	Outside Lines
1431A	Any small switchboard	20	20-25	1435W	1435U or R

DISTRIBUTING FRAMES

(Continued)

NO. 1425 TYPE

This is a unit type frame, adapted for telephone central office or exchange protective apparatus where the Nos. 1420 or 1430 type frames are too small for present requirement or future growth.

Fuses. No provision is made for mounting on this frame abnormal current fuses. If it is considered necessary to equip certain lines with this type of protector, it is suggested that they be mounted elsewhere, such as on the wall or on a special frame constructed for the purpose.

Construction. This frame is rigidly constructed of steel angles and bar iron, and is made up in units of one vertical each, three verticals of this frame being shown in the accompanying illustration.

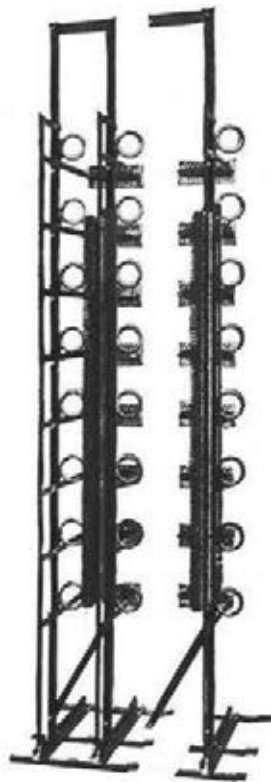
Each unit has a vertical bar which is arranged for mounting five No. 1435T protector groups which provide protectors of the carbon block and heat coil type for 100 magneto or central battery lines. Each protector group accommodates 20 lines.

This vertical protector bar is called the "vertical side" of the frame. The switchboard cables or inside lines are usually connected to these protectors.

Rubber covered distributing rings are placed conveniently, making it easy to run the jumper wires in a uniform, compact and neat manner, without going through more than one ring or making more than one turn.

The unit type of framework makes it possible, by lining up together a number of vertical units, to build a frame of any required capacity.

Initial Equipment. For initial equipment at least two units or verticals must be ordered and installed (which provide space for a maximum of 200 inside lines and 160 outside lines), as the No. 65 terminal strips to which the outside lines connect are mounted horizontally between adjacent vertical units, thus requiring at least two verticals to support a row of them. Eight of these terminal strips providing terminal facilities for 160 outside lines can be mounted between any two adjacent vertical units of the frame.



This shows two units of No. 1425C distributing frame lined up and bolted together.

As many 100 line units as desired may be installed.

Two units are necessary at the beginning of the frame; one unit for each additional 100 lines.

This is one 100 line unit of No. 1425C distributing frame. The Code No. 1425C covers the steel framework, distributing rings and fanning strip, but does not cover the protector groups and No. 65 terminal strips. The terminal strips for terminating 20 pairs of outside cable may be ordered as follows:

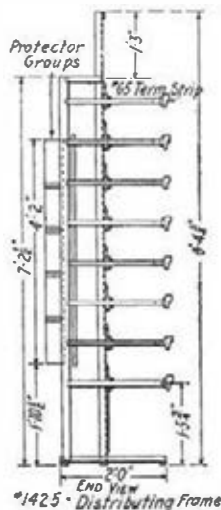
— No. 65 terminal strips. The carbon, mica and heat coil protector may be ordered as follows:

— No. 1435T Protector groups each accommodating 20 inside or switchboard pairs. These protector groups are suitable for both Central Battery and magnetolines.

For Example:

1. 1425C frame provides space for 100 protectors (or 100 inside lines) and no outside lines.
2. 1425C frames provide space for 200 protectors (or 200 inside lines—*see note) and 160 outside lines.
3. 1425C frames provide space for 300 protectors (or 300 inside lines—*see note) and 320 outside lines.

***Note.** It is customary to not equip the first vertical unit with protectors, but to mount on it the required terminal equipment for miscellaneous inside circuits. The No. 53 terminal strip is adapted for mounting on the vertical side of those frames for this purpose. In ordering these strips for use on this frame, however, so specify on the order.



INFORMATION

Protector Groups Used

Code No.

†1425C

"Vertical Side"
Inside LinesMagneto or central battery lines—No. 1435T
Misc. inside circuits—No. 53 terminal strip."Horizontal Side"
Outside Lines

No. 65 terminal strips

†This Code number includes one vertical unit of this frame and distributing rings only. The protector groups and terminals must be ordered separately.

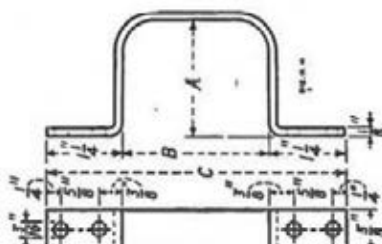
DISTRIBUTING RINGS AND DROPS



No. 1



No. 3



No. 4

Distributing Rings

Code No.	Diameter Dimensions (Inches)		Description and Use	Code No.	Dimensions			Description and Use
	Inside	Outside			"A"	"B"	"C"	
1	2 $\frac{7}{8}$	3 $\frac{7}{8}$	Steel with hard rubber covering. For distributing frames.	4A	1 $\frac{7}{8}$	2 $\frac{3}{8}$	4 $\frac{7}{8}$	Steel with black finish. For No. 23 cable terminals.
2	3 $\frac{1}{8}$	4 $\frac{1}{8}$		4B	2 $\frac{1}{8}$	3 $\frac{3}{8}$	6 $\frac{1}{8}$	
3	3	4		4C	2 $\frac{1}{8}$	5 $\frac{3}{8}$	8 $\frac{1}{8}$	



No. 4A Drop



No. 22A Drop



No. 55A and 56A Drop

Drops

The No. 4 type of drops are equipped with two electro-magnet spools each. The Nos. 22, 35, 55 and 56 types are single spool drops with tubular iron shells and are cross-talk proof.

The Nos. 4, 35 and 56 drops are manually restoring.

The No. 22 drop is electrically restored and has two windings, one for operating and one for electrical restoring.

The No. 35 type drop is equipped with two windings, one front, and one back, in order that it may be used in selective signaling. When so used, the middle of the winding (and one side of the associated ringing generators) is grounded.

All drops will operate on alternating ringing current.

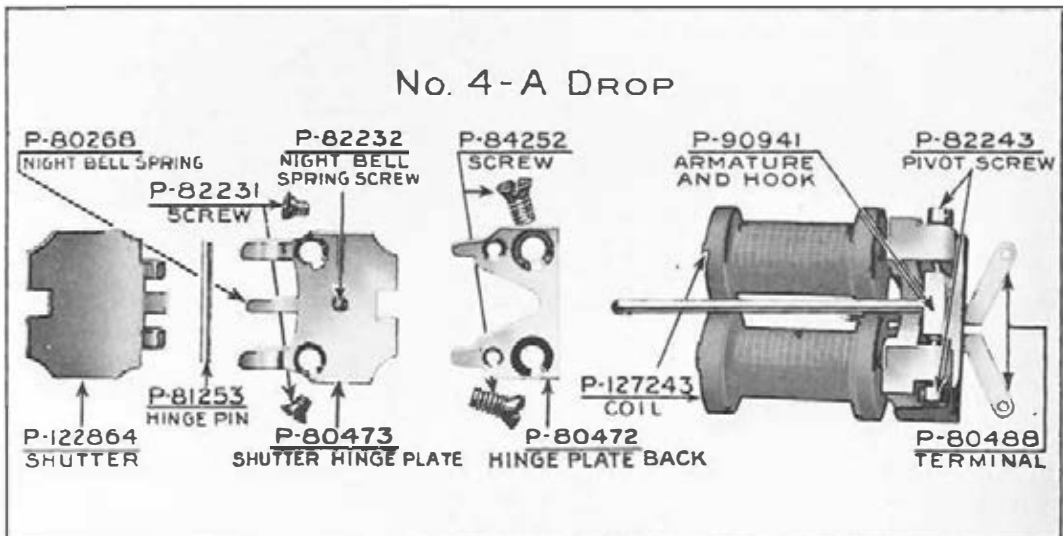
All drops are equipped with night bell contacts. The contacts of the No. 56F are made only while the drop is energized by the ringing current. In all the other drops listed below, the night bell contact remains closed until the drop is restored.

Code No.	No. of Windings	Approximate Res. (Ohms)	Finish of Shutters	Mounting Centers (Inches)	Overall Dimensions (Inches)			Used With Drop Mountings
					High	Wide	Deep	
4A	1	90	Black	1 $\frac{3}{8}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	2 $\frac{3}{8}$	2, 57, 58, 60, 65, 68
4C	1	1000	Black	1 $\frac{3}{8}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	2 $\frac{3}{8}$	
22A	2	700 (Line) 45 (Restoring)	Aluminum	1 $\frac{3}{8}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	5 $\frac{1}{4}$	
35A	2	285	Black	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	3 $\frac{1}{4}$	2, 57, 58, 60, 64, 65, 68, 83, 84, 87
35B	2	500	Black	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	3 $\frac{1}{4}$	
35C	2	10.5 Inner 11.3 Outer	Black	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	3 $\frac{1}{4}$	
56A	1	525	Black	1	1 $\frac{1}{4}$	1 $\frac{1}{4}$	3 $\frac{1}{4}$	2, 43, 53, 56, 57, 58, 60, 64, 65, 68, 69, 83, 84, 85
56B	1	670	Black	1	1 $\frac{1}{4}$	1 $\frac{1}{4}$	3 $\frac{1}{4}$	
56L	1	670	Brass	1	1 $\frac{1}{4}$	1 $\frac{1}{4}$	3 $\frac{1}{4}$	
56M	1	20	Black	1	1 $\frac{1}{4}$	1 $\frac{1}{4}$	3 $\frac{1}{4}$	

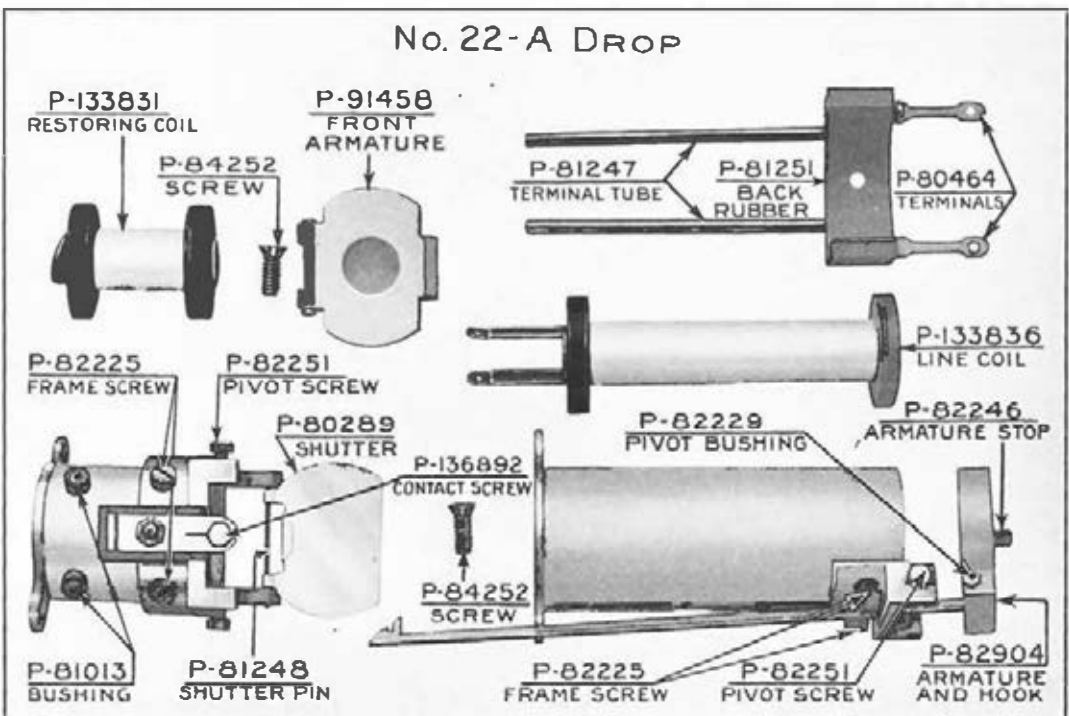
DROPS

(Continued)

Piece Parts for Nos. 4A, 4C and 22A Drops



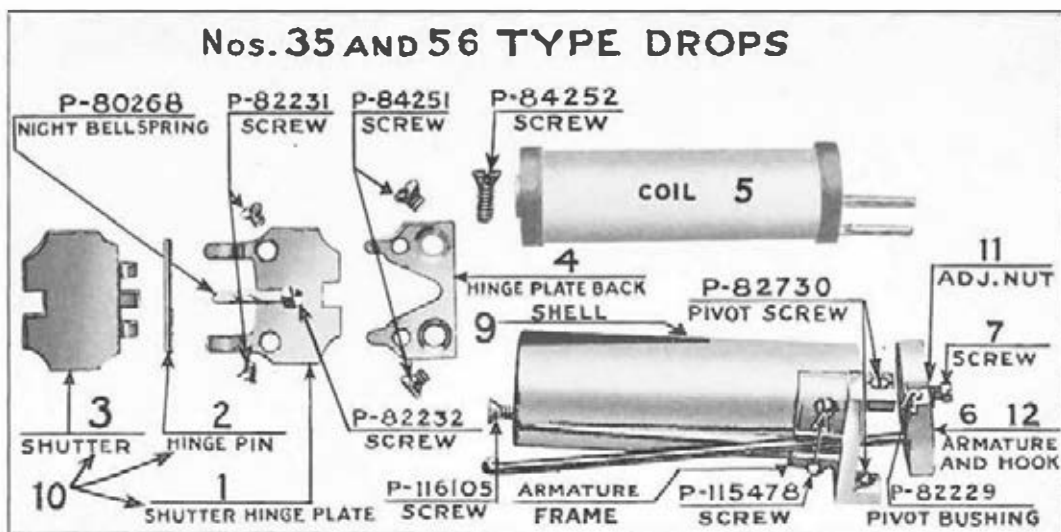
NOTE—Coil for 4C Drop—P-127245. Armature for 4A and 4C Drops P-81273



DROPS

(Continued)

Replacement Parts for Nos. 35 and 56 Type Drops



The above illustration shows the replacement part numbers which are common to all No. 35 and No. 56 types of drops. Where the part numbers differ, the proper replacement part number should be selected from the following list. The numbers at the beginning of this list correspond to the numbers shown in the above illustration.

	35A	35B	35C	35E	56A	56B	56F	56L	56M
1 Shutter Hinge Plate.....	P- 80473	P- 80473	P- 80473	P- 84307	P- 84307	P- 84307	P- 84307	P- 84307	P- 84307
2 Hinge Pin.....	P- 81253	P- 81253	P- 81253	P- 89079	P- 89079	P- 89079	P- 89079	P- 89079	P- 89079
3 Shutter.....	P-122864	P-122864	P-122864	P-122865	P-122865	P-122865	P-122865	P-131618	P-122865
4 Hinge Plate Back.....	P- 80472	P- 80472	P- 80472	P- 84309	P- 84309	P- 84309	P- 84309	P- 80472	P- 84309
5 Coil.....	P-132448	P-132449	P-132450	P-126668	P-132514	P-127006	P-132514	P-127006	P-201389
6 Armature and Hook.....	P- 89611	P- 89611	P- 89611	P- 89611	P- 84654	P- 84654	P- 91342	P- 84878	P- 84878
7 Screw.....	P- 82247	P- 82247	P- 82247	P- 82247	P- 82247	P- 82247	P- 91349	P- 82247	P- 82247
8 Armature and Frame.....	P- 81254	P- 81254	P- 81254	P- 84306	P- 84306	P- 84306	P- 84306	.....	.....
9 Shell.....	P- 89090	P- 89090	P- 89090	P- 89090	P- 89090	P- 89090	P- 91633	P- 89090	P- 89090
10 Shutter Hinge Plate Assem....	P-123409	P-123409	P-123409	P-123408	P-123408	P-123408	P-123408	P-131619	P-123408
11 Adj. Screw and Nut Assem....	P- 82016	P- 82016	P- 82016	P- 82016	P- 82016	P- 82016	P- 91384	.....	.....
12 Armature Frame and Hook Assem.....	P- 84915	P- 84915	P- 84915	P- 91369	P- 84878	P- 84878	P- 91352	.....	.....

DROP MOUNTINGS AND SPACES



No. 58 Drop Mounting

Drop Mountings

All drop mountings are of metal construction with black finished faces.

The 83, 84 and 85 drop mountings are equipped with metal blocks which permit the plate being mounted back from the front of the board in order that the drops may be located in such a manner that they will not be in danger of injury from contact with plugs which are carelessly withdrawn from adjacent jacks.

Code No.	Number per Strip	Centers Inches	Size of Plate Inches	For Drops Number	Used on Switchboards Number
2	10	1 $\frac{3}{8}$	15 x 1	4, 35, 56	101, 102, 1006, 1010, 1011
9	10	1	11 $\frac{1}{2}$ x 1	56	
43	10	1	10 $\frac{1}{2}$ x 1	56	
53	2	1 $\frac{1}{8}$	2 $\frac{1}{8}$ x 1 $\frac{3}{8}$	56	
56	20	1 $\frac{3}{8}$	24 $\frac{1}{8}$ x 1	56	9, 1800
57	15	1 $\frac{3}{8}$	24 $\frac{1}{8}$ x 1	4, 35, 56	1102
58	15	1 $\frac{3}{8}$	21 $\frac{3}{4}$ x 1	4, 35, 56	105, 1005
60	4	2	9 x 1	4, 35, 56	
64	5	1 $\frac{1}{2}$	8 $\frac{1}{4}$ x 1	35, 56	106
65	5	1 $\frac{1}{2}$	8 $\frac{1}{4}$ x 1 $\frac{1}{2}$	4, 35, 56	106
68	5	1 $\frac{3}{4}$	11 $\frac{1}{4}$ x 1	4, 35, 56	
69	10	1	11 $\frac{1}{8}$ x 1	56	10
71	15	1 $\frac{3}{4}$	21 $\frac{3}{4}$ x 1	56	1200 type
72	15	1 $\frac{3}{4}$	23 $\frac{1}{4}$ x 1	56	1200 type
73	10	1 $\frac{1}{2}$	17 $\frac{3}{4}$ x 1	4, 56	1200 type
74	15	1 $\frac{1}{8}$	17 $\frac{3}{4}$ x 1	56	1200 type
75	10	1 $\frac{3}{8}$	15 $\frac{1}{8}$ x 1	4, 35, 56	1800 type
76	4	1 $\frac{1}{2}$	7 $\frac{3}{4}$ x 1	35, 56	1800 type
77	6	1 $\frac{1}{2}$	10 $\frac{1}{4}$ x 1	4, 35, 56	1800 type
78	20	1	21 $\frac{3}{4}$ x 1	56	1200 type
80	10	1 $\frac{1}{4}$	21 $\frac{3}{4}$ x 1	56	1200 type
83	5	1 $\frac{3}{8}$	7 $\frac{3}{4}$ x 1	35, 56	
84	5	1 $\frac{3}{4}$	9 $\frac{1}{4}$ x 1	35, 56	
85	10	1	11 $\frac{1}{8}$ x 1	56	
87	8	1 $\frac{1}{4}$	10 $\frac{1}{4}$ x 1	35, 56	1800 type

Drop Spaces

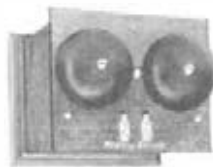
Wooden strips with ebonized face arranged to mount interchangeably with drop mountings as listed below. Intended for use in place of drop mountings when a switchboard is not fully equipped.

Code No.	Size of Face Inches	Corresponding Drop Mountings	Code No.	Size of Face Inches	Corresponding Drop Mountings
2	15 x 1	2	12	21 $\frac{3}{4}$ x 1	58, 71, 78, 80
7	24 $\frac{2}{3}$ x 1 $\frac{1}{2}$	56, 57	13	8 $\frac{1}{4}$ x 1 $\frac{1}{2}$	65
11	24 $\frac{1}{8}$ x 1 $\frac{1}{2}$	56, 57	15	24 $\frac{1}{8}$ x 1 $\frac{1}{2}$	*

*Used on No. 9 equipment when a narrow space is required to line up drop mountings in adjacent panels.

Western Electric

EXTENSION BELLS



No. 43 and 127 Types

Extension Bells

FOR ALTERNATING, PULSATING AND HARMONIC CURRENT

These extension bells are intended for auxiliary use in connection with wall, desk, or telephone arm telephones or for use instead of the regular ringers furnished in a telephone. The resistance of the extension bells should be the same as that of the ringers used on the same line.

No. 43 Type

These extension bells consist of a ringer mounted on the cover of a box. The standard finish is golden oak.

Code No.	Ringer	Approx. Resistance—Ohms	Gongs	Dimensions, Ins.	Operating Current
43F	6AG	*1400	29A	5 $\frac{5}{8}$ x 5 $\frac{3}{8}$ x 4 $\frac{5}{8}$	A.C.—biased to prevent tapping
43AC	55A	1000	29A	6 $\frac{1}{2}$ x 5 $\frac{1}{2}$ x 4 $\frac{3}{8}$	
43AD	55B	2500	29A	6 $\frac{1}{2}$ x 5 $\frac{1}{2}$ x 4 $\frac{3}{8}$	
43AE	6J	3500	29A	5 $\frac{5}{8}$ x 5 $\frac{3}{8}$ x 4 $\frac{5}{8}$	

No. 127 Type

These extension bells consist of a ringer mounted on the cover of an oak box. Approximate overall dimensions: 6 $\frac{1}{2}$ inches wide by 5 $\frac{3}{8}$ inches high by 4 $\frac{3}{8}$ inches deep. The standard finish is golden oak.

Code No.	Ringer	Resistance, Ohms	Gongs	Condensers	Operating Current
127A	6AG	*1400	29A	21AN	A.C.—biased to prevent tapping
127E	38AG	1020	26A	.....	A.C.—not biased
127F	38BG	2500	26A	.....	A.C.—not biased
127G	38FG	1620	26A	.....	A.C.—not biased
127L	41RG	.....	29A	21F	Harmonic—16 $\frac{2}{3}$ cycles
127M	41SG	.....	29A	21F	Harmonic—33 $\frac{1}{3}$ cycles
127N	41TG	.....	29A	21F	Harmonic—50 cycles
127P	41UG	.....	29A	21F	Harmonic—66 $\frac{2}{3}$ cycles

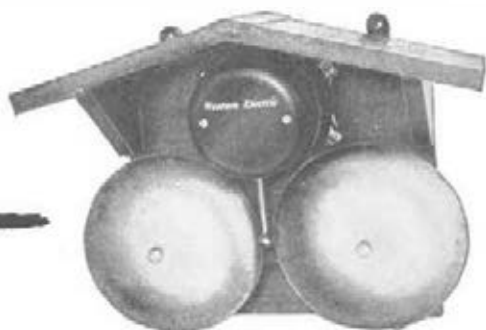
*The No. 6AG ringer (D.C. resistance 1400 ohms) has the same impedance as the older types of 1000 ohm ringers and are therefore interchangeable in service.

Note. 1—See No. 534D desk set box which is also an extension bell.

Note. 2—Each set is equipped with two No. 2-A binding posts for making the line connections.

EXTENSION BELLS

(Continued)



No. 342G



No. 392A

Nos. 342 and 392 TYPES—LOUD RINGING

Nos. 392 and 342 type loud ringing extension bells are used extensively in factories, mines, warehouses, in connection with police telephones and other places where the ordinary telephone ringer is inadequate, either due to excessive local noises or to the fact that the service conditions are such that the bells must be capable of being heard at a considerable distance.

In addition to their use in connection with telephones, these loud ringing extension bells are used in school, factory, police, mine, etc., signalling systems. For this service, they have the advantage over direct current bells in that no battery is required. See Hand Generator Boxes.

The windings of the No. 392 type bells are moisture-proofed and all metal parts are given a protective finish. These bells may be used on magneto telephone lines, and in signalling systems as normally furnished, that is, without a condenser, but if they are to be bridged across a central battery telephone line, a 2 m.f. condenser must be connected in series with the ringer coils.

The base is arranged for mounting a 21D condenser and the wiring is so arranged that a condenser may be easily connected in series with the ringer.

If a condenser is desired it should be ordered as follows in addition to the extension bell:

One 21D condenser.

One Condenser Strap P-43065.

Two Condenser Mounting Screws P-122026.

No. 392 Type—Loud Ringing

The No. 392A, B, E, G and H extension bells will be equipped with a biasing attachment if specified in the order.

Code No.	Approx. Res. (Ohms)	Diameter of Gongs, In.	Operating Current	Bias Feature
392A	1000	6 (28A)	A.C.	None
392B	2500	6 (28A)	A.C.	None
392D	2500	6 (28A)	P.C.	Bias spring and armature adjusting screws.
392E	1600	6 (28A)	A.C.	None
392J	1000	6 (28A)	A.C.	Bias spring to prevent tapping.
392G	1000	8 (23A)	A.C.	None
392H	2500	8 (23A)	A.C.	None

No. 342 Type—Loud Ringing

These extension bells consist of the No. 392 type extension bells, described above, mounted on a No. 149A backboard. This backboard has a sloping roof, which protects the bell from falling water and other substances.

Code No.	Extension Bell used
342G	392G
342H	392H
342J	392A
342K	392B

Nos. 392 and 342 Type Extension Bells—Biasing Attachments

The Nos. 392 and 342 type extension bells which are furnished unbiased may be equipped with the biasing attachment listed below thereby making them suitable for use on pulsating current. A screw driver and pliers are the only tools required for installing this attachment.

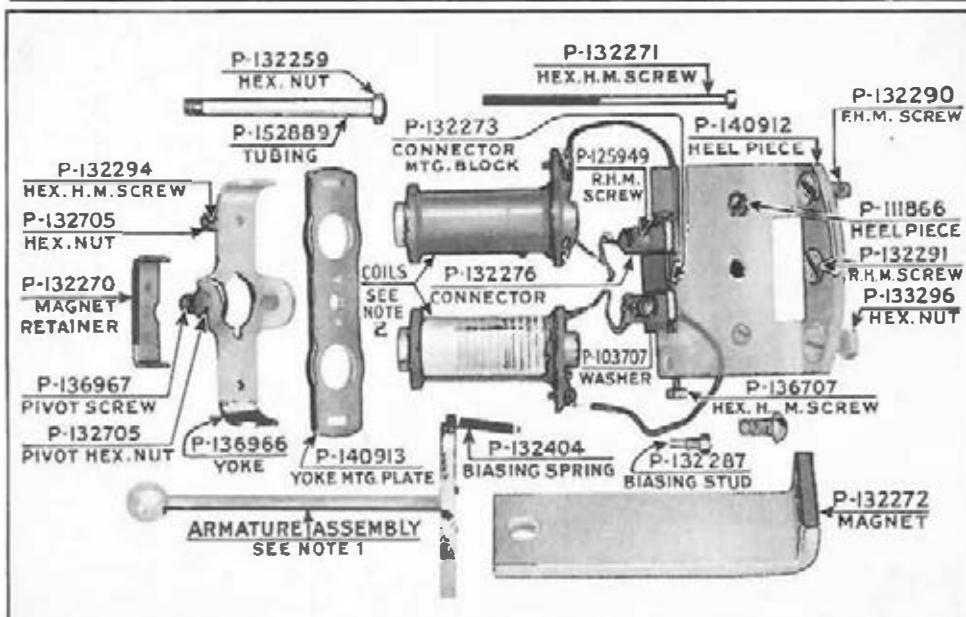
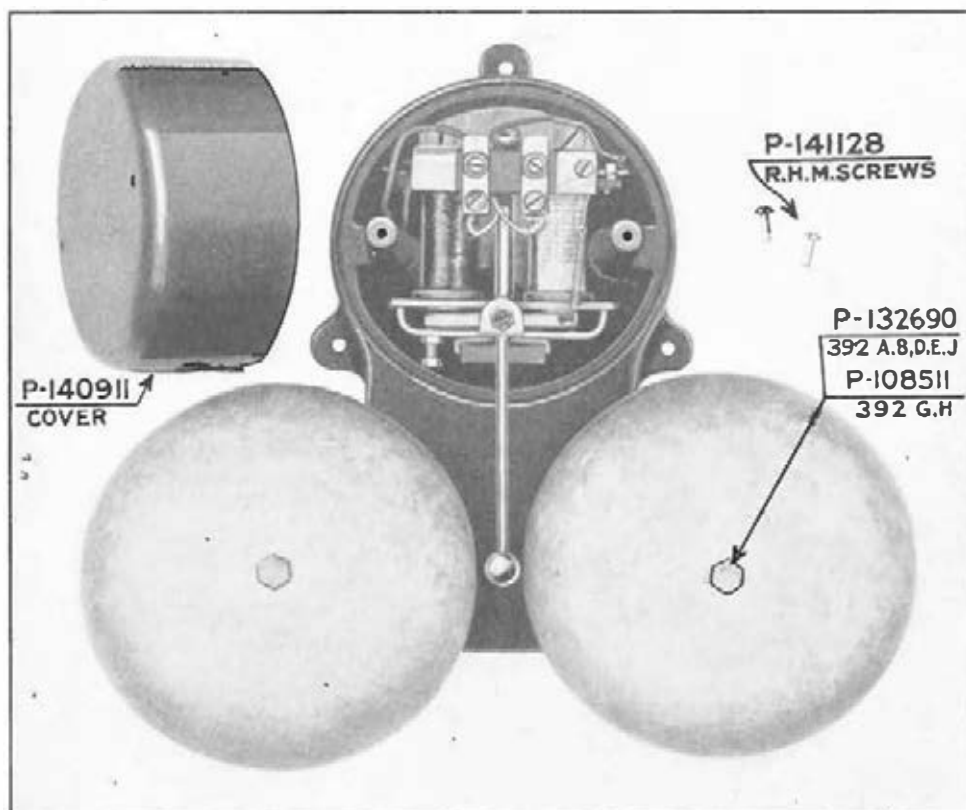
Code No.

D-76014 Biasing attachment for Nos. 392 and 342 type extension bells.

Western Electric

EXTENSION BELLS

Replacement Parts for Nos. 392 and 342 Extension Bells



Coil and Armature Parts

Note 1. Armature assembly:

392A
P-140919

392B
P-140919

392D
P-140919

392E
P-140919

392G
P-140917

392H
P-140917

392J
P-140919

Note 2. Ringer Coils:

P-145236

P-145237

P-145237

P-145238

P-145236

P-145237

P-145236

FANNING STRIPS AND FUSES



No. 2 Fanning Strip

Fanning Strips

Made from well seasoned maple. The overall dimensions are $1\frac{1}{8} \times \frac{1}{8}$ inch with lengths as given below. They are designed to mount on edge and fasten in place by means of flat head screws. The outside edge is finished black, so that white characters may be painted upon this surface for identification of the various wires. The holes through which the wires are to pass have their edges carefully chamfered in order that the insulation may not be injured.

Code No.	Capacity Pairs	Length Ins.	Used with Connecting Block	Protector
1	11	$8\frac{5}{8}$	6B	....
2	16	$12\frac{3}{8}$	6C	....
3	21	$16\frac{1}{8}$	6D	....
4	26	$19\frac{1}{8}$	6E	....
6	13	$10\frac{1}{8}$	6F	....
7	16	$9\frac{1}{4}$	10C	....
8	21	$12\frac{3}{8}$	10D	....
9	26	$15\frac{1}{4}$	10E	....
10	13	$22\frac{5}{8}$	....	1079
11	16	$27\frac{1}{8}$	....	1079



Mica Fuse, Western Union Style



Mica Fuse, Postal Style

Mica Fuses

Western Union and Postal Type

These fuses are furnished with copper or foil in either Western Union or Postal style. The fuse wire is mounted on a mica base, or inclosed between two strips of mica.

When ordering, specify ampere capacity desired. It is best to send a sample of the fuse wanted (an old one will do). If this is not possible, be sure to give the following information.

Ampere capacity.

Length.

Style (whether Western Union or Postal).

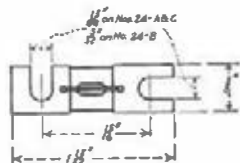
Kind of terminals or tips (copper or tin foil.)

Use (whether for exchange or telephone protection.)

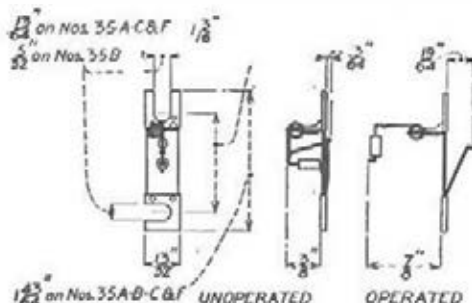
FUSES (Continued)



No. 24 Type Fuse



NOS. 35-A-B-C & F



Non-Alarm Type

These phenol fibre fuses will mount on 1 inch centers by means of Fuse Posts or individual porcelain mounting as in the No. 62 D Protector. The overall dimensions are: length $1\frac{1}{8}$ inch, width $\frac{3}{8}$ inch. The current carrying capacities and operating current values are given in the table below.

In ordering it is necessary that both the code number and rated capacity be given.

Code No.	Rated Capacity Amperes	Operates in Less Than One Minute on Amperes	Terminals	
			Finish	Slotted per Screw No.
*24A	$1\frac{1}{2}$	1	Tinned	10
	$1\frac{2}{3}$	2	Tinned	10
	$1\frac{3}{4}$	1	Copper	6
*24B	$1\frac{1}{3}$	2	Copper	6
	2	3	Copper	6
	3	4	Copper	6
24C	2	3	Copper	10

Indicator Alarm Type

These phenol fibre fuses have the fuse wire so mounted that one end is fastened to a coiled spring and the other to a flat spring on the opposite side of the base. The terminal ends have a copper tinned finish.

When the fuse operates, the coiled spring causes a glass bead to be brought into a prominent position where it acts as a visible indication of the blown fuse. The mounting of the fuse may be so arranged as to cause the flat spring on the bottom of the fuse to make contact with an alarm circuit when the fuse wire is broken.

No. 35 Type Fuses may be mounted as in the No. 62C Protector or by means of Fuse Posts. They operate on currents fifty per cent. in excess of those for which they are rated.

When ordering both the code number and rated capacity should be specified.

Code No.	Rated Amperes	Operates on		Color of Bead	Slotted For Screw	Mounting Centers, Inches
		Amperes	In Less Than			
35A	$1\frac{1}{2}$	2	$1\frac{1}{2}$ min.	White	No. 10	$1\frac{1}{4}$
35B	$1\frac{2}{3}$	2	$1\frac{1}{2}$ min.	White	No. 6	$1\frac{1}{4}$
35C	2	3	3 min.	Yellow	No. 10	$1\frac{1}{4}$
35F	$\frac{1}{2}$	$\frac{3}{4}$	$1\frac{1}{2}$ min.	Red	No. 10	$1\frac{1}{4}$
35G	3	$4\frac{1}{2}$	5 min.	Blue	No. 6	$1\frac{1}{4}$
35H	5	$6\frac{1}{2}$	5 min.	Green	No. 6	$1\frac{1}{4}$



No. 7A



No. 7T



No. 11C

Tubular Fuses

These fibre shell type fuses are carefully made from especially selected materials. The use of lead fuse wire prevents the possibility of overheating the shell. These fuses will carry their rated currents indefinitely without injury and will act reliably on one and one-half times their rated current values. Fuses of the same code number and rated capacity will give consistent performance as to rated and operating current values.

Code No.	Rated Capacity Amperes
*7A	1 to 8 as specified
7T	7
11C	7
11D	7

* Capacity as specified.

Used With

Nos. 61, 77, 1074A, 1075A and 1078A Protectors.
"B" Cable Terminals and Fuse Chambers.
Nos. 58AP and 1079 AP Protectors.
No. 25 Protector Mounting (No. 12 Type Protector).

FUSES

Tubular Fuses (Continued)



No. 60A



No. 55A

No. 60A FUSE

The No. 60A fuse is a sneak current fuse designed for protection of private branch exchanges in connection with the Nos. 58AP and 1079AP protectors. Consists of a red fibre tube approximately $1\frac{1}{8}$ inches long and $\frac{3}{8}$ inch in diameter. Will carry .35 ampere for a period of three hours and blow on .5 ampere in 210 seconds.

Code No.
60A

Protector Mounting
No. 16
No. 80

Protector Used With
58AP
1079AP

GLASS SHELL FUSES

This glass tube type fuse is equipped at both ends with tinned caps to which the fuse element is attached. Designed to mount in the No. 9A fuse block. Overall length of fuse is $2\frac{1}{8}$ inches.

Code No.	Will Carry		Will Blow on	
	Amperes	For Minutes	Amperes	In Less Than
55A	.400	**	.800	*****
62B	.250	15	.375	210 seconds



No. 47A



Telegraph Fuse

PORCELAIN SHELL FUSES

In certain cases where lines are exposed to high potential crosses, it is advisable to insert a fuse in the drop wire near the cross arm in addition to the No. 60AP protector installed at the telephone station. In such cases the No. 47 type is available; the porcelain shell used on this type of fuse will break upon the passage of a large current or upon the continued flow of smaller current. The wires in which the fuses are inserted will fall apart as the shells break, and the line end of the wire, being close to the cross arm, will not come in contact with objects on the ground. These fuses operate on one and one-half times their rated capacity.

Code No.
47A
47B

Capacity
7 amperes
14 amperes

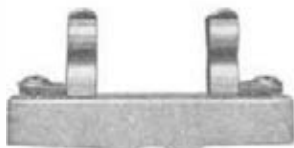
TELEGRAPH FUSES

Tubular telegraph fuses for use in the Nos. 2750, 2651, 2752 and 2753 fuse blocks are supplied in sizes up to 5 amperes capacity. The overall length of these fuses is $4\frac{1}{2}$ inches.

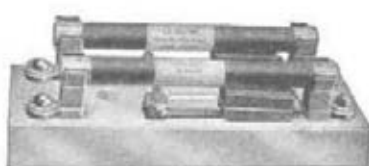
2760

As specified

FUSE BLOCKS, CHAMBERS AND POSTS



No. 9A Fuse Block



No. 2753 Fuse Block



No. 2750 Fuse Block

Fuse Blocks

WITHOUT FUSES

For Telegraph Service

List No.	Type	Description
9A	Single	A porcelain block provided with clips for holding one No. 55A fuse.
2750	Single	Porcelain fuse mounting, 1 x 6 inches, with one pair of brass spring fuse clips on $4\frac{1}{8}$ inch centers.
2751	Double	Porcelain fuse mounting, 2 x 6 inches, with two pairs of brass spring fuse clips on $4\frac{1}{8}$ inch centers.
2752	Single with arrester	Single porcelain fuse mounting, 1 x 6 inches, with one pair of brass spring fuse clips on $4\frac{1}{8}$ inch centers and two carbon block protectors.
2753	Double with arrester	Double porcelain fuse mounting, 2 x 6 inches, with two pairs of brass spring fuse clips on $4\frac{1}{8}$ inch centers and two carbon block protectors.

Fuse Chamber

Consists of a cast-iron chamber, provided with a hard rubber panel with fuse posts and a cable stub connected to the fuse post inside of a sealing chamber.

Intended for use as a part of "B" type cable terminals but can be furnished separately for mounting in "B" type cable terminal boxes. Refer to listings under "B" type cable terminals elsewhere.



No. 2A



No. 5A



No. 7A

Fuse Posts

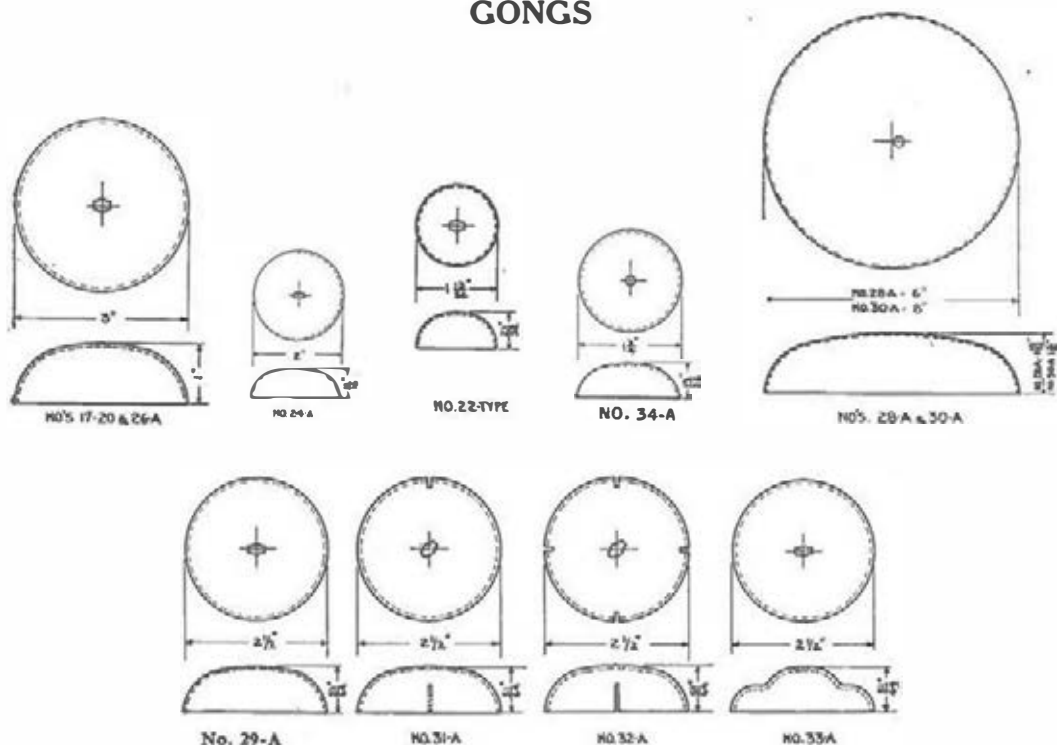
For Alarm Fuses

These fuse posts are made of brass and have the head of the screw used for clamping the fuse in place finished to correspond with the finish of the fuse end.

Fuses up to and including $1\frac{1}{2}$ ampere capacity are supplied with tinned terminals; fuses of 2 or 3 amperes capacity have copper terminals.

Code No.	Overall Dimensions, Inches			Finish	Screw No.	Used with Fuse No.
	Length	Width	Depth			
1C	$1\frac{1}{2}$	$\frac{5}{8}$	$\frac{5}{8}$	Tinned Brass	6	Nos. 24 and 35 Types
2A	$1\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{4}$	Dip Nickel	8	Nos. 24 and 35 Types
5A	2	$\frac{3}{8}$	..	Dip Nickel	..	Nos. 24 and 35 Types
5B	2	$\frac{3}{8}$	..	Brass	..	Nos. 24 and 35 Types
5C	$2\frac{3}{4}$	$\frac{3}{8}$	..	Dip Nickel	..	Nos. 24 and 35 Types
6	2	$\frac{3}{8}$	..	Brass	..	Nos. 24 and 35 Types
7A	$1\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{8}$	Tinned Brass	6	Nos. 24 and 35 Types
7B	$1\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{8}$	Tinned Brass	6	Nos. 24 and 35 Types

GONGS



Gong Dimension Diagram

Gongs

Western Electric standard $2\frac{1}{2}$ and 3 inch gongs have mounting screw holes which are slotted for engaging the projections on the gong posts of standard ringers, thus making it impossible for telephone users to inadvertently put the ringer out of adjustment by turning the gongs with the fingers (a frequent source of ringer trouble). These gongs may also be used on gong posts which are not provided with projections for engaging the "wing" holes.

All gongs here listed are formed from sheet metal.

Code No.	Metal and Finish	Principal Use
17	Brass, nickel plated.....	Former standard 3 in. gong for magento telephones. No. 26A recommended.
20	Brass, special black finish.....	Finished to resist the action of moisture and fumes. For use in No. 1336 type mine telephones and other places where similar service conditions are encountered.
22A	Brass, nickel plated.....	For use on No. 40 type ringers. Each of these gongs has a different tone.
22B	Steel, nickel plated.....	
22C	Brass, nickel plated.....	
22D	Steel, nickel plated.....	
22E	Brass, nickel plated.....	
22F	Steel, nickel plated.....	
23A	Steel, hot dipped galvanized.....	No. 392 type extension bells. Mounting screw hole drilled slightly off center to permit of adjustment.
24A	Brass, black finish.....	Where 2 inch gong is required.
26A	Brass, black finish.....	Standard 3 inch gong for magento telephones.
28A	Steel, hot dipped galvanized.....	No. 392 type extension bells. Mounting screw hole drilled slightly off center to permit of adjustment.
29A	Brass, black finish.....	Standard $2\frac{1}{2}$ inch gong for general telephone use.
31A	Brass, black finish.....	Differ from the No. 29A in that they have different tones.
32A	Brass, black finish.....	Intended for use where a number of telephones are placed close to each other.
33A	Bell metal, black finish.....	
34A	Steel, black finish.....	

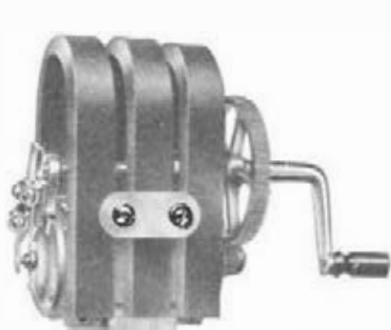
HAND GENERATORS

Western Electric hand generators are correct in both mechanical and electrical design and the materials used and manufacturing processes employed are such that their high efficiency is retained indefinitely. A few of the important features are as follows:

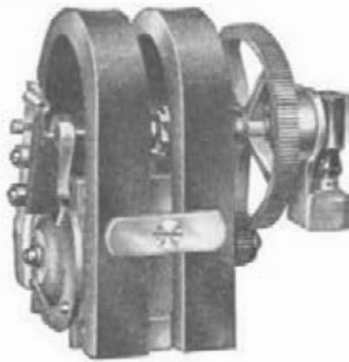
All parts are accurately machined and fitted and the bearings are of such size that no trouble due to the armature scraping on the pole pieces will be encountered even after years of service. The gears are accurately cut so that smooth noiseless operation is obtained.

All metal parts are given a protective finish and the armature winding is moistureproofed.

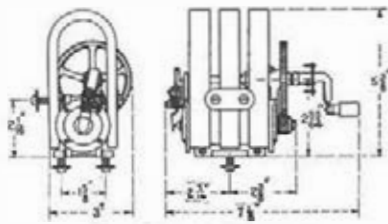
The magnets are made from steel which was developed especially for this purpose and the heat treatment employed is such that their strength is retained indefinitely.



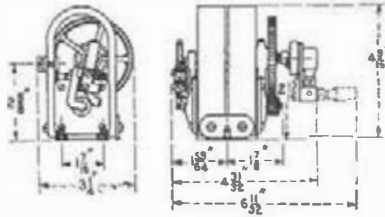
No. 22A



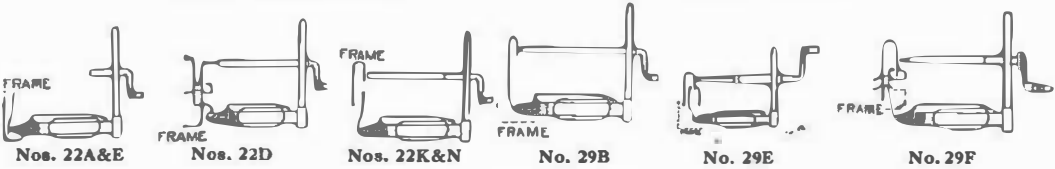
29B



No. 22 Type Generator



No. 29F Generator



Schematics of Generator Circuits

No. 22 Type Generators

The No. 22 type generator is used on lightly loaded magneto lines and may be obtained either for alternating or pulsating current.

These generators have three magnets except the No. 22E, which has only two.

Code No.	Voltage and Current	Generator Circuit	Principal Use and Description
22A	60 A.C.	Open	Telephone and small switchboards.
22D	43 P.C.	Closed	Telephones and small switchboards.
22E	42 A.C.	Open	Telephones. Same as 22A except that only two magnets are used
22K	60 A.C.	Closed	For use on lightly loaded four party selective lines.
22N	65 A.C.	Closed	Small switchboards and test sets. Has no means of opening circuit.
22T	*****	Open or Closed	Small switchboards and test sets. Has no means of opening circuit.
			Harmonic ringing in magneto telephones. Contact springs arranged for sending out impulses of current.

No. 29 Type Generators

The No. 29 type generators are used where light weight is essential as in linesmen's test sets, and portable telephones.

29B	30 A.C.	Short circuited	Used in 1017B test set. Has collapsible handle.
29E	65 A.C.	Open	Has back contact. Used in portable telephones.
29F	60 A.C.	Open	Portable telephones and No. 1017 type test sets. Has folding handle.

Western Electric

HAND GENERATORS

(Continued)

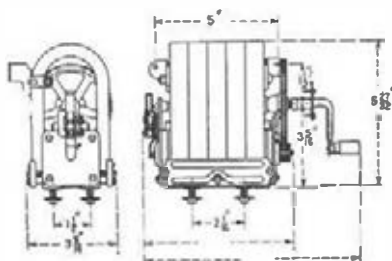
83



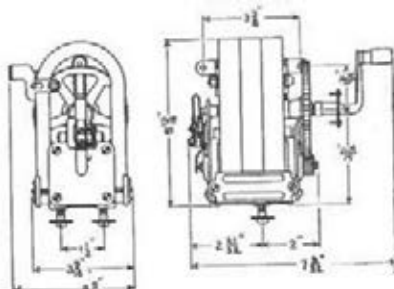
No. 48A



No. 50A



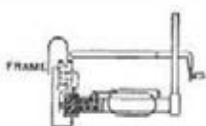
No. 48 Type Generator



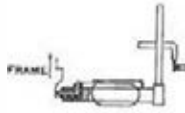
No. 50 Type Generator



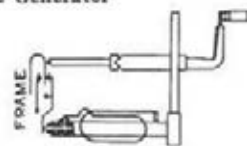
NOS. 48-A, C & G



NOS. 48-B & L



NOS. 48-H, J, K & P
Schematics of Generator Circuits



50-A.

No. 48 Type Generators

The No. 48 is our most powerful hand generator and is used in telephone for heavily loaded line service.

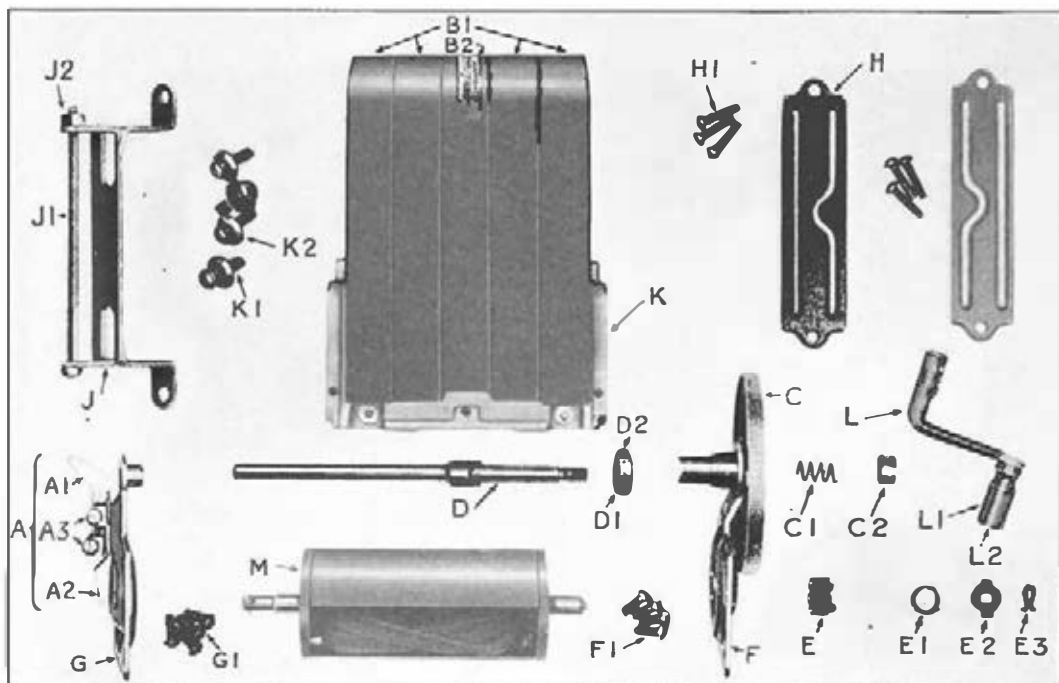
Code No.	Voltage and Current	Normal Condition of Generator Circuit	Principal Use and Description
48A	80 A.C.	Open	Standard for telephones intended for use on heavily loaded lines. Telephones designed for "secret" signalling.
48B	80 A.C. & 56 P.C.	Open	
48C	80 A.C.	Open	Mine telephones. All parts are treated to resist the action of moisture and fumes.
48G	80 A.C.	Closed*	
48H	80 A.C.	Closed*	For No. 1800 Switchboard.
48J	80 A.C.	Open	Switchboards.
48K	80 A.C.	Closed*	For No. 1800 Switchboard.
48P	80 A.C.	Closed*	Switchboards. Same as 48H except mounting brackets project to front.
48R	80 A.C.	Open	Switchboards. Not equipped with mounting brackets.
48S	80 A.C.	Open	Same as 48A except that an insulated coupling is interposed between the generator and the crank. Used in telephones designed for service on lines adjacent to high tension lines.
			Same as 48R except that all parts are treated to withstand the action of moisture.

*No switch. Closed normally and during operations.

No. 50 Type Generators

50A	60 A.C.	Open	For telephones for use on medium loaded lines.
50F	60 A.C.	Open	Same as the 50A, except that a shorter crank is provided and the rear mounting bracket is omitted. Intended for use in telephones in which a mounting bracket forms a part of the telephone.

HAND GENERATOR REPLACEMENT PARTS



Part	Name of Part	22A	22D	22E	22K	22N	29B	29E	29F	48A	48B
A	Contact Spring Assembly....	*	*	*	*	*	*	*	*	*	*
A-1	Shaft Contact Spring.....	P- 46968	P- 44597	P- 46968	.....	.....	P- 20800	P-113335	P-113335	P-101468	P-106102
A-2	Armature Contact Spring....	P- 46969	P- 44596	P- 46969	P- 46969	P- 46969	.....	P-122967	P-122967	P-103130	P-106099
A-3	But. H.M. Screw.....	P-122193	P-116353	P-122193	P-122193	P-122183	.....	P-122982	P-106222	P-106222	P-106222
B-1	End Magnet.....	P- 18383	P- 18383	xP- 18383	P- 18383	P-207127	xP- 21365	xP-122889	xP-121728	P-106117	P-106117
B-2	Center Magnet.....	P-136786	P-136786	†P-136786	P-136786	P-207128	†P-136787	†P-136789	†P-136788	P-136790	P-136790
C	Gear and Sleeve.....	P-139879	P-139885	P-139879	P-139883	P-139883	P-139885	P-139891	P-139891	P-139889	P-139889
C-1	Main Shaft Spring.....	P-141097	P- 19671	P-141097	.....	.....	P- 10293	P-135611	P-135611	P- 18377	P- 18377
C-2	Shaft Nut or Coupling.....	P- 18378	P-139870	P- 18378	.....	.....	P- 19420	P-149750	P-101492	P-101492	P-101492
D	Shaft.....	P-139882	P-139860	P-139882	.....	.....	P- 19464	P-139862	P-139862	P-139864	P-139864
D-1	Shaft Nut or Collar.....	P- 18379	P- 20087	P- 18379	P- 18379	P- 18379	P- 18379	P-113451	P-113451	P-113451	P-113451
D-2	Shaft Collar Screw.....	P- 21624	P- 21624	P- 21624	P- 21624	P- 21624	P- 21624	P-138680	P-138681	P- 21140	P- 21140
E	Pinion.....	P- 18375	P- 18375	P- 18375	P- 18375	P- 18375	P- 18375	P-122957	P-121699	P-101493	P-101493
E-1	Pinion Spring.....	P- 18375	P- 18375	P- 18375	P- 18375	P- 18375	P- 18375	P-122957	P- 42972	P- 42972	P- 42972
E-2	Pinion Washer & Pinion Cap.....	P- 21625	P- 21625	P- 21625	P- 21625	P- 21625	P- 21625	P-122964	P-103717	P- 42977	P- 42977
E-3	Cotter pin or R. H. M. Screw.....	P- 32588	P- 32588	P- 32588	P- 32588	P- 32588	P- 32588	P-122979	P-108955	P-108254	P-108254
F	Rear Bearing Bracket.....	P- 18366	P- 18366	P- 18366	P- 18366	P- 18366	P- 18366	P-124481	P-131593	P-106290	P-106290
F-1	R.H.M. Screw.....	P-146134	P-146134	P-146134	P-146134	P-146134	P-146134	P-124483	P-124482	P- 41140	P- 41140
G	Rear Bearing Bracket.....	P- 18367	P- 20094	P- 18367	P- 18367	P- 18367	P- 20037	P-124480	P-131592	P-106289	P-106143
G-1	R.H.M. Screws.....	P-146134	P-146134	P-146134	P-146134	P-146134	P-146134	P-124483	P-124482	P- 41140	P- 41140
H	Clamping Plate.....	P- 5863	P- 5863	P- 5863	P- 5863	P- 5863	P-113358	.....	.....	P-111330	P-111330
H-1	R.H.M. Screw.....	P- 41383	P- 41383	P- 41383	P- 41383	P- 41383	P- 46983	.....	.....	P- 30443	P- 30443
J	Mt. Bracket.....	.....	.....	.....	.....	.....	.....	.....	P-121710	P-121753	P-121753
J-1	R.H.M. Screw.....	.....	.....	.....	.....	.....	.....	.....	P-121774	P- 42986	P- 42986
J-2	Nut.....	.....	.....	.....	.....	.....	.....	.....	P-121771	P-101556	P-101556
K	Pin Piece.....	P- 18414	P- 18414	P- 18414	P- 18414	P- 18414	P- 21364	P-140483	P-131600	P-108260	P-108260
K-1	Mounting Screw Lower.....	P- 22779	P- 22779	P- 22779	P- 22779	P- 22779	P- 48704	.....	.....	P- 22779	P- 22779
	Upper.....	P- 14943	P- 14943	P- 14943	P- 14943	P- 14943	P- 48703	.....	.....	P-131379	P-131379
K-2	Washer.....	P-131379	P-131379	P-131379	P-131379	P-131379	.....	.....	.....	P-131379	P-131379
L	Crank Assembly.....	P-158949	P-158949	P-158949	P-158946	P-158946	P-143244	P-135306	P-143244	P-158950	P-158950
L-1	Crank Handle.....	P- 18372	P- 18372	P- 18372	P- 18372	P- 18372	P-18372	P- 18372	P- 18372	P- 18372	P- 18372
M	Armature.....	P- 44621	P- 44625	P- 44621	P- 44621	P- 44629	P- 44712	P-121693	P-121693	P-156430	P-156430

xThese are left-hand magnets.

†These are right-hand magnets.

*Order as follows: Example: 1 Contact Spring Assembly for No. 48A Generator.

HAND GENERATORS AND BOXES

Hand Generator Replacement Parts (Continued)

Part	Name of Part	48C	48G	48H	48J	48K	48P	48R	48S	50A	50F
A	Contact Spring Assembly.....	*	*	*	*	*	*	*	*	*	*
A-1	Shaft Contact Spring	P-101468	P-101468	.....	.....	.....	.....	P-101468	P-101468	P-101468	P-101468
A-2	Armature Contact Spring.....	P-103130	P-103130	P-103130	P-103130	P-103130	P-103130	P-103130	P-103130	P-103130	P-103130
A-3	But. H. M. Screw.....	P-106222	P-106222	P-106222	P-106222	P-106222	P-106222	P-106222	P-106222	P-106222	P-106222
B-1	End Magnet.....	P-107912	P-106117	P-106117	P-106117	P-106117	P-106117	P-106117	P-107912	P-106117	P-106117
B-2	Center Magnet.....	P-136791	P-136790	P-136790	P-136790	P-136790	P-136790	P-136790	P-136791	P-136793	P-136793
C	Gear and Sleeve.....	P-139889	P-139889	P-139900	P-139900	P-139900	P-139900	P-139889	P-139889	P-139889	P-139889
C-1	Main Shaft Spring.....	P-18377	P-18377	.....	.....	.....	.....	P-18377	P-18377	P-141097	P-141097
C-2	Shaft Nut or Coupling.....	P-101492	P-101492	.....	.....	.....	.....	P-158815	P-158815	P-101492	P-101492
D	Shaft.....	P-139864	P-139864	.....	.....	.....	.....	P-139874	P-139874	P-139866	P-139866
D-1	Shaft Nut or Collar.....	P-113451	P-113451	.....	.....	.....	.....	P-113451	P-113451	P-113451	P-113451
D-2	Shaft Collar Screw.....	P-21140	P-21140	.....	.....	.....	.....	P-21140	P-21140	P-21140	P-21140
E	Pinion.....	P-101493	P-101493	P-101493	P-101493	P-101493	P-101493	P-101493	P-101493	P-101493	P-101493
E-1	Pinion Spring.....	P-42972	P-42972	P-42972	P-42972	P-42972	P-42972	P-42972	P-42972	P-42972	.....
E-2	Pinion Washer & Pinion Cap.....	P-107916	P-42977	P-42977	P-42977	P-42977	P-42977	P-42977	P-107916	P-42977	P-42977
E-3	Cotter pin or R.H.M. Screw.....	P-108254	P-108254	P-108254	P-108254	P-108254	P-108254	P-108254	P-108254	P-108254	P-108254
F	Bearing Bracket.....	P-106290	P-106290	P-106290	P-103899	P-122083	P-106290	P-106290	P-106290	P-106290	P-106290
F-1	R.H.M. Screws.....	P-41140	P-41140	P-41140	P-41140	P-41140	P-41140	P-41140	P-41140	P-41140	P-41140
G	Bearing Bracket.....	P-106143	P-106289	P-106289	P-103898	P-122085	P-106289	P-106289	P-106289	P-106289	P-106289
G-1	R.H.M. Screws.....	P-41140	P-41140	P-41140	P-41140	P-41140	P-41140	P-41140	P-41140	P-41140	P-41140
H	Clamping Plate.....	P-107914	P-111330	P-111330	P-111330	P-111330	P-111330	P-111330	P-107914	P-113427	P-113427
H-1	R.H.M. Screw.....	P-107905	P-30443	P-30443	P-30443	P-30443	P-30443	P-30443	P-107905	P-30443	P-30443
J	Mounting Bracket.....	P-106176	P-106840	.....	P-106176	P-106176	P-106840	.....	.....	.....	.....
J-1	R.H.M. Screw.....	P-107906	P-42986	P-42986	P-42986	P-42986	P-42986	P-42986	P-42986	P-113428	P-140909
J-2	Nut.....	P-101556	P-101556	P-101556	P-101556	P-101556	P-101556	P-101556	P-101556	P-101556	P-101556
K	Pole Piece.....	P-108261	P-108260	P-108260	P-108260	P-108260	P-108260	P-108260	P-108261	P-113410	P-113410
K-1	Mounting Screws.....	P-107908	P-22779	P-22779	P-22779	P-22779	P-22779	P-22779	P-131380	P-22779	P-22779
K-2	Washer.....	P-131379	P-131379	P-131379	P-131379	P-131379	P-131379	P-131379	P-131379	P-131379	P-131379
L	Crank Assembly.....	P-158948	P-158947	P-158947	P-158947	P-158947	P-131286	P-158950	P-158950	P-158950	P-158949
L-1	Crank Handle.....	P-18372	P-18372	P-18372	P-18372	P-18372	P-18372	P-18372	P-18372	P-18372	P-18372
M	Armature.....	P-156431	P-156430	P-156430	P-156430	P-156430	P-156430	P-156430	P-156431	P-155522	P-155522

*Order as follows: Example: 1 Contact Spring Assembly for No. 48A generator.



No. 299F

Hand Generator Boxes

A hand generator box consists of a generator mounted in an oak cabinet having a hinged cover. The leads from the generator are connected to terminals mounted close to the inside edge of the box.

Code No.	Generator	Current	Dimensions of Box, Inches		
			Width	Depth	Length
299F	48A	Alternating.....	8	6	9
299G	48B	Alternating and pulsating.....	8	6	9
303A	22A	Alternating.....	6 $\frac{1}{8}$	4 $\frac{1}{2}$	8 $\frac{1}{2}$

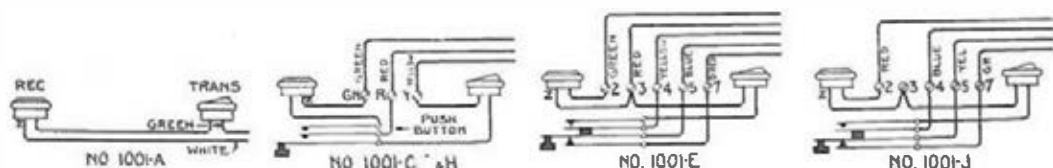
HAND SETS



No. 1001A



No. 1001C Hand Set



No. 1001 Type

The No. 1001 type hand sets were originally intended for the use of linemen and are designed to withstand the rough handling, incidental to such service. This design proved to be so satisfactory that it is now used extensively for a number of different purposes, as described below.

The handles are made of brass tubing with drawn brass end pieces and the transmitters and receivers are provided with drawn brass cases equipped with screw clamping rings, thereby making an instrument that is extremely rugged.

The No. 1001C and H hand sets are provided with a push button switch which is connected so that these hand sets function the same as the No. 1020AL desk stand. In view of this, they may be used in connection with our regular magneto and central battery desk set boxes in place of a desk stand, in cases where the service conditions are such that a hand set is required.

Code No.	Transmitter	Receiver	Cords		Push Button Spring Combination	Principal Use
			Code No.	Length		
1001A	244W	131W	{ 243 2-574 (waterproof)	{ 8 ins. 5 ft.	{ None	{ Used by lineman as a test set on central battery lines. The cord is equipped with spring connection clips.
1001C	285W	131W	{ 366 (waterproof)	{ 6 ft.	{ 2 make	{ Used with Nos. 1330 and 1331 portable magneto telephones.
1001E	244W	131W	{ 398	{ 6 ft.	{ 1 make and 1 break	{ Used with desk type Inter-phones (where 5 conductor cord is required.)
1001H	244W	131W	{ 422 (waterproof)	{ 5 ft. 2 ins.	{ 2 make	{ Used with No. 1375B portable magneto telephone.
1001J	244W	131W	{ 502	{ 6 ft.	{ 1 make and 1 break	{ Used with desk Inter-phones.

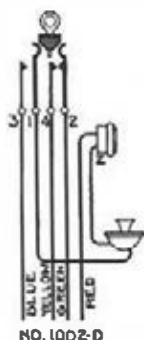
Note 1. See "Hand Set Hangers" and No. 141A Switch Hook.

Note 2. Further data on above hand set transmitters and receivers are listed under their respective headings.

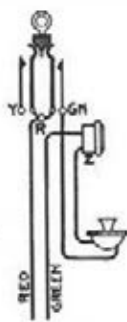
Note 3. For a hand set wired similar to the No. 1001A type, but having a cut-out button, the Nos. 1001C or H types may be used, making line connections by means of the green and yellow tracer conductors of the hand set cord only.

HAND SETS

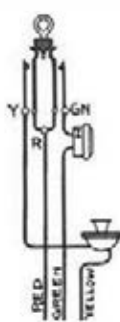
(Continued)



NO. 1002-D



NO. 1002-E



NO. 1002-AC



No. 1002AC

No. 1002 Type Hand Sets

The transmitter and receiver of the No. 1002 type hand sets are mounted on a nickel plated tubular brass frame, equipped with a hard rubber handle. A switch mounted within the frame, is actuated by a plunger which terminates in a ring by which the hand set is suspended, when not in use. When the hand set is removed from the hook, the switch is automatically closed. These hand sets function the same as certain desk stands, and, therefore, may be used in place of desk stands, if required. A hook (No. 141A switchhook) is furnished with each hand set.

Code No.	Transmitter	Receiver	Cords				Switch Combination
			Code No.	Length	Code No.	Length	
1002D	267W	141W	336	14 ins.	402	8½ ins.	429 4 ft. 6 ins. 1 make and (4 conductors) 1 break
1002E	267W	141W	336	14 ins.	402	8½ ins.	430 4 ft. 6 ins. 1 make (2 conductors) contact
1002AC	267W	141W	415	9½ ins.	414	4¼ ins.	318 4 ft. 2 make (3 conductors)

Note. The No. 1003 type hand sets are listed under Inter-phones.

Hand Set Hangers

Descriptions

- 1B** Mounts on a vertical surface for holding a No. 1001 type hand set when not in use. The hand set is suspended by its receiver, which fits into a recess in the hanger. Cast brass; black finish. Overall dimensions, 3½ inches wide, 2½ inches deep and 3¾ inches high.
- 1C** Same as the No. 1B, except that it is equipped with rubber studs and a spring, so arranged as to prevent the hand set from swaying. Used principally on steamships.



No. 1004B Hand Set



No. 1B Hanger

No. 1004-B Hand Set

An aluminum hand set primarily designed for use in railway train dispatching work for use of linemen. Line connections are made to the bottom of the hand set. By pressing a button, the necessary connections are made for conversion. Calls may be received by the receiver acting as a howler. No provisions are made for signalling from the hand, as the dispatcher is always on the line.

Includes the following:

- 1 Special No. 131W receiver per D-51129—70 ohm.
- 1 Special No. 244W transmitter per D-51130.
- 1 No. 32 induction coil.
- 1 No. 39A condenser.
- 1 No. 705 Eveready flash light battery.

HEAD BANDS AND HEAT COILS

Head Bands (Receivers)

Code No.	Description
1B	Consists of a wire head band with olive drab textile covering, equipped with adjustable yokes for holding two No. 528BW receivers (less the No. 3A head band ordinarily furnished), also for holding two No. 509W receivers.
1C	Similar to No. 1B, except for use with two No. 128W receivers.
3A	Wire head band used as part of No. 528BW receiver.
3B	Same as No. 3A, except that the wire head piece is covered with black sleeving.

The above types of Head Bands are illustrated elsewhere under "Receivers."

Heat Coils



No. 76A Heat Coil

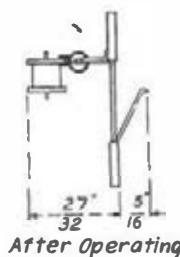
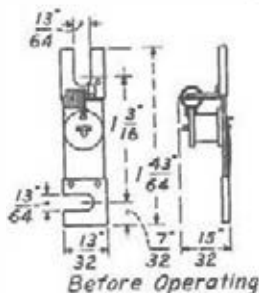


No. 40 Type Heat Coil

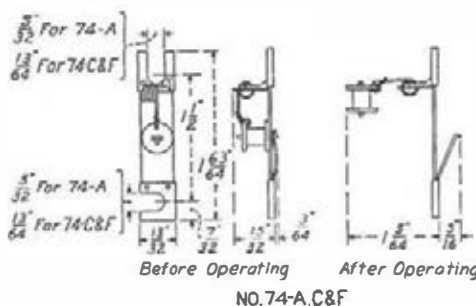
No. 76 TYPE

The No. 76A heat coil is used in the No. 1168A, No. 1168B, 1269A and 1269B protectors and in the No. 1435P, 1435H and 1435T protector groups for protecting central office equipment against sneak currents. It consists of a black hard rubber shell. When a current greater than that for which it is designed passes through the winding, the solder melts and allows a spring on the protector mounting to press the pin against a contact, thus grounding the line. Replaces No. 73A.

Code No.	Approx. Resistance	Will Operate in 210 Sec. On Amperes	For Use As
76A	3.45 ohms	.54	Heat Coil
72A	...	...	Composition Dummy
40	...	...	Brass Dummy



NO. 74-B,D,E&G



NO. 74-A,C&F



No. 74 Type Heat Coil

No. 74 TYPE

These heat coils are designed to act on small current values at which fuses will not give reliable operation. They are similar in mechanical construction to the No. 35 type fuses, differing in that a heat coil is used in place of a fuse wire. The spool of the coil is soldered to the alarm spring with low melting solder and the indicator spring is hooked into a hole in the upper spoolhead. When excessive current passes through the winding, the heat generated melts the solder, allowing the alarm spring to actuate the alarm and the indicator spring causes the spool to fly up, thereby giving a visible indication of the operated coil.

Fuse posts may be used in mounting the No. 74 type heat coils. They will carry continuously one half their operating current.

Code No.	Rated Max.	Resistance Min.	Will Operate in 210 Sec. on Current of (Amperes)	Size of Mounting Screw Required
74A	18	16	.18	No. 10
74B	3.7	3.3	.40	No. 10
74C	7	5.5	.265	No. 10
74D	3.9	3.8	.34	No. 10
74E	7	5.5	.265	No. 10
74F	57	53	.110	No. 10
74G	57	53	.110	No. 10

HOWLERS AND INDUCTION COILS

Howlers

No. 1 TYPE



No 1C Howler

The Nos. 1B and 1C howlers are equipped with a bi-polar magnet structure of the same general construction as in Western Electric receivers. They are wound to 1,000 ohms resistance and are designed primarily to operate on high frequency current such as is produced by the Nos. 1312A and 1314A railway composite telephones, No. 1004A hand set and the high frequency signalling device No. D-16411. The diaphragm of the howler may be accurately adjusted in relation to the pole pieces by rotating the front half of the case. When the correct position is obtained the case may be locked in position by means of a ring nut.

Code

No.

1B

1C

Description

Equipped with an iron mounting bracket

Mounted on a wooden base.

Overall Dimensions

Ins.

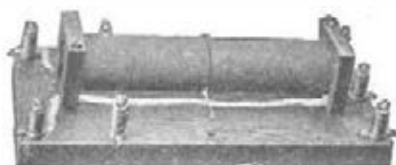
$7\frac{1}{8} \times 3\frac{1}{8} \times 2\frac{1}{4}$

$6\frac{1}{4} \times 6 \times 3\frac{1}{4}$

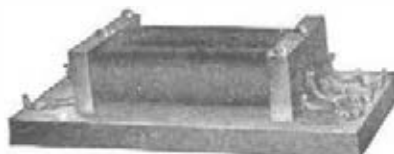
Induction Coils



No. 5



No. 10



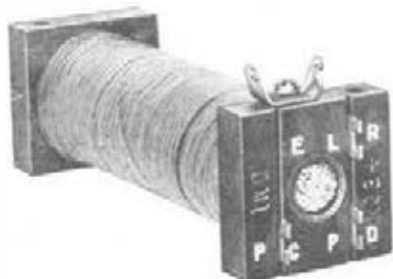
No. 24



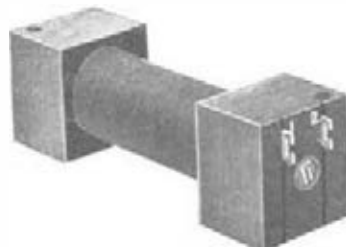
No. 23



Nos. 13, 29 and 31



No. 34

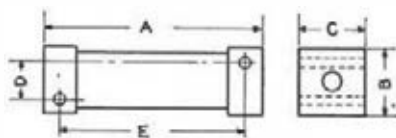


No. 46, also general design of Nos. 62 to 68

INDUCTION COILS (Continued)



Induction Coil Nos. 13, 29 and 31



Induction Coil Dimensions

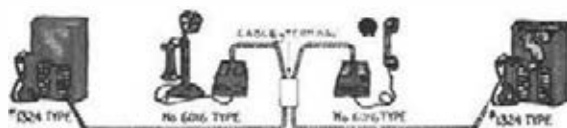
Western Electric induction coils are designed to obtain extremely high transmission efficiency. One of the important features is that the entire winding is included in the effective flux area. In other words, the entire winding is contributed to the efficiency of the induction coil; there being no dead sections of the winding to reduce its efficiency through the introduction of direct current resistance.

As a result of several years' research work, we have adopted a new core material which consists of a special steel alloy, used in the form of thin strips. This new material permits of greater transmission efficiency than was heretofore possible with any induction coil core material known to the telephone art.

Code No.	Description and Principal Use	Overall Dimensions, Ins. —(See Dimension Diagram)—				
		A	B	C	D	E
5	When equipped with a magnetic interrupter (P-101495), this induction coil is used for converting the current from three or four dry cells into a high frequency current for signalling howlers and No. 1004 hand sets. (See High Frequency Current Signalling Device).....	4 ³ / ₄	1 ¹ / ₈	1 ¹ / ₈	1 ¹ / ₈	4 ³ / ₈
10	Local and toll magnetic switchboards. Equipped with a wood base on which are mounted seven binding posts.....	8 ⁷ / ₈	4 ¹ / ₈	2 ³ / ₈	...	...
13	Standard for local battery telephones.....	3 ¹ / ₄	1	1 ¹ / ₈	⁵ / ₈	2 ¹ / ₈
23	Nos. 9 and 10 central battery, switchboards and associated desks, Nos. 1 and 4 P.B.X. switchboards and magneto switchboards.....	4 ¹ / ₄	1 ¹ / ₈	1 ³ / ₄	1 ¹ / ₈	3 ⁷ / ₈
24	No. 1 central battery switchboards and Nos. 1 and 2 toll switchboards and associated desks. Consists of two induction coils mounted side by side on a wood base together with five terminals.....	6 ³ / ₄	3 ¹ / ₄	1 ⁷ / ₈	...	...
29	Train dispatching (local battery) telephones.....	3 ¹ / ₄	1	1 ¹ / ₈	³ / ₈	2 ¹ / ₈
30	Used in train dispatching service and No. 1336H telephone set.....	4 ¹ / ₄	1 ³ / ₈	...	...	...
31	Same as the No. 13 induction coil, except that it is treated to resist the action of moisture and fumes. Used in No. 1336 type mine telephones.....	3 ¹ / ₄	1	1 ¹ / ₈	⁵ / ₈	2 ¹ / ₈
32	Used in No. 1336F telephone set and No. 1004 type hand sets for train dispatching. Similar to No. 29, except that it is treated to resist the action of moisture.....	3 ¹ / ₄	1	1 ¹ / ₈	⁵ / ₈	2 ¹ / ₈
42	Used for train dispatching service in No. 501 desk set box and No. 1317BU telephone set.....	4 ¹ / ₄	1 ¹ / ₈	1 ³ / ₄	1 ¹ / ₈	3 ⁷ / ₈
44	Train dispatching service in Receiver Circuit of No. 502 subscriber set.....	4 ¹ / ₄	1 ¹ / ₈	1 ³ / ₄	1 ¹ / ₈	3 ⁷ / ₈
46	Standard for central battery telephone. Is interchangeable with the No. 20 induction coil, which was formerly the standard.....	4 ¹ / ₈	1 ³ / ₈	1 ³ / ₈	⁷ / ₈	3 ⁷ / ₈
43	Train dispatching service in Transmitter Circuit of No. 502 subscriber set.....	4 ¹ / ₄	1 ¹ / ₈	1 ³ / ₄	1 ¹ / ₈	3 ⁷ / ₈
62	Primarily for use in "B" operators anti-side-tone telephone circuit.....	4 ¹ / ₄	1 ¹ / ₈	1 ³ / ₄	1 ¹ / ₈	3 ⁷ / ₈
63	Primarily for use in "A" operators and P.B.X. attendant's anti-side-tone telephone circuit.....	4 ¹ / ₄	1 ³ / ₈	1 ³ / ₄	1 ¹ / ₈	3 ⁷ / ₈
65	Primarily for use in toll operators anti-side-tone circuit.....	4 ¹ / ₄	1 ¹ / ₈	1 ³ / ₄	1 ¹ / ₈	3 ⁷ / ₈
67, 68	For use in loud speaking telephone for communication in central offices between the test desk and main frame.....	4 ¹ / ₄	1 ¹ / ₈	1 ³ / ₄	1 ¹ / ₈	3 ⁷ / ₈

Picture Index of Inter-phone Systems

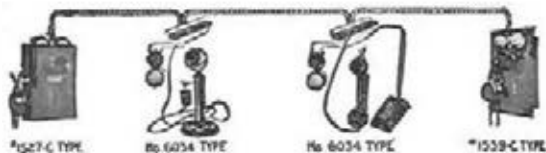
SYSTEM NO. 1



System No. 1

- Selective Ringing—Selective Talking Service**
 3 up to 24 stations. Pages 94-98
 1. Any station can ring selectively any other station.
 2. More than one conversation can take place simultaneously.
 3. Apparatus, operation and appearance, the highest grade obtainable.
 (For systems Nos. 7, 8, 9 and 10 see Apartment House Inter-phones on following pages.)

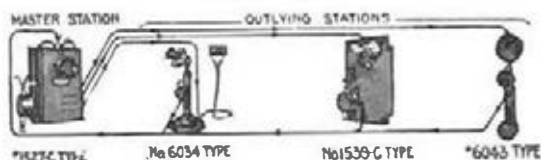
SYSTEM NO. 11



System No. 11

- Selective Ringing—Common Talking Service**
 3 up to 8 stations. Page 99
 1. Any station can ring selectively any other station.
 2. Only one conversation can be carried on at a time.
 3. Apparatus pleasing in appearance and moderate in cost.

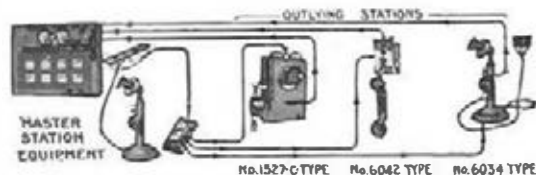
SYSTEM NO. 12



System No. 12

- Master and Outlying Stations—Common Talking Service**
 3 up to 8 stations. Pages 100-101
 1. The "master station" can call any one of the "outlying stations," selectively and the outlying stations can call the master station (but not each other).
 2. Wall, desk or hand set inter-phones may be used interchangeably in this system for both the master and outlying stations.
 3. Only one conversation can be carried on at a time.

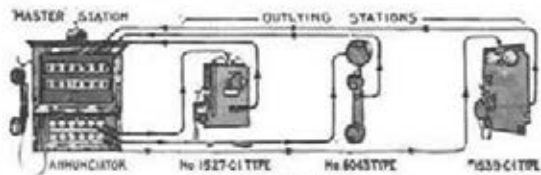
SYSTEM NO. 12A



System No. 12A

- Master Annunciator and Outlying Stations—Common Talking Service**
 3 up to 20 stations. Page 102
 1. Adapted for schools where the principal must call the teachers individually and teachers must call the principal but not each other.
 2. Same as System No. 12 except master station is equipped with an annunciator for identifying calls from the outlying stations.
 3. The master station annunciator is of the Electrical Reset type.
 4. Only one conversation can be carried on at a time.

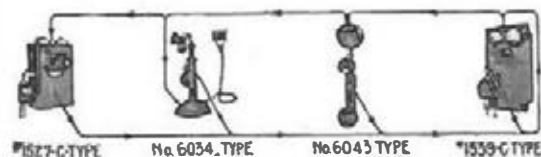
SYSTEM NO. 12B



System No. 12B

- Master Annunciator and Outlying Stations—Common Talking Service**
 3 up to 24 stations. Pages 103-104
 Formerly Known as Systems No. 16B&C
 1. The "outlying stations" can ring the "master annunciator" station but not each other.
 2. Master annunciator station may or may not have push buttons for calling any one of the outlying stations.
 3. This system is also designed for replacing existing ordinary annunciator and push button systems (where the wiring is suitable).
 4. Only one conversation can be carried on at a time.

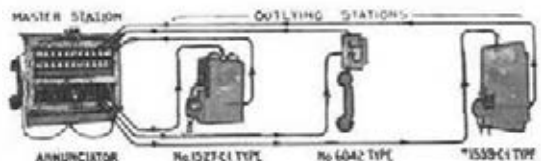
SYSTEM NO. 15C



System No. 15C

- Code Ringing—Common Talking Service**
 2 up to 6 stations. Page 106
 1. A simple private line system (requires only 3 line wires between stations).
 2. When a button is pressed at any station the bells of all other stations will ring simultaneously.
 3. The various stations are called by signalling each one with a different code.
 4. Only one conversation can be carried on at a time.

SYSTEM NO. 18



System No. 18

- Master Annunciator with Connecting Cords**
 10 up to 70 stations. Pages 107-108
 1. From the "master station annunciator" any one of the "outlying stations" can be called selectively, or the master station can be called from the outlying stations.
 2. Communication can be established between any two outlying stations by means of connecting cords at the master station annunciator.

Note. These diagrams are intended to show the Ringing Service provided for the various Inter-phone systems and should not be confused with the wiring diagrams, which are shown in a separate bulletin, "Installing and Maintaining Western Electric Inter-phones."

Western Electric INTER-PHONES

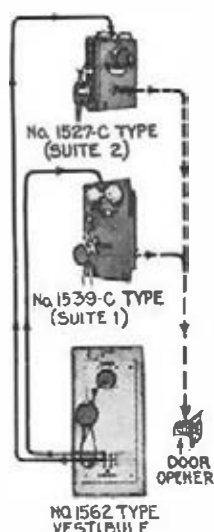
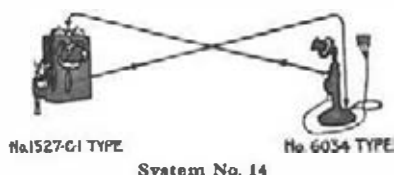
Picture Index of Inter-phone Systems

SYSTEM No. 14

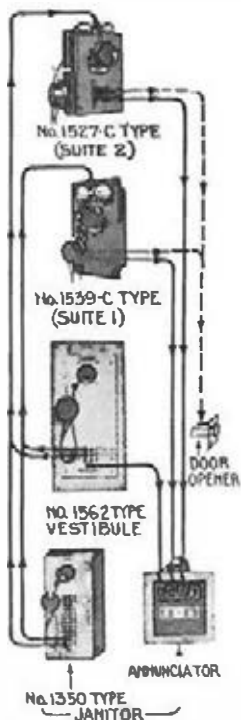
Private Line

2 Stations Only Page 105

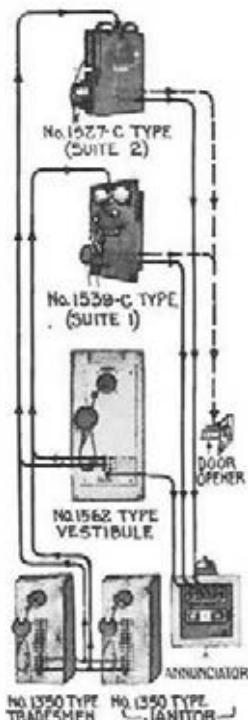
1. For connecting two points separated by a mile or less.
2. Only two line wires are required for connecting between the two stations.
3. Either station can ring and converse with the other.



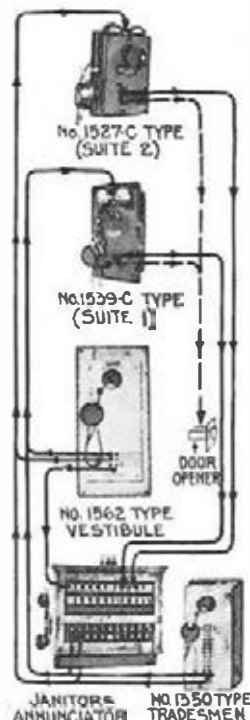
SYSTEM No. 7



SYSTEM No. 8



SYSTEM No. 9



SYSTEM No. 10

APARTMENT HOUSE SYSTEMS Nos. 7, 8, 9 AND 10 Selective Talking (Non-Interfering Service)

Pages 109-111

Systems Nos. 7, 8, 9 and 10 will furnish selective ringing and selective talking (or non-interfering) service, making it possible for a number of conversations to take place simultaneously.

System No. 7

Non-Interfering Service

One vestibule and up to 24 suite Inter-phones..... Page 110

1. Vestibule can call apartments.
2. Apartments can open door, if desired.

System No. 8

Non-Interfering Service

One vestibule, one janitor and up to 24 suite Inter-phones..... Page 110

1. Vestibule can call apartments and janitor.
2. Apartments can call janitor and open door, if desired.
3. Janitor can call apartments.

System No. 9

Non-Interfering Service

One vestibule, one janitor, one tradesman's and up to 24 suite Inter-phones..... Page 110

1. Vestibule can call apartments and janitor.
2. Apartments can call janitor and open door if desired.
3. Janitor and tradesmen can call apartments.

System No. 10

Non-Interfering Service

One janitor's switchboard, two or more vestibule and tradesmen's Inter-phones and any number of suite Inter-phones up to 70. Page 111
This system provides the same service as in System No. 9, but on a larger scale. Intended for use where several vestibules in the same or adjoining apartments are to be served by one janitor. A maximum of 24 suite Inter-phones can be connected to each vestibule set.

Note. The above diagrams are intended to show the ringing service only, and should not be confused with the wiring diagrams, which are shown in a separate bulletin, "Installing and Maintaining Western Electric Inter-phones."

INTER-PHONES

Picture Index of Inter-phone Systems

APARTMENT HOUSE SYSTEMS— (Continued)

Systems No. 20 and 21

Selective Ringing—Common Talking Service
Pages 112 and 115

There are six combinations of the Nos. 20 & 21 System suitable for systems consisting of one vestibule and up to 24 suite inter-phones.

Systems No. 20A and 21A

Pages 113 and 116

1. Vestibule can call apartments.
2. Apartments can open door.

Systems No. 20C and 21C

Pages 113 and 116

1. Vestibule can call apartments and janitor.
2. Apartments can open door.

Systems No. 20D and 21D

Pages 113 and 116

1. Vestibule can call apartments and janitor.
2. Apartments can open door and call janitor.

Systems No. 20E and 21E

Pages 114 and 117

1. Vestibule can call apartments and janitor.
2. Apartments can open door and call janitor and laundry.

Systems No. 20G and 21G

Pages 114 and 117

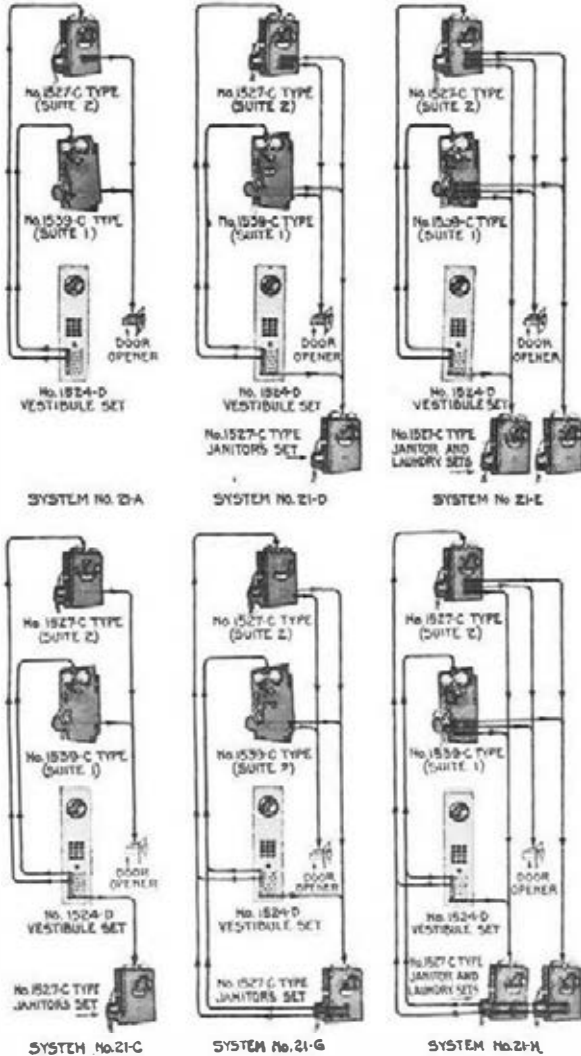
1. Vestibule can call apartments and janitor.
2. Apartments can open door and call janitor.
3. Janitor can call apartments.

Systems No. 20H and 21H

Pages 114 and 117

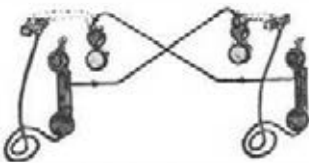
1. Vestibule can call apartments and janitor.
2. Apartments can open door and call janitor and laundry.
3. Janitor and laundry can call apartments.

Note. The above diagrams are intended to show the ringing service only, and should not be confused with the wiring diagrams, which are shown in a separate bulletin, "In-



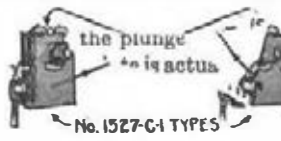
stalling and Maintaining Western Electric Inter-phones."

INTER-PHONE OUTFITS



Outfit No. 17
Page 124

Composed of 2 No. 1003 Type Hand Set Inter-phones and installing material complete in one box.



Outfit No. 30
Page 124

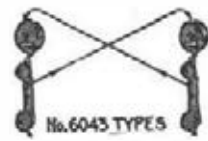
Includes two private line surface wall Inter-phones packed in one box.

Outfit No. 30A

Includes one No. 30 Outfit and installing material for inside use.

Outfit No. 30B

Includes one No. 30 Outfit and installing material for outside use.



Outfit No. 31
Page 124

Includes two private line surface hand set Inter-phones packed in one box.

Outfit No. 31A

Includes one No. 31 Outfit and installing material for inside use.

Outfit No. 31B

Includes one No. 31 Outfit and installing material for outside use.

INTER-PHONES

System No. 1

Selective Ringing—Selective Talking Service



Inter-phones for the No. 1 System represent the highest standards of design, engineering and refined manufacture. Four types of Inter-phones are provided, namely, Surface Wall, Flush Wall, Desk and Hand Sets, and they may be used interchangeably in the same system. These sets all incorporate the same important refinements, as listed hereinafter.

The Transmitter and Receiver are of the same type and high grade of construction as those used for public telephone exchange service. Due to their character, the transmission is pleasingly uniform and clear throughout the system with a minimum of battery consumption. These transmitters and receivers are familiar to telephone users throughout the world.

The Vibrating Bells and Buzzers are wound to 10 ohms with enameled insulated wire, and have the following advantages (over the low resistance bells which are to be found on the market).

- (a) The current required to ring on long and short lines is more nearly equalized.
- (b) The trouble experienced with armature adjustment is decreased.
- (c) On account of the high resistance less ringing current is used and the life of the battery is lengthened, lowering the maintenance cost.
- (d) The enameled insulation on the windings being moistureproof, assures against current leakage, or short-circuiting due to moisture or poor insulation.
- (e) Avoids use of an excessive number of dry cells to ring the bells of distant stations and prevents harmful sparking at bells near the battery (as would be the case with two or three ohm bells).

The Terminal Block located in the set is made of hard maple which has been boiled in beeswax to make it impervious to moisture. After this treatment, it is given a coat of insulating varnish. On the terminal blocks are mounted terminal connections having a solder terminal and a screw terminal. To the solder terminal is connected the local wiring of the set, while the screw terminal provides an easy method of connecting to the inter-phone cable, no soldering being required to make a permanent cable connection. All terminals are plainly marked on the terminal block in order to easily identify the local cabling and inter-phone wiring.

The Local Wiring from the push button keys, transmitter, bell, retardation coil and switchhook to the terminal block is made by means of a neatly formed cable. Each wire is colored differently in order to easily trace the wiring or identify it in any part of the set. The wires in the local cable form are thoroughly treated to keep out moisture and then laced with linen cord to keep them in shape. The wiring to the apparatus and terminals is soldered to insure a permanent and reliable connection. The cable is so formed and enough slack left in it to allow the face plate to be opened and closed for inspection, without straining, bending or in any way interfering with the wiring. To further support the form and hold it in position, leather straps are fastened to the terminal base and ringing key frame.

INTER-PHONES

System No. 1 (Continued)

Selective Ringing—Selective Talking Service

The **Interior Apparatus**, such as the transmitter mounting, switchhook, vibrating bell, bell adjusting mounting, and retardation coil are mounted on a treated maple block and fastened to the faceplate. This method insulates the apparatus and affords uniform alignment. All terminals are marked in order to easily connect and trace cord and wire connections.

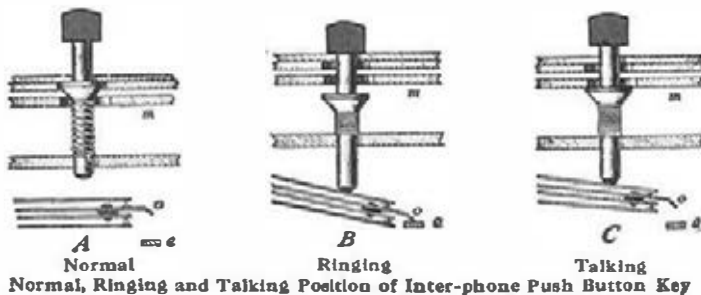
A **Retardation Coil** of 100 ohms resistance is contained in each Inter-phone. It furnishes talking current from one talking battery for all conversations, provides against "cross-talk" and reduces the drain from the battery to a minimum.

The **Metal Parts** of the wall sets and desk set key boxes, with the exception of the transmitters and bells, are treated with the Parker Rustproof Process. This consists of treating the parts in a hot chemical bath, which changes the surface of the metal to a non-rusting basic phosphate.

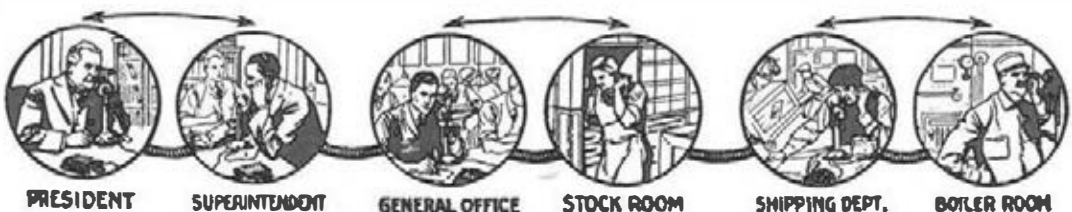
The **Protecting Surface** provided by the Parker Process does not add an additional coating of some other non-oxidizing material, but it is practically a part of the metal itself and prevents rust from spreading if it should start by the exposure of the bare metal at any spot.

Durable Black Enamel Baked On (over the Parkerized surfaces) provides a tough elastic, non-chipping finish, two coats of the enamel being applied on surfaces exposed to view.

The **Push Button Keys**, and their operating mechanism, are mounted in a rigid metal frame. In designing this key two operations are arranged for (1) for ringing, and (2) for talking.



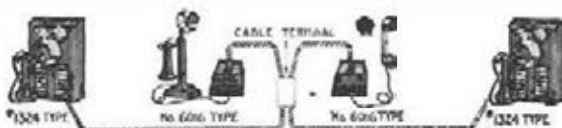
Each key consists of a hard rubber push button mounted on a metal plunger, which passes through a hole in a movable locking plate ("m"), (which is under the spring tension). When the button is completely depressed ("B") the spring ("o") makes contact with the ringing battery supply at ("e"), causing the ringing current to flow to the station to which this particular key is connected, and ringing the bell at that station. When the pressure is released, the plunger returns to an intermediate position ("C") breaking the ringing contact and placing the inter-phone on the line of the station called ready for conversation. While the conversation is taking place, the plunger is automatically held in the talking position by the locking plate ("m") and held there until the plate is actuated by depressing another button. The pressing of another button causes the locking plate ("m") to release the key so that it assumes its normal position as shown in "A." Talking current for the inter-phone is cut off as soon as the receiver is placed back on the switchhook.



INTER-PHONE SYSTEM

SYSTEM NO. 1

Selective Ringing—Selective Talking



System No. 1. Showing 4 Stations in One System

Service. For use in business organizations, industries, stores, institutions, large residences, etc., where frequently more than one conversation will take place at the same time, where instantaneous connections without loss of time are necessary and where the highest grade of transmission is required.

Operation. Each station can (by merely pressing a button) selectively ring and talk with any other station without disturbing the rest of the stations in the system and as many separate conversations can be carried on simultaneously as there are pairs of Inter-phones. For example, in a system consisting of six Inter-phones, three separate conversations can be carried on at the same time.

For each station in the system, one push button key is required in each Inter-phone.

Capacity. The Inter-phones are available in standard sizes of 6, 12, 16, 20 and 24 buttons.

Types of Inter-phones. Wall, desk or hand set Inter-phones may be used interchangeably in this system. The Inter-phones are described in detail on the preceding pages.

ACCESSORIES

Cable

For connections between the various stations, cable specially designed for Inter-phones can be supplied. A system requires a sufficient amount of cable for connection to each station, the cable being run by the shortest or most convenient route between the various station locations. This cable includes the necessary number of wire conductors (two pairs for battery leads and one pair for each station in the system) and is furnished in three different types to suit various locations and conditions:

Type	6 Stations	12 Station	16 Stations	20 Stations	24 Stations
Fireproof braid.....	No. 134B	No. 141B	No. 157B	No. 158B	No. 136B
Green cotton braid.....	No. 155B	No. 156B	.....	.....	.....
Lead covered.....	No. 134B	No. 141B	No. 157B	No. 158B	No. 136B

These cables are described under "Inter-phone accessories."

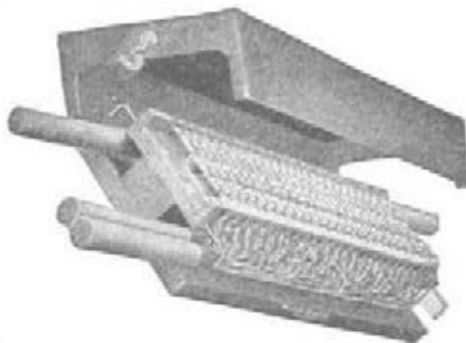
Cable Terminals

A cable terminal should be used wherever a junction is to be made between cables. For example: Where an outside lead-covered cable is connected to an interior cable, or wherever a branch is taken off from the main cable. In cases where the cable can be run direct to the Inter-phone, no cable terminal is necessary. The number of cable terminals required should be determined by the installer.

For 6 and 12 button systems use the No. 19A cable terminals.

For 16, 20 and 24 button systems use the No. 19B cable terminal.

Cable terminals are described under "Inter-phone accessories."



No. 19B. Cable Terminal with Cable Connections

Batteries

Not more than twelve Blue Bell dry cells will be necessary for operating the system. (Five cells for the talking circuit; four to seven cells for the ringing circuit, depending upon length of line.)

The cells can be placed in the basement or any other accessible place.

Detailed information for installing, including wiring diagrams, battery requirements, cable connections, etc., are included in our bulletin, "Installing and Maintaining Western Electric Inter-phones," which will be furnished upon request.

INTER-PHONES

Description of Selective Talking Inter-phones (Continued)

SYSTEM NO. 1

Selective Ringing—Selective Talking Service

WALL INTER-PHONES

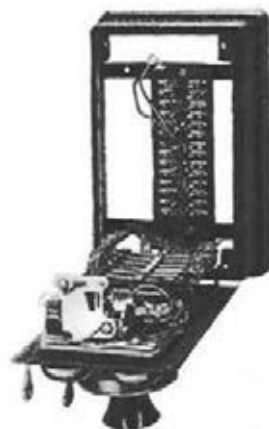
No. 1324 Type

The No. 1324 type Inter-phone is an all metal set having a hinged face plate, movable transmitter and hand receiver. The sets are finished in black enamel. The face being hinged, makes it possible to easily inspect all connections and apparatus, without disturbing the installation.

This Inter-phone is furnished in 6, 12, 16, 20 and 24 button sizes.



No. 1324 Type Wall Inter-phone



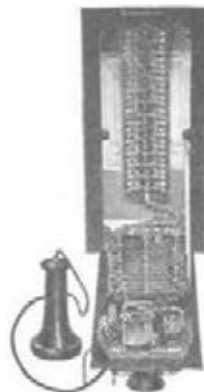
Open View Wall Inter-phone



No. 1355 Type Wall Inter-phone



Metal Outlet Box



Interior of No. 1355 Type Wall Inter-phone

No. 1355 TYPE

The No. 1355 type Inter-phone is a flush mounting set having a steel face plate on which is mounted all of the talking and signalling apparatus and a sheet steel outlet box arranged for $\frac{3}{4}$ inch conduit. The outlet box can be separated from the set and built into the wall during the construction of the building. The face plate is hinged at the bottom, making all terminals easily accessible for installation or inspection. The set is compact but not crowded, and designed to meet the most exacting requirements. The sets are finished in black enamel. Furnished in 16, 20 and 24 button sizes.

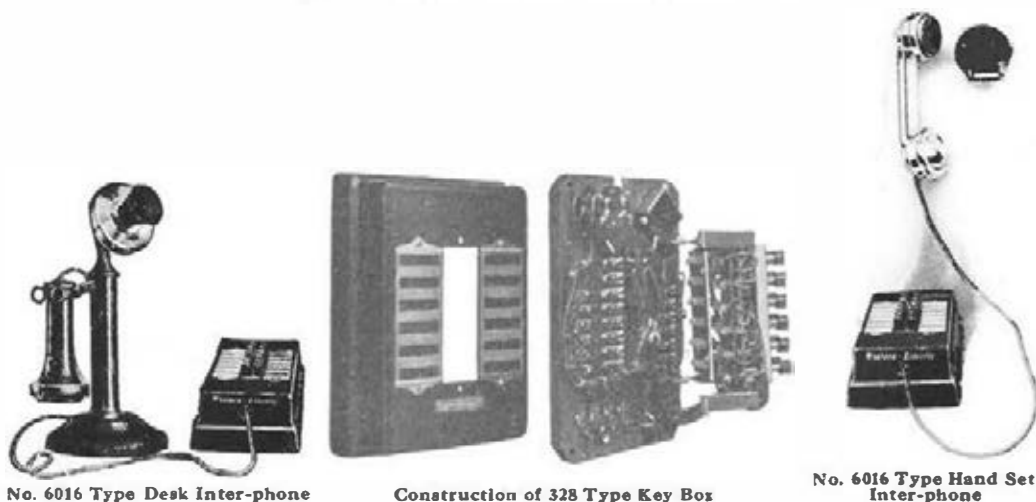
No. of Buttons	Code No.	Mounting	Dimensions—Inches					
			Height	Housing Width	Depth	Height	Outlet Box Width	Depth
6	1324C-6	Surface	10	6 $\frac{3}{8}$	3 $\frac{1}{8}$	....	....	....
12	1324C-12	Surface	10	6 $\frac{3}{8}$	3 $\frac{1}{8}$	....	....	....
16	1324C-16	Surface	14 $\frac{1}{8}$	7 $\frac{1}{8}$	3	....	....	....
20	1324C-20	Surface	14 $\frac{1}{8}$	7 $\frac{1}{8}$	3	....	....	....
24	1324C-24	Surface	14 $\frac{1}{8}$	7 $\frac{1}{8}$	3	....	....	....
16	1355C-16	Flush	14 $\frac{1}{2}$	6 $\frac{7}{8}$	....	12 $\frac{1}{8}$	5 $\frac{1}{4}$	3 $\frac{1}{4}$
20	1355C-20	Flush	14 $\frac{1}{2}$	6 $\frac{7}{8}$	....	12 $\frac{1}{8}$	5 $\frac{1}{4}$	3 $\frac{1}{4}$
24	1355C-24	Flush	14 $\frac{1}{2}$	6 $\frac{7}{8}$	....	12 $\frac{1}{8}$	5 $\frac{1}{4}$	3 $\frac{1}{4}$

INTER-PHONES

Description of Selective Talking Inter-phones (Continued)

SYSTEM NO. 1

Selective Ringing—Selective Talking Service



No. 6016 Type Desk Inter-phone

Construction of 328 Type Key Box

No. 6016 Type Hand Set Inter-phone

DESK AND HAND SET INTER-PHONES

No. 6016 Type Desk Inter-phones

The No. 6016 type desk Inter-phone consists of a desk stand and a metal key box which employ the same operating mechanism as described under "Push button keys."

The Desk Stand is finished in dull black. It is the same type of Western Electric desk stand that is generally used for public telephones, millions of which are in service, its efficiency and dependability being well known.

The Key Box is finished in dull black enamel and is provided with four rubber feet to keep the metal housing from scratching the table or desk. The connecting cord between the key box and the desk stand is 5½ feet long. Cable entrances are provided at the bottom and ends of the box. Furnished in 6, 12, 16, 20 and 24 button sizes.

No. of Buttons	Code No.	Desk Stand	Cord, Ft.	Includes		Dimensions—Inches		
				Key Box		Width	Length	Depth
6	6016D-6	1120BE	5½	328C-6		5	7½	2⅝
12	6016D-12	1120BE	5½	328C-12		5	7½	2⅝
16	6016D-16	1120BE	5½	328C-16		5¾	10¾	2⅝
20	6016D-20	1120BE	5½	328C-20		5¾	10¾	2⅝
24	6016D-24	1120BE	5½	328C-24		5¾	10¾	2⅝

No. 6016 Type Hand Set Inter-phone

The No. 6016 type hand set Inter-phone is the same as the No. 6016 desk set type, except that it employs a Western Electric No. 1001 type hand set and hanger instead of a desk stand.

The Hand Set is nickel plated, of pleasing appearance and extremely sturdy construction. This same type of hand set has been in use for years by telephone linemen and outside repairmen, which attests to its ability to withstand severe service and rough usage.

The Hand Set Hanger is made of cast metal and finished in black. Furnished for supporting the hand set when not in use.

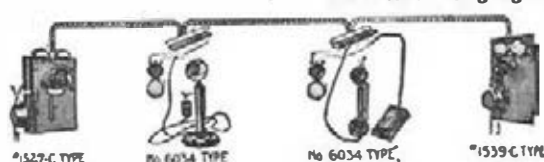
The Key Box is of the same type described above for use with the No. 6016 desk type Inter-phone.

No. of Buttons	Code No.	Hand Set	Cord, Ft.	Includes		Dimensions—Inches		
				Hand Set Hanger	Key Box	Width	Length	Depth
6	6016H-6	1001J	6	1B	328C-6	5	7½	2⅝
12	6016H-12	1001J	6	1B	328C-12	5	7½	2⅝
16	6016H-16	1001J	6	1B	328C-16	5¾	10¾	2⅝
20	6016H-20	1001J	6	1B	328C-20	5¾	10¾	2⅝
24	6016H-24	1001J	6	1B	328C-24	5¾	10¾	2⅝

INTER-PHONES

System No. 11

Selective Ringing—Common Talking



System No. 11.

Service. For use in residences, banks, institutions, wa houses, stores or other mercantile establishments where conversations can be limited to one at a time.

Operation. Each Inter-phone in the system is equipped with a number of push buttons (one for each other station in the system). By depressing the button marked with the name or number of the station wanted, the bell at that station will ring and there only.

Any station in the system can selectively ring any other station. Only one conversation can be carried on at a time.

Capacity. The wall type Inter-phones can be furnished in capacities of 2, 3, 4, 6 and 8 buttons, accommodating 3, 4, 5, 7 and 9 stations respectively in a system.

The desk and hand set Inter-phones are furnished in capacities of 4 and 8 buttons, accommodating 5 and 9 stations respectively in a system.

Types of Inter-phones. Wall, desk or hand type Inter-phones may be used interchangeably in the same system. These Inter-phones are described in detail under the heading of "Description of Common Talking Inter-phones."

No. 1527C-4
Surface Type

No. of Buttons	Wall Type Inter-phones		Desk Set Inter-phones	Hand Set Inter-phones
	Surface	Flush		
2	1527C-2	1539C-2	.....	.....
3	1527C-3	1539C-3	.....	.....
4	1527C-4	1539C-4	6034M	6034AZ
6	1527C-6	1539C-6	.....	.....
8	1527C-8	1539C-8	6034P	6034BB

No. 1539C-3
Flush Inter-phone

ACCESSORIES

Retardation Coil

A No. 51H retardation coil must be ordered separately for installation near the battery of each system.

Cable

For connection between the various stations, cable especially designed for Inter-phones can be furnished. This cable includes the necessary number of wire conductors (3 common wires and one individual wire for each station).

Cables are described under "Inter-phone accessories."



No. 6034 Type Inter-phone



No. 6034 Type Hand Set Inter-phone

	With Fireproof Braid	With Green Cotton Braid	With Lead Covering
For 3 and 4 button systems....	Code No. 161B	Code No. 142B	Code No. 161B
For 6 and 8 button systems....	Code No. 162B	.....	Code No. 162B

Connecting Blocks

Where a junction is to be made between cables, or wherever a branch is taken off the main cable, a connecting block should be used. In cases where the cable can be run direct to the Inter-phone, the connecting block is not required. The number of connecting blocks required depends upon local conditions. The No. 6G connecting block will answer the purpose in most cases.

Batteries

Five Blue Bell dry cells are required for the operation of this system, when the distance between the two stations farthest apart is 750 feet or less, and Inter-phone cable, listed above, is used. On lines of greater length, it is recommended that instead of increasing the number of battery cells to more than five, larger wire be used. The Blue Bell dry cells can be placed in the basement or any other accessible place.

Note. Detailed information covering wiring diagrams of system and Inter-phones, number and size of wires contained in cables, connecting blocks, battery requirements, etc., can be found in the booklet, "Installing and Maintaining Western Electric Inter-phones," which will be furnished upon request.

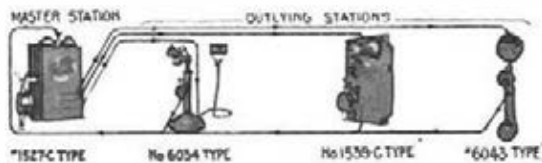


51H Retardation Coil

INTER-PHONES

System No. 12

Master Station—Common Talking



Service. Consists of one centrally located "Master Station" Inter-phone to which are connected other "outlying station" Inter-phones. The system provides for communication from a central point to different stations and vice versa.

Operation. The Master Station Inter-phone is equipped with a number of push buttons; one for each outlying station in the system. By depressing the button marked with the name or number of the outlying station wanted, the bell at that station will ring and there only.

The outlying stations are equipped with only one button which will ring the master station when depressed.

Only one conversation can be carried on at a time.

Capacity. One Master Station and from two to eight outlying stations.

Types of Inter-phones. Wall, desk and hand set Inter-phones may be used in this system for either the master or outlying stations.



No. 1527C-4
Wall Inter-phone



No. 1539C-2
Wall Inter-phone



No. 6034 Type Hand Set Inter-phone



No. 6034 Type Desk Inter-phone

MASTER STATIONS

These Inter-phones are described in detail under "Description of Common Talking Interphones."

No. of Buttons	Metal Wall Type Inter-phones		Desk Set Inter-phones	Hand Set Inter-phones
	Surface	Flush		
2	1527C-2	1539C-2	.....	.....
3	1527C-3	1539C-3	.....	.....
4	1527C-4	1539C-4	6034M	6034AZ
6	1527C-6	1539C-6	.....	.....
8	1527C-8	1539C-8	6034P	6034BB

INTER-PHONES System No. 12 (Continued)



No. 1527C-1
Surface Inter-phone



No. 6034 Type Desk Inter-phone



No. 1539C-1
Flush Inter-phone



No. 6043E
Hand Set Inter-phone



No. 6042E
Hand Set Inter-phone



No. 6042K
Hand Set Inter-phone

OUTLYING STATIONS

No. of
Buttons
1

—Metal Wall Type Inter-phones—
Surface 1527C-1 Flush 1539C-1

Desk Set
Inter-phones
6034AP

Hand Set
Inter-phones
6042K
*6042E
6043E

**No. 6042E is same as No. 6042K, but without face plate and wall box.

ACCESSORIES

Retardation Coil

A No. 51H retardation coil must be ordered separately with each master station Inter-phone and installed near the battery of the system.



No. 51H Retardation Coil

Wiring

For connections between the outlying stations and the master station either cable or insulated wires can be used, depending largely upon the layout of the system. Three common wires are required throughout the system, and in addition, one individual wire from the master to each outlying station. Where there is a long run of a large number of wires, it will be found economical to use cable, and at all distributing and junction points, to install connecting blocks. From these connecting blocks separate wires can be run to the Inter-phones. The sizes of cable and the number of connecting blocks required should be determined in accordance with the installation instructions.

Batteries

Five Blue Bell dry cells are required for the operation of this system when the distance between the master station and most distant outlying station is 750 feet or less and No. 22 B. & S. gauge wire (as in the case of Western Electric cable) is used.

On lines of greater length it is recommended that instead of increasing the number of battery cells to more than five, larger wire be used. This should be determined in accordance with the installation instructions.

The Blue Bell dry cells can be placed in the basement or any other accessible place.

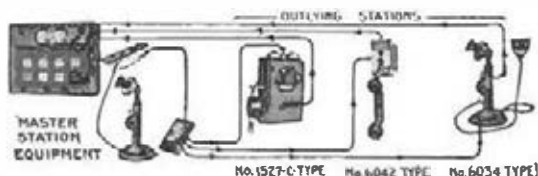
Note. Detailed information covering wiring diagrams, connection of wires and cables, connecting blocks, etc., can be found in our booklet, "Installing and Maintaining Western Electric Inter-phones," which will be furnished upon request.

INTER-PHONES

System No. 12A

MASTER ANNUNCIATOR SYSTEM

Two-Way Ringing—Common Talking



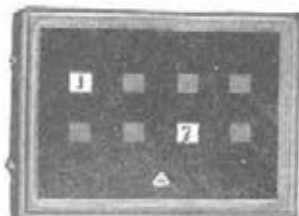
System No. 12A

Showing Master Annunciator and 3 Outlying Stations

extra buttons for electrically resetting the annunciator drops. To call an outlying station, the push button marked with the name or number of the party wanted is depressed. This rings the bell at the station selected and there only.

Each outlying station inter-phone is equipped with a push button which signals the master station when depressed. This call will also be registered at the master station by the operation of the annunciator drop corresponding to the station calling.

Capacity. One master station and 3 up to 20 or more outlying stations.



Master Station Annunciator

TYPES OF INTER-PHONES

Master Station

To consist of the following:

1. A desk set inter-phone with a 5½ foot flexible conductor cord.
2. A push button block with or without weighted base and having a flexible conductor cord of any length desired.
3. A connecting block.
4. A surface type annunciator.

Each of the above items must be ordered separately and in accordance with the following code numbers and capacities; larger capacities can be furnished.

No. of Outlying Stations	*No. of Buttons	**Push-button Block			Desk Stand. No.	Connecting Block No.	Annunciator		
		†Metal	Wood	Wood Weighted			Wood Type	No. of Drops	Metal Type
3	4	104A	7900	7980	1320BF	6G	401	4	407
5	6	106A	790	798	1320BF	6G	401	6	407
7	8	108A	7910	7990	1320BF	6G	401	8	407
10	12	...	7921	79010	1320BF	6B	401	10	407
14	16	...	7930	79020	1320BF	6B	401	14	407
17	20	...	793	7902	1320BF	6F	401	18	407

* One button of the push-button block is required for every eight annunciator drops for electrically resetting the drops.

** Connecting cords for push-button blocks may be ordered separately in any length (6 feet of cord being the average length).

† Metal push-button blocks are described under "Inter-phone Accessories."

Outlying Stations

Wall, Desk or Hand Set Inter-phones may be used. The Inter-phones are the same as specified for the Outlying Stations of System No. 12.

ACCESSORIES

Retardation Coil

A No. 51H retardation coil must be ordered separately for installation near the battery of each system.

Wiring

Two common wires are required throughout the system and in addition two individual wires from the master to each outlying station. Cable or insulated wires may be used. Where there is a long run of a large number of wires, it will be found economical to use cable and at all distributing and junction points, to install connecting blocks. From these connecting blocks separate wires can be run to the Inter-phones. The sizes of cable and the number of connecting blocks required should be determined in accordance with the information furnished in our booklet, "Installing and Maintaining Western Electric Inter-phones."

Cables are described under "Inter-phone Accessories."

Batteries

The batteries for this system are the same as specified for System No. 12.



No. 1320BF Desk Stand



No. 51H

Retardation Coil

INTER-PHONES

System No. 12B

MASTER ANNUNCIATOR SYSTEM

(One-way or Two-way Ringing—Common Talking)

Service. Provides for communication between a master station annunciator and a number of outlying stations.

The master station annunciator (Mechanical Reset Type) is equipped with a hand set Inter-phone, and can be obtained with or without push buttons, depending upon the kind of ringing service required as follows:

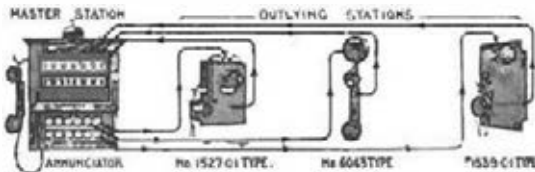


Fig. 1

Fig. 1. Two-way Ringing (Annunciator Equipped with Push Buttons, One for Each Outlying Station) enabling the outlying stations to ring the master station and the master station to ring the outlying stations individually.

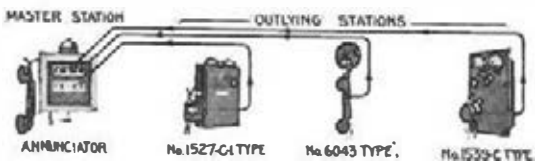


Fig. 2

Fig. 2. One-way Ringing (Annunciator without Push Buttons) enabling the outlying stations to ring the master station but the master station cannot ring the outlying stations.

Operation. Each outlying station is equipped with a push button which signals the master station when depressed. The call will also be registered at the master station by the operation of the annunciator drop corresponding to the station calling.

Only one conversation can be carried on at a time.

Capacity. One master station and any number of outlying stations up to 24 or more.

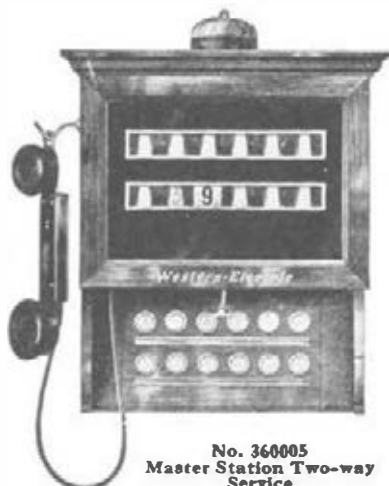
TYPES OF INTER-PHONES

Master Station

This consists of a black finished hand set with a three-foot cord and an annunciator with hook for holding the hand set.

The annunciator and hand set must be ordered separately.

Finish of annunciator is golden oak. Light or dark oak finish can be furnished without additional charge.

Annunciators
For Two-Way Ringing

List No.	No. of Drops & Push Buttons (One per Outlying Station)
360000	2
360001	4
360002	6
360003	8
360004	10
360005	12
360006	15
360007	20
360008	24

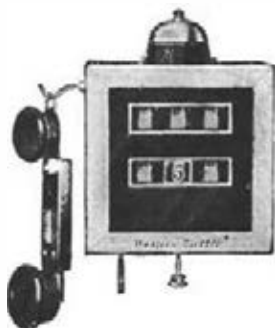


INTER-PHONES

System No. 12B (Continued)

MASTER ANNUNCIATOR SYSTEM

Annunciators (Continued)



No. 360011
Master Station
One-way Service

List
No.

360009
360010
360011
360012
360013
360014
360015
360016
360017

For One-Way Ringing

No. of Drops & Push Buttons
(One per Outlying Station)

2
4
6
8
10
12
15
20
24



No. 1003D
Hand Set

Hand Set

A No. 1003D hand set must be ordered separately with each annunciator. This set is equipped with a three-foot cord, and can be hung on the hook on the side of the annunciator.

Outlying Stations

Wall or hand set Inter-phones may be used. These sets are described in detail under "Description of Common Talking Inter-phone."



No. 1527C-1

No. of Buttons	Wall Type Inter-phone (Metal)		Hand Set Inter-phones	
	Surface	Flush	Surface	Flush
1	1527C-1	1539C-1	6043D	6042M
..	*****	*****	*****	*6042D

*No. 6042D is the same as No. 6042M, but without face plate and wall box.



No. 1539C-1

ACCESSORIES

Wiring

For one-way ringing service (annunciator without push buttons) one wire, common to all stations in the system and in addition, one individual wire from the master station to each outlying station.

For two-way ringing service (annunciator equipped with push buttons) one wire, common to all stations in the system, also two individual wires from the master station to each outlying station.

Batteries

Only one battery is required for the operation of the system. This should consist of three or four Blue Bell dry cells, where the distance between the master station and the farthest outlying station is 250 feet or less and No. 22 B. & S. gauge copper wire is used. On lines of greater length it is recommended that instead of increasing the number of dry cells to more than four, larger wires be used as follows:

250 to 400 ft. use 20 B. & S. gauge copper wire
400 to 600 ft. use 18 B. & S. gauge copper wire
600 to 1000 ft. use 16 B. & S. gauge copper wire

Detailed information for installing, wiring diagrams, battery requirements, cable connections, etc., are included in our bulletin, "Installing and Maintaining Western Electric Inter-phones," which will be furnished upon request.



No. 6043



No. 6042 Type
Hand Set
Inter-phone

INTER-PHONE SYSTEMS

System No. 14

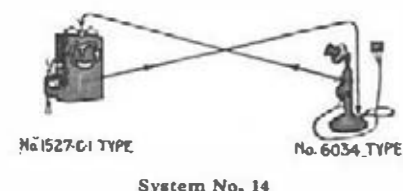
Two Station Private Line

Service. For use where only two stations are required and where the sets are distantly located from each other.

Only two wires are used for connecting the Inter-phones; dry cells being required at each station.

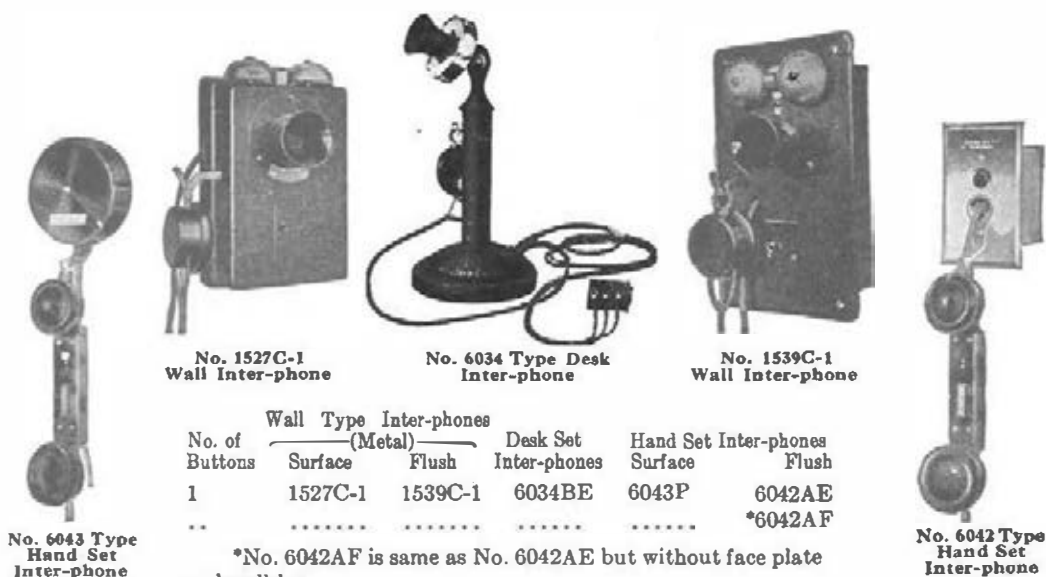
Note. Refer also to pages on description of "Inter-phone outfits" composed of two wall or hand set Inter-phones and the necessary installing material complete.

Operation. Either station can ring the other by simply depressing the push button of the set.



System No. 14

Types of Inter-phones. Wall, desk or hand set Inter-phones may be used interchangeably. The Inter-phones listed below are described in detail under "description of Inter-phones."

No. 1527C-1
Wall Inter-phoneNo. 6034 Type Desk
Inter-phoneNo. 1539C-1
Wall Inter-phone

No. of Buttons	Wall Type Inter-phones (Metal)		Desk Set Inter-phones	Hand Set Inter-phones	
	Surface	Flush		Surface	Flush
1	1527C-1	1539C-1	6034BE	6043P	6042AE
**	*****	*****	*****	*****	*6042AF

*No. 6042AF is same as No. 6042AE but without face plate and wall box.

Wiring and Battery Requirements. A battery of three Blue Bell dry cells is required at each station to furnish current for talking and ringing if the length of line is less than 750 feet. If the length of the line is increased, additional dry cells are required at each station to insure satisfactory ringing. The following list indicates the additional dry cells required at each station:

Length of Line Between Stations	Additional Number of Cells for Each Station			
	B. & S. Gauge Copper Wire			
	No. 12	No. 14	No. 16	No. 18
750 to 1000 ft.	1	1	1	2
1000 to 1500 ft.	1	1	1	3
1500 to 3000 ft.	1	2	3	**
3000 to 4000 ft.	2	3	**	**
4000 to 5000 ft.	2	**	**	**
5000 to 6000 ft.	3	**	**	**

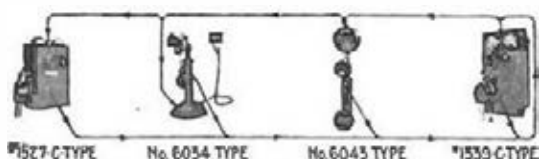
Blue Bell dry cells are listed under "Inter-phone accessories."

Detailed information for installing, including wiring diagrams, battery requirements, cable connections, etc., are included in our bulletin, "Installing and Maintaining Western Electric Inter-phones," which will be furnished upon request.

INTER-PHONES

System No. 15C

Code Ringing—Common Talking



System No. 15
Showing 4 stations in one system

Service. A simple and inexpensive system for small residences, warehouses, stores or mercantile establishments, where only a few stations are required and the number of calls between the stations are not frequent.

Requires only three line wires throughout the system for two or more stations.

Only one conversation can be carried on at a time.

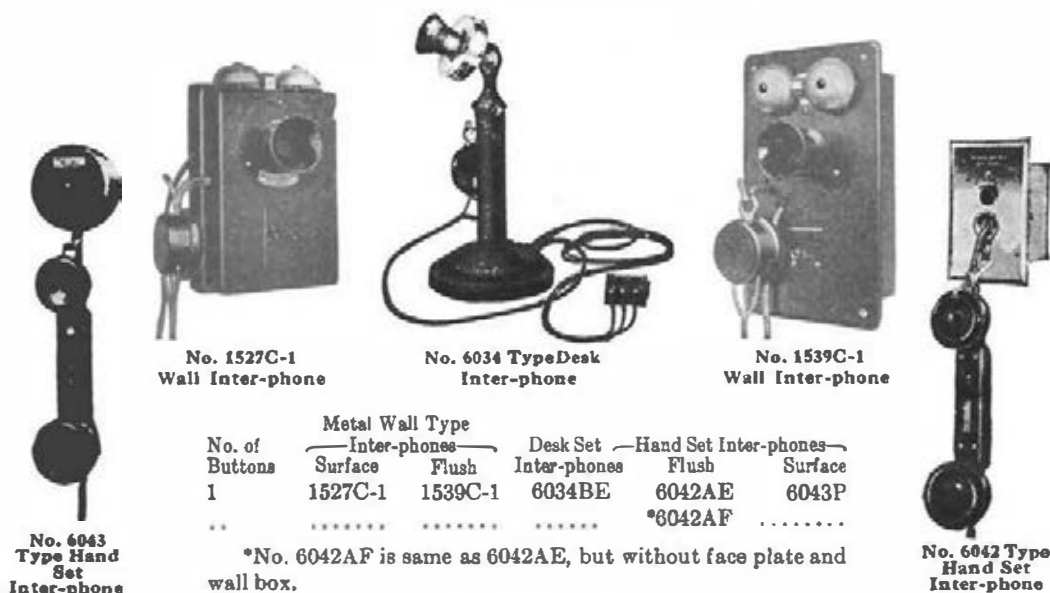
Operation. Each station is equipped with one push button which, when depressed rings the bells at all the other stations.

The various stations are called by signalling each one with a different code ring; for instance: Two rings for Station No. 2, three rings for Station No. 3, etc.

If more than six stations are in service, signalling code mistakes are likely to occur, due to the possibility of misunderstood signals. System No. 11 is recommended where the initial installation comprises more than four or six stations.

Capacity. Two to six stations may be operated in this system. More stations can be added but at the expense of ease and certainty in signalling.

Types of Inter-phones. Wall, desk or hand set Inter-phones may be used in the system. These Inter-phones are described in detail under "Description of Common Talking Inter-phones."



No. of Buttons	Metal Wall Type Inter-phones		Desk Set Inter-phones	Hand Set Inter-phones	
	Surface	Flush		Flush	Surface
1	1527C-1	1539C-1	6034BE	6042AE	6043P
..	*****	*****	*****	*6042AF	*****

*No. 6042AF is same as 6042AE, but without face plate and wall box.

ACCESSORIES

Retardation Coil

A No. 51H retardation coil must be ordered separately and installed near the battery of the system.

Wiring

Three wires are required for connecting the Inter-phones for two or more stations.

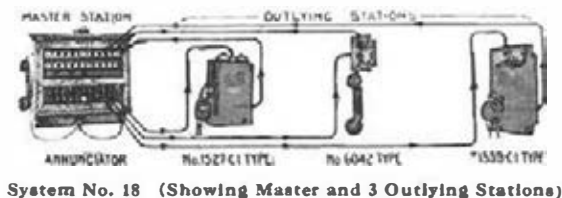
Batteries

Five dry cells are required for the operation when the length of the line is 750 feet or less, and not more than four stations are to be used, connected by Nos. 20 or 22 B. & S. gauge copper wire. If more than four Inter-phones are required or if the line is longer than 750 feet, larger wires should be used in accordance with the installation instructions. The dry cells can be placed in the basement or any other accessible place.

Note. Detailed information for installing, including wiring diagrams, battery requirements, cable connections, etc., are included in our bulletin, "Installing and Maintaining Western Electric Inter-phones," which will be furnished upon request.

INTER-PHONES

System No. 18

MASTER ANNUNCIATOR SYSTEM
(Non-Interfering)

System No. 18 (Showing Master and 3 Outlying Stations)

Service. For use in hotels, clubs, Y. M. C. A. buildings, schools, hospitals, etc., to provide for communication between a central or master station and a large number of outlying stations, as follows:

1. The Master Station can selectively ring and talk with any of the outlying stations and the outlying stations can call the Master Station.

2. Communication can be arranged between any two outlying stations through the medium of one or two connecting cords at the Master Station.

No connection can be made between this system and a public telephone system.

Operation. The Master Station Annunciator consists of a number of drops and jacks (one for each outlying station in the system), a push button for ringing, a hand set Inter-phone and a cord and plug for calling and answering.

1. To call an outlying station, the Master Station operator inserts the plug into the jack corresponding to the station wanted and depresses the ringing button of the annunciator. The operator converses with the outlying station by pressing the talking lever of the Hand Set Inter-phone.

2. Each outlying station Inter-phone is equipped with a push button for ringing the Master Station and at the same time operating one of the annunciator drops, thereby registering the call. The Master Station operator answers by inserting the answering plug into the jack corresponding to the drop operated and pressing the talking lever of the hand set.

3. If one outlying station wishes to converse with another outlying station, a connection can be established by means of a pair of connecting cords (equipped as part of the annunciator when so specified), each cord terminating in separate plugs. This connection is effected as follows:

The Master Station operator withdraws the answering plug from the jack of the station calling, inserting in its place one of the connecting cord plugs, and proceeds to call the station wanted as explained above, in item 1. Having secured an answer from the station wanted, the operator again withdraws the answering plug and inserts in its place the other plug end of the connecting cord. This completes the connection between the two outlying stations.

No annunciator supervisory features are provided to indicate the termination of a conversation between outlying stations, if supervision is required, it will be considered special. Where a large number of connections are required between outlying stations, our No. 1801 lamp signal, Private Exchange Switch-board, is recommended.

INTER-PHONES

System No. 18 (Continued)

MASTER ANNUNCIATOR SYSTEM

Capacity. One master station and 10 to 70 or more outlying stations.

TYPES OF INTER-PHONES

Master Station Annunciator

Wood cas with standard oak finish. Other special finishes can be furnished. Drops and jacks will be numbered from one up, unless otherwise specified.



Master Station Annunciator

List No.	No. of Drops	List No.	No. of Drops
1028	10	1034	36
1029	12	1035	42
1030	18	1036	48
1031	20	1037	56
1032	24	1038	60
1033	30	1039	70

Each of the above list numbers covers the annunciator only and does not include the hand set Inter-phone which must be ordered separately.

Hand Set Inter-phone for Annunciator

This consists of a No. 1003K hand set.

Hook

A No. 141A hook can be used for supporting the hand set, the hook to be secured into the side of the annunciator.

Connecting Cords

If Inter-communication between outlying stations is desired, one or two pairs of connecting cords may be ordered as described under "Operation" (Item 3).

Outlying Stations

Wall or hand set Inter-phones may be used. These are described in detail under "Description of Common Talking Inter-phones."

No. of Buttons	—Metal Wall Inter-phones—		—Hand Set Inter-phones—	
	Surface	Flush	Flush	Surface
1	1527C-1	1539C-1	6042L	6043G
..	.....	.....	*6042G	.....

*No. 6042G is same as No. 6042L, but without face plate and wall box.

Wiring

One wire, common to all stations in the system is required, and, in addition, two individual wires between the master and each outlying station. Where there is a long run of a large number of wires, it will be found economical to use cable and install cable terminals or connecting blocks at all distributing and junction points. From there, the installation can be continued by means of separate wires to the various outlying stations. The size of cable and number of connecting blocks should be determined by the installer in accordance with the installation requirements.

Batteries

Five or more dry cells are required for operating the system. The cells can be placed in the basement or any other accessible place.

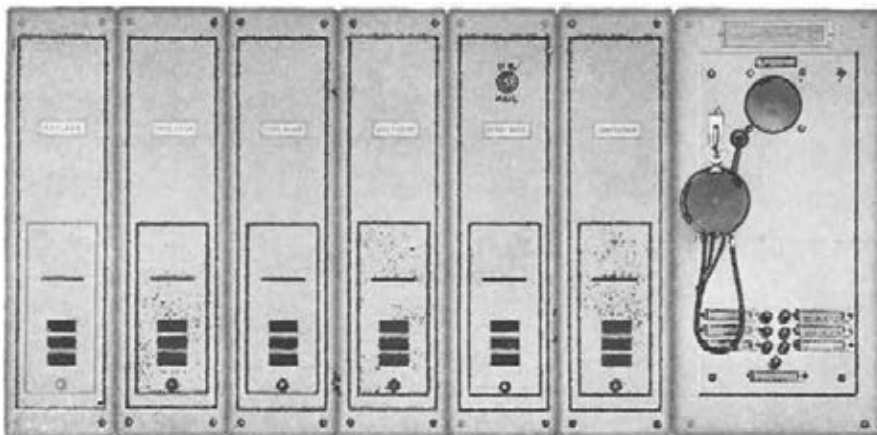
Detailed information for installing, including wiring diagrams, battery requirements, cable connections, etc., are included in our bulletin, "Installing and Maintaining Western Electric Inter-phones," which will be furnished upon request.

No. 1527C-1
Wall Inter-phoneNo. 1539C-1
Wall Inter-phoneNo. 6043 Type
Hand Set
Inter-phoneNo. 6042 Type
Hand Set
Inter-phone

INTER-PHONES

Apartment House Systems Nos. 7, 8, 9 and 10

Selective Ringing—Selective Talking—Non-Interfering Service



No. 1562C-7 Vestibule Inter-phone with No. 336 Mail Box Group Complete

Service. Apartment house Inter-phones are designed to provide service between the vestibule apartments, janitor and tradesmen. The systems are planned throughout with the utmost care to give the most reliable service.

Systems Nos. 7, 8, 9 and 10 cover the practical service requirements of most apartment houses. One system may be expanded into another at any time by the use of additional apparatus.

These systems are designed for selective ringing and talking or non-interfering service, making it possible for the master station, such as the vestibule, the tradesmen and the janitor to communicate with different apartments simultaneously without interference with each other.

Operation. The vestibule, janitor's and tradesmen's Inter-phones are equipped with push button keys (one for each apartment station). By depressing the button marked with the name or number of the apartment desired, the bell at that station will ring and there only.

The apartment Inter-phones can be provided with one or two push buttons for ringing the janitor's station or operating an electric door opener.

Separate conversation may take place simultaneously between the vestibule, janitor or tradesmen and different apartments.

Types of Inter-phones. Wall type Inter-phones are specified throughout for the various systems. These Inter-phones, including the Mail box units, are described in detail under "Description of Apartment House Inter-phones."

Types of Systems. See descriptions on following pages.

Accessories for Systems Nos. 7, 8, 9 and 10

Coil and Condenser Box. One retardation coil and one condenser are required for each vestibule, janitor's (either wall Inter-phone or master annunciator) or tradesmen's station.

Cable. For connecting the various stations, either cable or insulated wires can be used, depending largely upon the layout of the building. Where there is a long run of a large number of wires (for instance, between the janitor, vestibule, and tradesmen Inter-phones or for the vertical riser from floor to floor) it will be found economical to use cable, and to install cable terminals or connecting blocks at all of the distributing and junction points.

For connecting the Inter-phones of the various apartments to these distributing points, insulated wires (No. 22 B. & S. gauge) can be used. The number of wires are outlined in the description of each system on the following pages.

Batteries. Not more than 12 Blue Bell dry cells will be necessary for operating any of the above systems (5 cells for the talking circuits and 4 to 7 cells for the ringing circuits, depending upon the length of the line). The cells can be placed in the basement or any other accessible place.

Note. This battery data is based on the use of standard Inter-phone cable or No. 22 B. & S. gauge wire.

Door Opener. If a door opener is included in the system, additional dry cells will be required. Generally, two or three cells have been found sufficient for this purpose. Any standard type of door opener may be used.

Note. Detailed information for installing wiring diagrams, battery requirements, cable connections, etc., are included in our booklet, "Installing and Maintaining Western Electric Inter-phones," which will be furnished upon request.

INTER-PHONES

Apartment House Systems Nos. 7, 8, 9 and 10 (Continued)

Selective Ringing—Selective Talking—Non-Interfering Service

SYSTEM No. 7

Service. Vestibule can call apartments. Apartments can open door, if desired.

Capacity. One vestibule and any number of suite Inter-phones up to 24.

Inter-phone Apparatus Required for System No. 7

Vestibule

†1 No. 1562 type Inter-phone and mail boxes as required.

Apartments

1527C-0 Surface type Inter-phones or
1527C-1 Surface type Inter-phones, 1 button (for door) or
1539C-0 Flush type Inter-phone or
1539C-1 Flush type Inter-phone, 1 button (for door).

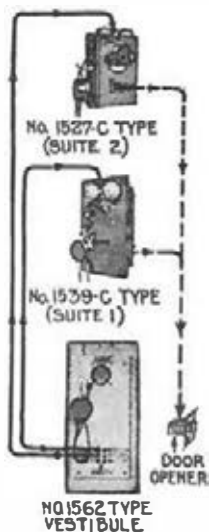
Miscellaneous

1 No. 295BC coil and condenser box.

Wiring and Battery Requirements

*2 wires common to entire system.
1 wire for each suite Inter-phone.
Battery to furnish operating current.
1 door opener and miscellaneous installing material.

SYSTEM No. 7



SYSTEM No. 8

Service. Vestibule can call apartments and janitor. Apartments can call janitor and open door, if desired. Janitor can call apartments.

Capacity. One vestibule, one janitor and any number of suite Inter-phones up to 24.

Inter-phone Apparatus Required for System No. 8

Vestibule

†1 No. 1562 type Inter-phone and mail boxes as required.

Apartments

1527C-1 Surface wall Inter-phone, 1 button (for janitor) or
1527C-2 Surface wall Inter-phone, 2 buttons (for janitor and door)
1539C-1 Flush wall Inter-phone, 1 button (for janitor) or
1539C-2 Flush wall Inter-phone, 2 buttons (for janitor and door).

Janitor

1 No. 1350 Type Inter-phone, 1 janitor's annunciator and
1 No. 295 AS Coil and condenser box.

Wiring and Battery Requirements

*2 wires common to entire system.
2 wires for each suite Inter-phone.
4 wires for connecting vestibule to janitor and coil and condenser box.
Battery to furnish operating current.
1 door opener and miscellaneous installing material.

SYSTEM No. 9

Service. Vestibule can call apartments and janitor. Apartments can call janitor and open door, if desired. Janitor and tradesmen can call apartments.

Capacity. One vestibule, one janitor, one tradesman and any number of suite Inter-phones up to 24.

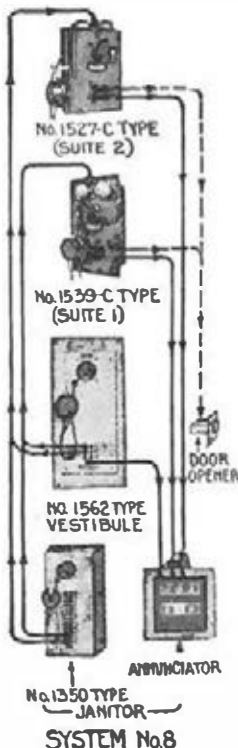
Inter-phone Apparatus Required for System No. 9

Vestibule

†1 No. 1562 Type Inter-phone and mail boxes as required.

*Note. 1 common wire to be omitted when door opener is not required.

†See "Description of Apartment House Inter-phones" for selecting proper type of vestibule equipment.



SYSTEM No. 8

INTER-PHONES

Apartment House Systems Nos. 7, 8, 9 and 10 (Continued)

Selective Ringing—Selective Talking—Non-Interfering Service

SYSTEM No. 9 (Continued)

Apartments

- 1527C-1 Surface wall Inter-phone, 1 button (for janitor) or
- 1527C-2 Surface wall Inter-phone, 2 buttons for janitor and door or
- 1539C-1 Flush wall Inter-phone, 1 button for janitor or
- 1539C-2 Flush wall Inter-phone, 2 buttons, for janitor and door.

Tradesmen

- 1 No. 1350 type Inter-phone.

Janitor

- 1 No. 1350 type Inter-phone, 1 janitor's annunciator and
- 1 No. 295BD coil and condenser box.

Wiring and Battery Requirements

- *2 wires common to entire system.
- 2 wires for each suite Inter-phone.
- 4 wires for connecting vestibule to janitor, tradesmen's set and coil and condenser box.
- Battery to furnish operating current.
- 1 door opener and miscellaneous installing material.

SYSTEM No. 10

Service. Provides the same service as outlined under System No. 9, but on a larger scale, intended for use where several vestibules in the same or adjoining apartment houses are to be served by one janitor. The janitor's equipment consists of a master annunciator.

Capacity. One janitor's switchboard, two or more vestibule and tradesmen's Inter-phones and any number of suite Inter-phones up to 70.

Inter-phone Apparatus Required for System No. 10

Vestibule

- 2 or more No. 1562 type Vestibule Inter-phones and mail boxes as required.

Apartments

- 1527C-1 Surface wall Inter-phone, 1 button for janitor or
- 1527C-2 Surface wall Inter-phone, 2 buttons for janitor and door or
- 1539C-1 Flush wall Inter-phone, 1 button for janitor or
- 1539C-2 Flush wall Inter-phone, 2 buttons, for janitor and door.

Tradesmen

- 2 or more No. 1350 type Inter-phones.

Janitor

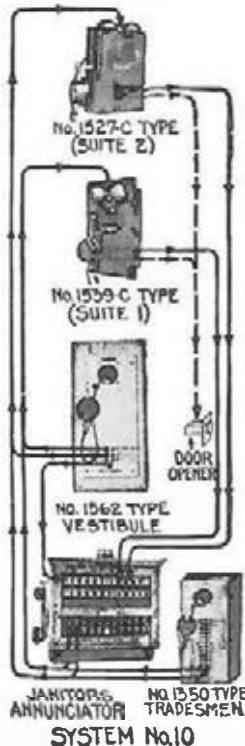
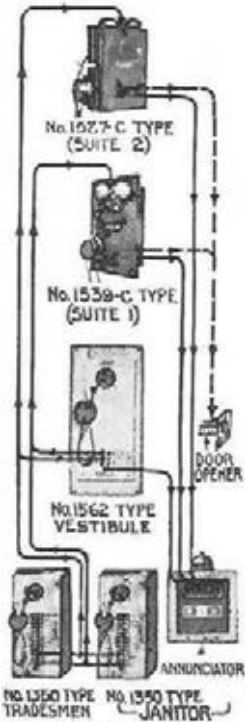
- 1 annunciator switchboard and
- **1 or more No. 295 type coil and condenser boxes.

Wiring and Battery Requirements

- *2 wires common to entire system
- 2 wires for each suite Inter-phone
- 5 wires for connecting each vestibule to janitor, tradesmen's sets and coil and condenser box
- Battery to furnish operating current
- 1 door opener and miscellaneous installing material.

Note. **One retardation coil and one condenser are required for the janitor's annunciator and each vestibule and tradesmen's Inter-phone.

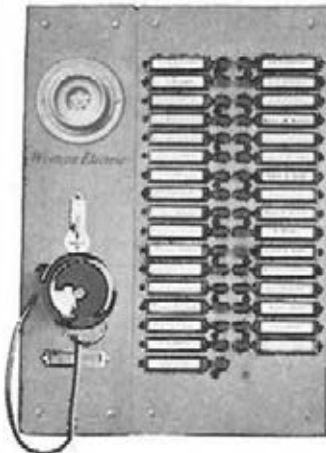
*One common wire can be omitted if door opener is not required.



INTER-PHONES

Apartment House System No. 20

Selective Ringing—Common Talking



No. 1520U Inter-phone with
Push-Button Plate

Service. The No. 20 Inter-phone Systems are designed to provide an inexpensive and reliable means of communication between vestibule, apartments, janitor's quarters, laundry and tradesmen's entrance. This system differs from Systems Nos. 7, 8, 9 and 10 (as described on the preceding pages) in that only one conversation can be carried on at a time, as all sets are connected to one talking circuit.

There are six combinations of the No. 20 System, differing from each other in the number of locations in the apartments which are to be connected for inter-communicating service. The operation of each of these combinations, however, is the same.

Operation. The vestibule Inter phone is equipped with a push button for calling the janitor, also a push-button plate is provided for mounting beside the Inter-phone, the plate being equipped with push-buttons for calling each apartment. To call an apartment, the push-button having the name of the apartment wanted is depressed; this rings the bell at the apartment selected and there only.

The apartment Inter-phones can be provided with push-buttons for operating the door opener, calling the janitor, laundry or any other station in accordance with the combination selected.

The janitor's laundry and tradesmen's Inter-phones can be arranged either for receiving calls from the other stations without being able to signal back, or for receiving calls and for signalling back to any one of the apartments.

Only one conversation can be carried on at a time.

Types of Inter-phones. Wall type Inter-phones are specified throughout for the No. 20 Systems, the sets are described in detail under "Description of Apartment House Inter-phones."

Types of Systems. (See descriptions on following pages.)

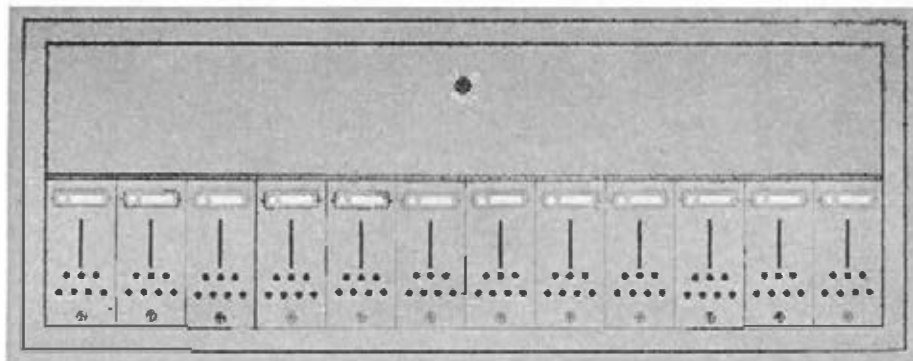
ACCESSORIES FOR No. 20 SYSTEMS

The cabling, terminals, door opener (if required) for these systems are the same as outlined for Systems 7, 8, 9 and 10.

BATTERY REQUIREMENTS

For the operation of each system a battery of not more than five dry cells is required. These can be placed in the basement or any other accessible place.

Note. Detailed information covering wiring diagrams, connection of wires and cables, connecting blocks, etc., can be found in our booklet, "Installing and Maintaining Western Electric Inter-phones," which will be furnished upon request.



Mail Boxes (Mounted Separately)

INTER-PHONES

Apartment House System No. 20 (Continued)

Selective Ringing—Common Talking

SYSTEM No. 20A

Service. Vestibule can call apartment; apartments can open door.

Vestibule

†1 No. 1520U Inter-phone, push-button plate and mail boxes as required.

Code
No.

Apartments

- 1527C-0 Surface Wall Inter-phone, or
- 1527C-1 Surface Wall Inter-phone (button for door), or
- 1539C-0 Flush Wall Inter-phone, or
- 1539C-1 Flush Wall Inter-phone (button for door).

Wiring and Batteries

*3 wires common to all Inter-phones. 1 wire for each apartment Inter-phone, batteries to furnish operating current, 1 door opener and miscellaneous installing material.

SYSTEM No. 20C

Service. Vestibule can call apartments and janitor; apartments can open door.

Vestibule

†1 No. 1520U Inter-phone, push-button plate and mail boxes as required.

Code
No.

Apartments

- 1527C-0 Surface Wall Inter-phone, or
- 1527C-1 Surface Wall Inter-phone, 1 button (for door opener), or
- 1539C-0 Flush Wall Inter phone, or
- 1539C-1 Flush Wall Inter-phone, 1 button (for door opener).

Janitor

1 No. 1527C-0 Surface Wall Inter-phone.

Wiring and Batteries

*3 wires common to all Inter-phones, 1 wire for each apartment Inter-phone, 2 extra wires for connecting battery with vestibule and janitor's Inter-phone.

SYSTEM No. 20D

Service. Vestibule can call apartments and janitor; apartments can open door and call janitor. Inter-phone apparatus.

Vestibule

†1 No. 1520U Inter-phone, push-button plate and mail boxes as required.

Code
No.

Apartments

- 1527C-1 Surface Wall Inter-phone, 1 button (for janitor), or
- 1527C-2 Surface Wall Inter-phone, 2 buttons (for janitor and door), or
- 1539C-1 Flush Wall Inter-phone, 1 button (for janitor), or
- 1539C-2 Flush Wall Inter-phone, 2 buttons (for janitor and door).

Janitor or Laundry

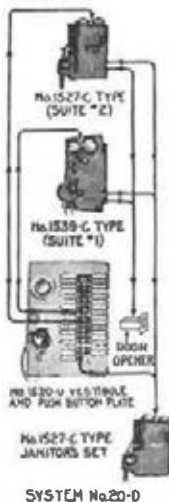
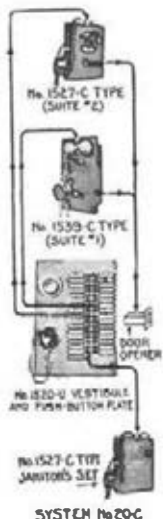
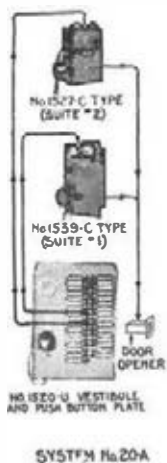
1 No. 1527C-0 Surface Wall Inter-phone.

Wiring and Batteries

*4 wires common to all Inter-phones. 1 wire for each apartment Inter-phone, batteries to furnish operating current, 1 door opener and miscellaneous installing material.

Note: *One wire may be omitted if door opener is not used.

†See "Description of Apartment House Inter-phones" for selecting proper type of vestibule equipment.



INTER-PHONES

Apartment House System No. 20 (Continued)

Selective Ringing—Common Talking

SYSTEM No. 20E

Service. Vestibule can call apartments and janitor; apartments can open door and call janitor and laundry.

Vestibule

†1 No. 1520U Inter-phone, push-button plate and mail boxes as required.

Code

No.

Apartments

1527C-2 Surface Wall Inter-phone, 2 buttons (for janitor and laundry) or
1527C-3 Surface Wall Inter-phone, 3 buttons (for janitor, laundry and door) or

1539C-2 Flush Wall Inter-phone, 2 buttons (for janitor and laundry) or

1539C-3 Flush Wall Inter-phone, 3 buttons (for janitor, laundry and door).

Janitor and Laundry

2 No. 1527C-0 Surface Wall Inter-phones.

Wiring and Batteries

*Five wires common to all Inter-phones. A wire for each apartment Inter-phone, batteries to furnish operating current, one door opener and miscellaneous installing material.

SYSTEM No. 20G

Service. Vestibule can call apartments and janitor; apartments can open door and call janitor, and janitor can call apartments.

Vestibule

†1 No. 1520U Inter-phone, push-button plate and mail boxes as required.

Code

No.

Apartments

1527C-1 Surface Wall Inter-phone, 1 button (for janitor) or

1527C-2 Surface Wall Inter-phone, 2 buttons (for janitor and door) or

1539C-1 Flush Wall Inter-phone, 1 button (for janitor) or

1539C-2 Flush Wall Inter-phone, 2 buttons (for janitor and door).

Janitor and Laundry

1 Nos. 1527C-2 to 1527C-8 surface wall Inter-phones (depending upon number of push buttons required).

Note. For more than 8 buttons, add push button block.

Wiring and Batteries

*Four wires common to all Inter-phones. One wire for each apartment Inter-phone, batteries to furnish operating current, one door opener and miscellaneous installing material.

SYSTEM No. 20H

Service. Vestibule can call apartments and janitor, apartments can open door and call janitor and laundry, janitor and laundry can call apartments.

Vestibule

†1 No. 1520U Inter-phone, push-button plate and mail boxes as required.

Code

No.

Apartments

1527C-2 Surface Wall Inter-phone, 2 buttons (for janitor and laundry) or

1527C-3 Surface Wall Inter-phone, 3 buttons (for janitor, laundry and door) or

1539C-2 Flush Wall Inter-phone, 2 buttons (for janitor and laundry) or

1539C-3 Flush Wall Inter-phone, 3 buttons (for janitor, laundry and door)

Janitor and Laundry

1 Nos. 1527C-2 to 1527C-8 surface wall Inter-phones (depending upon number of push buttons required).

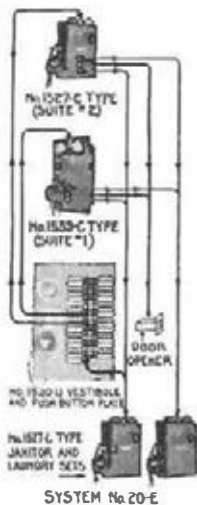
Note. For more than 8 buttons, add push button block.

Wiring and Batteries

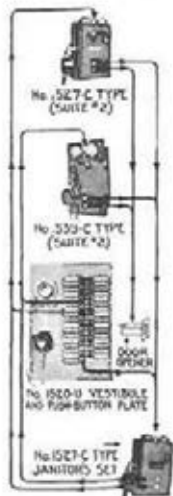
*Five wires common to all Inter-phones. One wire for each apartment Inter-phone, batteries to furnish operating current, one door opener and miscellaneous installing material.

Note. *One wire may be omitted if door opener is not used.

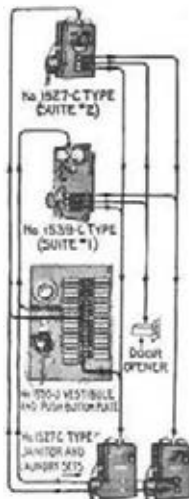
†See "Description of Apartment House Inter-phones" for selecting proper type of vestibule equipment.



SYSTEM No. 20-E



SYSTEM No. 20-G

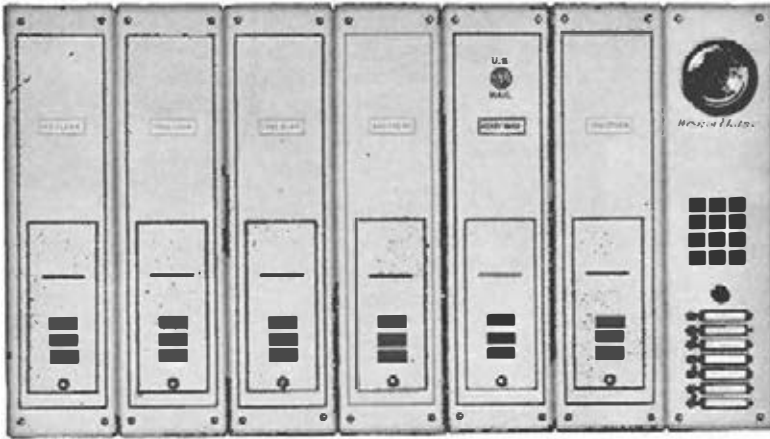


SYSTEM No. 20-H

INTER-PHONES

Apartment House System No. 21

Selective Ringing—Common Talking



No. 1524D Inter-phone with Mail Boxes Complete

Service. The No. 21 Inter-phone Systems are designed to provide communication between vestibule, apartments, janitor's quarters, laundry and tradesmen's entrance.

This system has the same service requirements as system No. 20 (described on the preceding pages) except that the vestibule equipment consists of a loud speaking cordless type inter-phone which eliminates all projecting parts and provides against theft of receivers and cords.

There are six combinations of the No. 21 System, differing from each other in the number of locations in the apartments which are to be connected for inter-communicating service. The operation of each of these combinations, however, is the same.

Operation. The vestibule Inter-phone is equipped with a push-button for talking and listening. Also push-buttons are provided for calling each apartment.

To call one of the apartments from the vestibule, the push-button (opposite the name of the party wanted) is depressed, which rings the bell of that apartment. The vestibule party next depresses the talking and listening button of the telephone set, and keeps it depressed while awaiting reply, and while conversing with the apartment party.

The apartment Inter-phones can be provided with push-buttons for operating the door opener, calling the janitor, laundry or any other station in accordance with the combination selected.

The janitor's, laundry and tradesmen's Inter-phones can be arranged either for receiving calls from the other stations without being able to signal back, or for receiving calls and for signalling back to any one of the apartments.

Only one conversation can be carried on at a time.

Types of Inter-phones. Wall type Inter-phones are specified throughout for the No. 21 Systems. The sets are described in detail under "Description of Apartment House Inter-phones."

Types of Systems. (See descriptions on following pages.)

ACCESSORIES FOR No. 21 SYSTEMS

The cabling, terminals, door opener (if required) for these systems are the same as outlined for Systems 7, 8, 9 and 10.

BATTERY REQUIREMENTS

For the operation of each system three sets of dry batteries are required, each set to consist of three dry cells. The batteries can be placed in the basement, or any other accessible place.

Note. Detailed information covering wiring diagrams, connection of wires and cables, connecting blocks, etc., can be found in our booklet, "Installing and Maintaining Western Electric Inter-phones," which will be furnished upon request.

INTER-PHONES

Apartment House System No. 21 (Continued)

Selective Ringing—Common Talking

SYSTEM No. 21A

Service. Vestibule can call apartments; apartments can open door.

Vestibule

†1 No. 1524 type Inter-phone, push-button plate and mail boxes as required.

Code

No.

Apartments

- 1527C-0 Surface Wall Inter-phone, or
 1527C-1 Surface Wall Inter-phone (button for door), or
 1539C-0 Flush Wall Inter-phone, or
 1539C-1 Flush Wall Inter-phone (button for door).

Wiring and Batteries

*3 wires common to all Inter-phones. 1 wire for each apartment Inter-phone, batteries to furnish operating current, 1 door opener and miscellaneous installing material.

SYSTEM No. 21C

Service. Vestibule can call apartments and janitor; apartments can open door.

Vestibule

†1 No. 1524 type Inter-phone, push-button plate and mail boxes as required.

Code

No.

Apartments

- 1527C-0 Surface Wall Inter-phone, or
 1527C-1 Surface Wall Inter-phone, 1 button (for door opener), or
 1539C-0 Flush Wall Inter-phone, or
 1539C-1 Flush Wall Inter-phone, 1 button (for door opener).

Janitor

1 No. 1527C-0 Surface Wall Inter-phone.

Wiring and Batteries

*3 wires common to all Inter-phones, 1 wire for each apartment Inter-phone, 2 extra wires for connecting battery with vestibule and janitor's Inter-phone.

SYSTEM No. 21D

Service. Vestibule can call apartments and janitor; apartments can open door and call janitor. Inter-phone apparatus.

Vestibule

†1 No. 1524 type Inter-phone, push-button plate and mail boxes as required.

Code

No.

Apartments

- 1527C-1 Surface Wall Inter-phone, 1 button (for janitor), or
 1527C-2 Surface Wall Inter-phone, 2 buttons (for janitor and door), or
 1539C-1 Flush Wall Inter-phone, 1 button (for janitor), or
 1539C-2 Flush Wall Inter-phone, 2 buttons (for janitor and door).

Janitor or Laundry

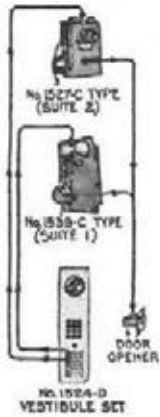
1 No. 1527C-0 Surface Wall Inter-phone.

Wiring and Batteries

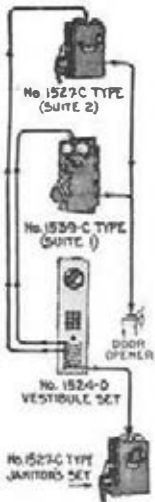
*4 wires common to all Inter-phones. 1 wire for each apartment Inter-phone, batteries to furnish operating current, 1 door opener and miscellaneous installing material.

Note. *One wire may be omitted if door opener is not used.

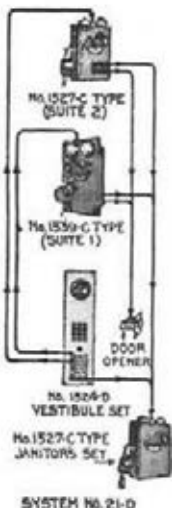
† See "Description of Apartment House Inter-phones" for selecting proper type of vestibule equipment.



SYSTEM No. 21A



SYSTEM No. 21C



SYSTEM No. 21-D

INTER-PHONES

Apartment House System No. 21 (Continued)

Selective Ringing—Common Talking

SYSTEM No. 21E

Service. Vestibule can call apartments and janitor; apartments can open door and call janitor and laundry.

Vestibule

†1 No. 1524 type Inter-phones, push-button plate and mail boxes as required.

Code No.

Apartments

1527C-2 Surface Wall Inter-phone, 2 buttons (for janitor and laundry) or
1527C-3 Surface Wall Inter-phone, 3 buttons (for janitor, laundry and door) or
1539C-2 Flush Wall Inter-phone, 2 buttons (for janitor and laundry) or
1539C-3 Flush Wall Inter-phone, 3 buttons (for janitor, laundry and door)

Janitor and Laundry

2 No. 1529C-0 Surface Wall Inter-phones.

Wiring and Batteries

*Five wires common to all Inter-phones. A wire for each apartment Inter-phone, batteries to furnish operating current, one door opener and miscellaneous installing material.

SYSTEM No. 21G

Service. Vestibule can call apartments and janitor; apartments can open door and call janitor, and janitor can call apartments.

Vestibule

†1 No. 1524 type Inter-phone, push-button plate and mail boxes as required.

Code No.

Apartments

1527C-1 Surface Wall Inter-phone, 1 button (for janitor) or
1527C-2 Surface Wall Inter-phone, 2 buttons (for janitor and door) or
1539C-1 Flush Wall Inter-phone, 1 button (for janitor) or
1539C-2 Flush Wall Inter-phone, 2 buttons (for janitor and door)

Janitor and Laundry

1 Nos. 1527C-2 to 1527C-8 surface wall Inter-phones (depending upon number of push buttons required)

Note. For more than 8 buttons, add push button block.

Wiring and Batteries

*Four wires common to all Inter-phones. One wire for each apartment Inter-phone, batteries to furnish operating current, one door opener and miscellaneous installing material.

SYSTEM No. 21H

Service. Vestibule can call apartments and janitor, apartments can open door and call janitor and laundry, janitor and laundry can call apartments.

Vestibule

†1 No. 1524 type Inter-phone, push-button plate and mail boxes as required.

Code No.

Apartments

1527C-2 Surface Wall Inter-phone, 2 buttons (for janitor and laundry) or
1527C-3 Surface Wall Inter-phone, 3 buttons (for janitor, laundry and door) or
1539C-2 Flush Wall Inter-phone, 2 buttons (for janitor and laundry) or
1539C-3 Flush Wall Inter-phone, 3 buttons (for janitor, laundry and door)

Janitor and Laundry

1 Nos. 1527C-2 to 1527C-8 surface wall Inter-phones (depending upon number of push buttons required)

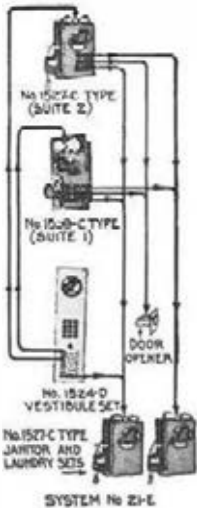
Note. For more than 8 buttons, add push button block.

Wiring and Batteries

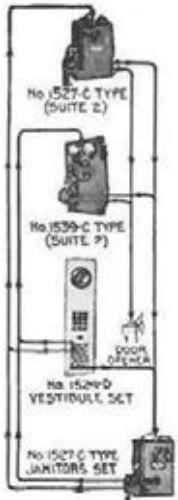
*Five wires common to all Inter-phones. One wire for each apartment Inter-phone, batteries to furnish operating current, one door opener and miscellaneous installing material.

† See "Description of Apartment House Inter-phones" for selecting proper type of vestibule equipment.

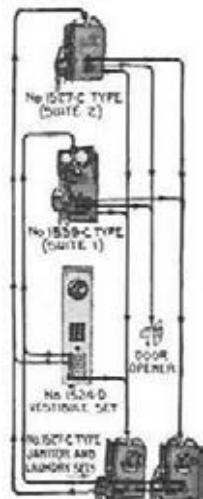
Note. *One wire may be omitted if door opener is not used.



SYSTEM No. 21E



SYSTEM No. 21G



SYSTEM No. 21H

INTER-PHONES

Description of Common Talking Inter-phones

USED IN SYSTEMS NO. 7 TO NO. 21

Selective Ringing—Common Talking Service

WALL INTER-PHONES NOS. 1527C AND 1539C TYPES

GENERAL

The Nos. 1527C and 1539C Inter-phones represent the highest development yet attained toward the standardization of design and construction of Common Talking Type Inter-phones.

This result is due to the exceptional engineering skill employed in producing a universal Inter-phone that is simple, yet pleasing in design; compact, yet with every part accessible for instant inspection; rugged, yet light in weight and efficient in operation.

CONSTRUCTION AND FLEXIBILITY

The principal features of these Inter-phones are:

Surface and Flush Type Inter-phones so wired as to be adaptable for use in any of our "Common Talking" Inter-phone systems.

An Interchangeable Push Button Arrangement provides for readily furnishing Inter-phones from stock in capacities of 1, 2, 3, 4, 6 and 8 buttons as required.

Circuit Labels in Each Inter-phone together with an envelope containing strap wires and a diagram of connections give clear, concise instructions for universally connecting the completely equipped sets for any of our Common Talking Systems.

The Push Button Arrangement provides for the future growth of an Inter-phone system by simply ordering push button units of the required capacities without having to remove or dismantle the sets from the system. (This assumes that cable including spare wires is originally installed.)

FINISH OF INTER-PHONES

The Metal Parts of the Nos. 1527C and 1539C Inter-phones with the exception of the transmitter and bells are treated with the Parker Rustproof Process. This consists of treating the parts in a hot chemical bath, which changes the surface of the metal to a non-rusting basic phosphate.

The Protecting Surface provided by the Parker Process does not add an additional coating of some other non-oxidizing material, but it is practically a part of the metal itself and prevents rust from spreading if it should start by the exposure of the bare metal at any spot.

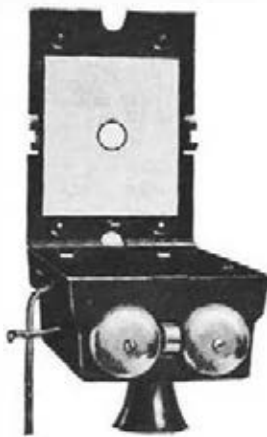
Durable Black Enamel Baked On (over the Parkerized surfaces) provides a tough elastic, non-chipping finish, two coats of the enamel being applied on surfaces exposed to view.

OF INTEREST TO CONTRACTORS AND ARCHITECTS

The universal and flexible feature of these new metal wall Inter-phones is of special importance since it now enables contractors and dealers to carry complete stocks of Inter-phones for adoption to any of our common talking systems with but a small amount of investment.



No. 1527C-2 Type
Inter-phone



Open View



No. 1527C-4 Type
Inter-phone

No. 1527C INTER-PHONES
(Surface Type)

The No. 1527C Type Inter-phone has a surface mounting metal housing which contains all of the talking and signalling apparatus, also a metal backboard, which is furnished for mounting the set to the wall.

The Housing of the set is of rugged construction, being formed out of sheet steel and is equipped with hinge hooks which match up with slots in the base of the metal backboard. This arrangement permits fastening the backboard in place on the wall and then mounting the housing unit to it.

The Hinge Arrangement of this set enables the installer to swing down the housing unit from the backboard (see illustration) for making connections to the terminals; also to permit interior inspection of the set at any time after its installation.

INTER-PHONES

Description of Common Talking Inter-phones (Continued)

USED IN SYSTEMS NO. 7 TO NO. 21

Selective Ringing—Common Talking Service

WALL INTER-PHONES

Nos. 1527C AND 1539C TYPES

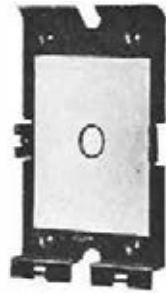
The Metal Backboard is designed to permit the entrance of wires or cabling from either the top, bottom or center of the set; also, a metal guide ring is located near the cable entrance at the base of the backboard so that the connecting wires may be looped through this ring to hold them in place and provide a proper bending point when the housing is swung forward.

The Finish is durable dull black enamel with nickel trimmings (see general notes on "Finish of Inter-phones").

Interior of Housing
for 1527C Type

Code No.	No. of Buttons	For Inter-phone Systems
1527C-0	0	7, 20 and 21
1527C-1	1	7, 8, 9, 10, 12, 14, 15, 18, 20 and 21
1527C-2	2	8, 9, 10, 20 and 21
1527C-3	3	11, 12, 20 and 21
1527C-4	4	11, 12, 20 and 21
1527C-6	6	11, 12, 20 and 21
1527C-8	8	11, 12, 20 and 21

Dimensions of Housing (0 to 8 Buttons)

High,
Ins.
7½Wide,
Ins.
5Deep
Ins.
2¾Backboard
for 1527C TypeNo. 1539C-1 Type
Inter-phoneOutlet Box
for 1539C TypeBack of Face Plate
for 1539C TypeNo. 1539C-2 Type
Inter-phoneNo. 1539C INTER-PHONES
Flush Type

The No. 1539C type Inter-phone has a flush steel face plate on which is mounted all of the talking and signalling apparatus, also a metal outlet box which is furnished for mounting the set in the wall.

The Outlet Box is of unique design in that metal aligning strips are fastened at the top and bottom front of the box (see illustration), so as to properly align the set after the face plate unit is fastened to the outlet box (in case the outlet box is installed out of plumb). It is equipped with adjustable ears for mounting it in the wall, the same as are furnished on standard sectional outlet boxes. Knockouts are provided at both the top and bottom for the entrance of ½ inch conduit or connecting wires.

The Face Plate Support for Installer is an added feature of this set, consisting of a wire hook mounted on a small card with printed instructions for its use. This hook is for temporarily supporting the Inter-phone face plate, of flush type sets, during installation, so that the wires may be readily connected to the terminals by the installer.

The Finish is durable dull black enamel with nickel trimmings (see general notes on "Finish of Inter-phones").

Code No.	No. of Buttons	For Inter-phone Systems
1539C-0	0	7, 20 and 21
1539C-1	1	7, 8, 9, 10, 12, 14, 15, 18, 20 and 21
1539C-2	2	8, 9, 10, 20 and 21
1539C-3	3	11, 12, 20 and 21
1539C-4	4	11 and 12
1539C-6	6	11 and 12
1539C-8	8	11 and 12

—Dimensions of Face Plate—
High 9 Ins.
Wide 5 1/8 Ins.

—Dimensions of Outlet Box (For Wall Opening)—
High 7 1/2 Ins.
Wide 4 Ins.
Deep 2 1/8 Ins.

INTER-PHONES

Description of Common Talking Inter-phones (Continued)

USED IN SYSTEMS NO. 11 TO NO. 15

Selective Ringing—Common Talking Service

DESK SET INTER-PHONES

No. 6034 Types

A compact type of desk Inter-phone embodying all of the necessary talking and signalling equipment and retaining in design the same general appearance of the standard type of desk telephone.

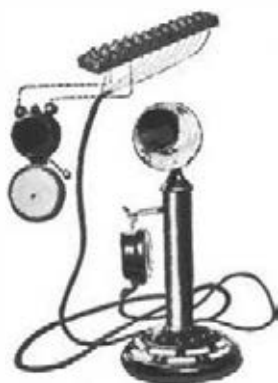
The stands are equipped with watch-case receivers and finished in dull black enamel with nickel trimmings, presenting a neat and attractive appearance.

The desk stands of the Nos. 6034AP and BE Inter-phones are each equipped with a push button and buzzer. The push button is mounted in a convenient position in the stem of the stand for signalling purposes and the buzzer is mounted in the base of the stand for receiving calls.

The four and eight button types of Inter-phones have the push buttons mounted in the base of the desk stands (including blank name plates) for signalling the various stations in a system, also a separate bell is furnished for receiving the calls.



No. 6034BE Desk Inter-phone



No. 6034 Type Desk Inter-phone

No. of But-tons	Code No.	Includes				
		Desk Stand		Bell	Connecting Block	For System
		Code No.	Cord Ft.			
1	6034AP	1020BG	6	•	2No.11A	12
1	6034BE	1420BG	6	•	12A	14 & 15C
4	6034M	1020AS	6	11B	8G	11, 12
8	6034P	1020AT	6	11B	8H	11, 12

Note. *Buzzer in base of desk stand.

HAND SET INTER-PHONES

No. 6034 Types

These Inter-phones are for the same service as the four and eight button desk types as described above except that a hand set and a separate push button block is furnished in place of the desk stand.

The hand set may be hung at the side of a desk or placed in any position desired. (See description of "Hand Sets" below.)

No. of But-tons	Code No.	Includes						
		Hand Set		Push Button Block		Bell	Con-necting Block	For System
		Code No.	Cord Ft.	Code No.	Cord Ft.			
4	6034AZ	1003K	6	104AC	6	11B	8G	11, 12
8	6034BB	1003K	6	108AC	6	11B	8H	11, 12

Nos. 6042 and 6043 Types

HAND SETS (No. 1003 Types)

This represents one of the most convenient types of talking equipment. The transmitter and receiver are a part of the hand set, which can be held and operated with one hand, leaving the other free. A bar marked "Press to talk" mounted in the hand set handle is held down by the natural position of the hand while talking. When not in use, the hand set can be hung on a hook or laid down in any position. The hand set is finished in dull black.



No. 6034 Type Hand Set Inter-phone

Description of Common Talking Inter-phones (Continued)

USED IN SYSTEMS NO. 12 TO NO. 18

Selective Ringing—Common Talking Service

HAND SET INTER-PHONES (Continued)

Nos. 6042 and 6043 Types



No. 382 Type
Apparatus Unit



Face Plate
No. 12007



Type AA Union
Sectional Switch Box



No. 383 Type Apparatus Unit
Surface Mounting



Apparatus Unit (or Box). In connection with most "one button" hand sets it is necessary to use Apparatus Units containing terminals and other accessories. Two types can be furnished.

Surface Mounting Apparatus Units (No. 383 type) are equipped with an insulated base, black finished round metal cover and nickel hook. Approximate size 3 1/4 inches in diameter by 1 1/4 inches deep.

Flush Mounting Apparatus Boxes (No. 382 type) are intended to be set in the wall and are equipped with a brush brass finished face plate. These boxes consist of three parts—a Gem A Union sectional switchbox, an apparatus unit and a face plate. The face plate is 4 1/2 x 2 3/4 inches, the wall box 2 x 3 x 3 inches deep.

An important point to be observed is that wall box and face plate are the same as those used in electric light wiring for push button switches. This feature is of special importance to the contractor, since it allows him to draw on his own stock of Union sectional switchboxes and face plates. For this reason we are prepared to furnish sets either complete, including wall box and face plate, or minus these parts.

How Hand Sets Are Connected to Apparatus Units

With the Surface Apparatus Unit the hand set is permanently attached to the hand set and apparatus unit.

With the Flush Apparatus Box the hand set cord is permanently attached to the box. Except the Numbers 6042E and K (systems 12A and 12B). These cords are equipped with plugs. The plug can be inserted or removed from the receptacle located in the center of the face plate.



No. 6042K Type
Hand Set
Inter-phone



No. 6043 Type
Hand Set
Inter-phone

No. 6042 Flush Types

No. of Buttons	Hand Set			Apparatus (Flush Type)			For Systems
	Code No.	Code No.	Cord Ft.	Code No.	Switchbox	Face Plate No.	
1	6042E	**1003G	3	382E	None	None	12 & 12A
	or 6042K	**1003G	3	382EB	Gem A	12007	
1	6042D	1003K	3	382J	None	None	12B
	or 6042M	1003K	3	382JB	Gem A	12007	
1	6042AF	1003AA	3	382J	None	None	14 & 15C
	or 6042AE	1003AA	3	382JB	Gem A	12007	
1	6042G	1003C	3	382J	None	None	18
	or 6042L	1003C	3	382JB	Gem A	12007	

*Notes. Switch boxes 2 x 3 x 3 inches deep (standard).

**Hand set cord equipped with plug.

No. 6043 Surface Types

No. of Buttons	Code No.	Hand Set	Cord, Ft.	Apparatus Box (Surface Type)	For Systems
1	6043E	1003J	3	383J	12 & 12A
1	6043D	1003E	3	383J	12B
1	6043P	1003AB	3	383J	14 & 15C
1	6043G	1003P	3	383J	18

INTER-PHONES

Description of Annunciators

USED IN SYSTEMS NOS. 10, 12A AND 18

Selective Ringing—Common Talking

The Finish of the annunciators used for our various Inter-phone systems is light golden oak and the cabinets are neat and attractive in design. Special finishes can be furnished on order at a slight additional expense.

The Drops used in all hand reset annunciators are gravity type and made of decarbonized steel and brass, constructed to withstand the most severe service. The drops are shallow in design to permit neatness and compactness in the annunciator, also they remain locked against all vibration, falling only when current passes through the magnet.

The drops used in the electrical reset annunciators are the Semaphore gravity type. Two lock drops are combined in one unit, self-locking in either position. When energized, the right-hand magnet throws and locks the shutter to the left-hand side. The left-hand magnet, when operated by the reset button of the annunciator, returns the shutter to its original position.

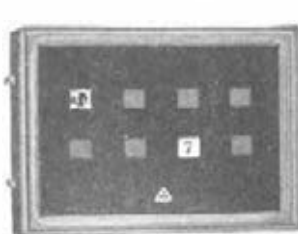
ANNUNCIATOR FOR SYSTEM No. 12A

Nos. 401 to 407 Types

An electrical reset type annunciator for use in connection with our No. 12A system masterstation and may also be used for other purposes where a standard type of electrical reset annunciator is desired.

The drops (as described above) are mounted on the backboard and are regularly furnished with a reset button for every eight drops, the buttons mounted in bottom of case. A buzzer is mounted on the backboard of the annunciator for audible signalling.

The finish of the wood case (Nos. 401 and 406 types) is golden oak. The finish of the metal case (Nos. 405 and 407 types) is dull black. Other finishes are "special."



No. 401 Type Annunciator

No. of Drops	Arrangement—		Dimensions			Wood Type	Meta Type
	Across	Down	High	Wide	Deep		
4	2	2	7 $\frac{1}{8}$	7 $\frac{1}{4}$	2 $\frac{1}{2}$	(Surface Mounting) No. 401	No. 407
6	3	2	7 $\frac{1}{8}$	9 $\frac{1}{2}$	2 $\frac{1}{2}$		
8	4	2	7 $\frac{1}{8}$	11 $\frac{3}{4}$	2 $\frac{1}{2}$		
10	4	3	11 $\frac{1}{8}$	11 $\frac{3}{4}$	2 $\frac{1}{2}$		
12	4	3	11 $\frac{1}{8}$	11 $\frac{3}{4}$	2 $\frac{1}{2}$	(Flush Mounting) No. 406	No. 405
14	5	3	11 $\frac{1}{8}$	14 $\frac{1}{2}$	2 $\frac{1}{2}$		
16	6	3	11 $\frac{1}{8}$	16 $\frac{1}{4}$	2 $\frac{1}{2}$		
18	6	3	11 $\frac{1}{8}$	16 $\frac{1}{4}$	2 $\frac{1}{2}$		
20	5	4	12 $\frac{1}{8}$	14	2 $\frac{1}{2}$		
22	6	4	12 $\frac{1}{8}$	16 $\frac{1}{4}$	2 $\frac{1}{2}$		
24	6	4	12 $\frac{1}{8}$	16 $\frac{1}{4}$	2 $\frac{1}{2}$		

Note. Intermediate or larger sizes in sets of two drops can be furnished.

ANNUNCIATORS FOR INTER-PHONE SYSTEMS Nos. 10 AND 18

Master Station Annunciator
Nos. 1028 and 1051

A hand reset type wooden case annunciator with golden oak finish, presenting a neat and attractive appearance. Other finishes can be furnished on order at a slight additional expense. The annunciators are equipped with a number of drops and jacks, a push button for ringing, a hand or desk set Inter-phone (which must be ordered separately) and a cord and plug for calling and answering calls.

The drops and jacks will be numbered from one up, unless otherwise specified. The number of vestibule drops for System No. 10 must be specified on order. The combined resistance of bell and drops in series is 10 ohms resulting in lengthening the life of the battery and lowering the maintenance cost.

The Nos. 1028 to 1039 series are for use in System No. 18.

The Nos. 1040 to 1051 series are for use in System No. 10.

INTER-PHONES

Description of Annunciators (Continued)

USED IN SYSTEMS NOS. 8 TO 18
Selective Ringing—Common Talking Service

No. of Drops	System No. 18 List No.	System No. 19 List No.	Arrangement of Drops and Jacks		Outside Dimensions in Inches		
			Across	Down	Height	Width	Depth
10	1028	1040	5	2	23	12½	5½
12	1029		6	2	23	14	5½
14		1041	7	2	23	16	5½
18	1030	1042	9	2	23	18½	5½
20	1031	1043	10	2	23	20	5½
24	1032	1044	12	2	23	23	5½
30	1033	1045	10	3	29	20	5½
36	1034	1046	12	3	29	23	5½
42	1035	1047	14	3	29	26	5½
48	1036	1048	12	4	34	23	5½
56	1037	1049	14	4	34	26	5½
60	1038	1050	12	5	40	23	5½
70	1039	1051	14	5	40	23	5½

Note. Larger sizes can be furnished on order.

Each of the above List Nos. cover the annunciator only and does not include the Inter-phone, which must be ordered separately as follows:

Desk or Hand Set Inter-phones for Systems Nos. 10 and 18 Annunciators

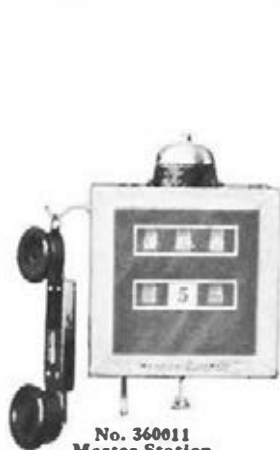
1003K Hand set, black finish, 3 ft. cord. || 1320BF Desk stand, black finish, 5½ ft. cord.

Hook

A No. 141A hook can be furnished for hanging the hand set to the side of the annunciator.

Connecting Cords

One or two pairs of connecting cords can be furnished when specified on order. These cords are for use only in System No. 18 as described under "Operation" of that system.



No. 360011
Master Station
One-way Service



No. 360005
Master Station Two-way
Service



Janitor's Annunciator
No. 361332 to 361339

ANNUNCIATORS FOR INTER-PHONE SYSTEMS Nos. 8, 9 AND 12B

Hand reset type wooden case annunciators with golden oak finish. Other finishes can be furnished on order at a slight additional expense.

The Nos. 360000 to 360008 series are for use in System No. 12B "Two-Way Ringing Service,"

The Nos. 360009 to 360017 series are for use in System No. 12B "One-Way Ringing Service"

The Nos. 361332 to 361339 series are for use in "Apartment House Systems Nos. 8 and 9"

No. of Drops	System No. 12B		Systems Nos. 8 and 9 List No.	Drop Arrangement (Horizontal Rows)
	Two-Way Service List No.	One-Way Service List No.		
2	360000	360009	361332	1
4	360001	360010	361333	1
6	360002	360011	361334	2
8	360003	360012	361335	2
10	360004	360013	361336	2
12	360005	360014	361337	2
15	360006	360015	361338	3
18			361339	3
20	360007	360016	*****	2
24	360008	360017	*****	2
25	*****	*****	361339	5

Note. Larger sizes can be furnished on order.

Each of the above List Nos. (360000 to 360017) cover the annunciators only and do not include the hand set which must be ordered separately, as follows:

Hand Set Inter-phone for System No. 12B Annunciators

1003D Hand set, black finish, 3 ft. cord. 141A Hook furnished on order for hanging hand set.

INTER-PHONES

Inter-phone Outfits

General. Where intercommunication is desired between two points in the home or in business, Western Electric Inter-phones can be furnished in "a-pair-in-a-package" outfit; that is, two Inter-phones complete with all the installing materials and instructions necessary to put them up. The outfits do not, however, include batteries, which must be ordered separately. For average conditions four or five dry cells will be sufficient.

Service. Consists of two wall or hand set type Inter-phones suitable for a private telephone line between house and barn or garage, or for a line that is wholly within a house, also for use in offices or shops between two buildings or in one building.

Operation. Either station can ring and talk to the other.



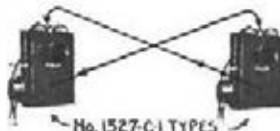
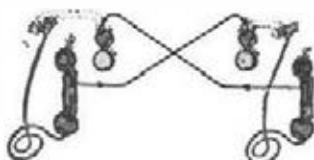
No. 17 Outfit



No. 30 Outfit



No. 31 Outfit



No. 1527-C-1 TYPES



No. 6043 TYPES

Outfit No. 17

This consists of two No. 1003 type hand sets with all material required to install a simple intercommunicating system between two points not over 80 feet apart, and where the wire will be wholly indoors and not exposed to weather conditions or moisture. The material, in addition to the hand sets, consists of two connecting blocks with mounting screws, 80 feet of insulated twisted pair copper wire, 60 insulated nails for fastening wire, two hooks for holding hand sets, two bells, two battery connectors and illustrated installing instructions.

Outfits No. 30 and No. 31

Outfit No. 30

Includes two surface wall No. 1527C-1 Inter-phones and 1 No. 51H retardation coil in one box but no installing or wiring material.

Outfit No. 31

Includes two hand set type No. 6043P Inter-phones and No. 51H retardation coil in one box but no installing or wiring material.

Outfits No. 30A and No. 31A

These outfits are for use where the wiring is to be run entirely under cover and not exposed to moisture or weather.

Outfit No. 30A

Includes one No. 30 outfit in one box (described above) and another box containing installing material (described below).

Outfit No. 31A

Includes one No. 31 outfit in one box (described above) and another box containing installing material (described below).

The wiring material furnished with the No. 30A and No. 31A outfits consists of 75 feet of insulated 3 conductor copper wire, two battery connectors, insulated nails for fastening wires, and illustrated installing instructions.

Outfits No. 30B and No. 31B

These outfits are for use where the wiring is to be run in the open between or outside of buildings, and exposed to weather and moisture.

Outfit No. 30B

Includes one No. 30 outfit in one box (described above) and another box containing installing material (described below).

Outfit No. 31B

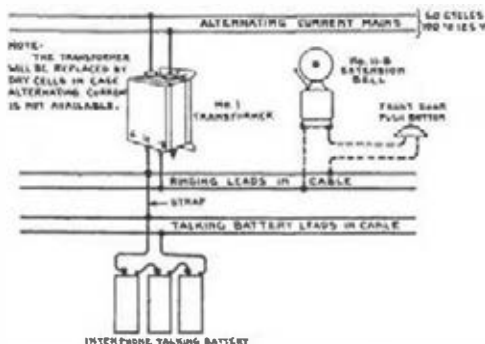
Includes one No. 31 outfit in one box (described above) and another box containing installing material (described below).

The wiring material furnished with the No. 30B and No. 31B outfits consists of 150 feet of outside 3 conductor copper wire, two brackets with screws, hooks and knobs to attach wires to building, two porcelain tubes to insulate wires when entering building, two battery connectors, 25 insulated nails for fastening wires inside building, and illustrated installing instructions.

INTER-PHONE ACCESSORIES



No. 1 Transformer



Connections showing use of Bell-ringing Transformer for ringing Inter-phone Bells and Door-bells. Dotted lines show wiring for Door-bell using same source of Ringing Current

Bell-ringing Transformers

List
No.
1

Description

Self-contained unit for use on 60 cycle alternating circuits at 100-125 volts. May be used for ringing the bells on system 1. Not suitable for use in any other system. Delivers current at three voltages 6, 12 and 18. Cannot be used for furnishing talking current.

Hand Set Hanger

-Code
No.

Description

1B A black finish hanger for holding No. 1001 type hand set.

Hand Set Hook

Code
No.

Description

141A A hook to be screwed into wall for holding No. 1003 type hand set.

Push Button Blocks

For use with Inter-phone Systems Nos. 12A, 20G and 20H, also in private installations and for call bell service.

WOOD PUSH BUTTON BLOCK

Stock finish of this type is dark golden oak with nickel trimmings. The directory plate is backed with a strip of transparent celluloid to protect the directory list.



Wood Base	Weighted Base	No. of Buttons
Code No.	Code No.	
7900	7980	4
790	798	6
7910	7990	8
7921	79010	12
7930	79020	16
793	7902	20

Green mercerized cord per foot per button and attaching cord per button, are furnished at extra charge.

METAL PUSH BUTTON BLOCK

A black finished metal box, bushed for the entrance of connecting cord or wires. A base plate is provided having two punched holes for mounting, if desired. Felt pads are attached to the bottom of the plate.

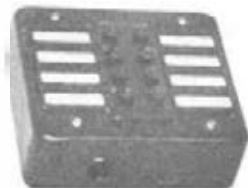
The push button groups and escutcheons, also the finish of these boxes are the same as specified for Unit Wall Inter-phones on the preceding pages. The box is $3\frac{3}{4} \times 4\frac{1}{4} \times 1\frac{1}{8}$ inches in size.

Push Button Blocks Without Cords

Code No.	No. of Buttons	Code No.	No. of Buttons
101A	1	104A	4
102A	2	106A	6
103A	3	108A	8

Push Button Blocks With Cords (6 Ft. Lgths.)

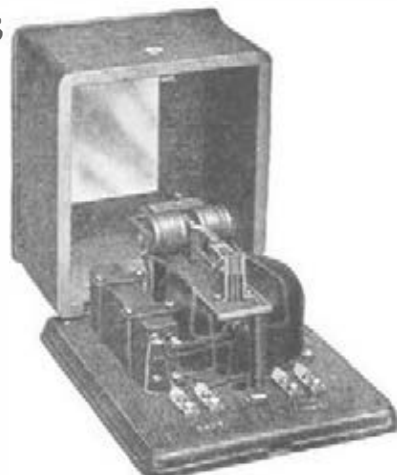
104AC	4	108AC	8
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Western Electric INTERRUPTERS



No. 84A Open



No. 62A Open

Interrupters

(Pole Changers)

The Western Electric **Interrupters** listed below are suitable for private branch exchange service and for use with magneto switchboards and central battery equipments. They are a convenient means of obtaining alternating or pulsating current, or both, from a direct current source of energy.

The types and the various models differ in mechanical construction and circuit arrangement to suit (a) the source of current used to drive the vibrating element; (b) the source of energy used for producing ringing current and (c) the kind of current output necessary for ringing. These three points are covered in the description of each model. The interrupters may be mounted horizontally or vertically.

No. 62A TYPE

This is a ringing transformer or interrupter for furnishing alternating ringing current. All the current needed for operating the interrupter and for ringing, is supplied by a single battery of from four to eight dry cells. The alternating current is of approximately forty volts.

The outfit is designed for ringing a small number of telephone bells on a low resistance line and is suited to private branch exchange service such as is required in connection with the No. 1801 P.B.X. switch-board when serving a number of stations in the same building.

This interrupter starts quickly, and is therefore adapted for code ringing. As it operates only when a push button or local contact on a ringing key is closed, it is economical, requiring no energy except when actually ringing.

Code No.62A

No. 84 TYPE

All No. 84 type interrupters act as electrically operated pole changers, producing ringing current from a source of direct current. They have been thoroughly tested by wide application and extended service in all branches of the operating field.

The Nos. 84A, 84C, 84F and 84G interrupters are for use in central battery offices.

The Nos. 84D and 84E models are designed for magneto exchanges.

Each No. 84 type interrupter is mounted on the top of a metal case, 8 inches square at the base, in which condensers, resistance and a switching key for starting and stopping the machine, are mounted. A metal cover with a glass window is hinged on this case and protects the moving parts. A circuit label is pasted on the inside of the cover. These interrupters occupy a small amount of space, are easy to install, have their adjustable parts readily accessible, and require a minimum amount of maintenance.

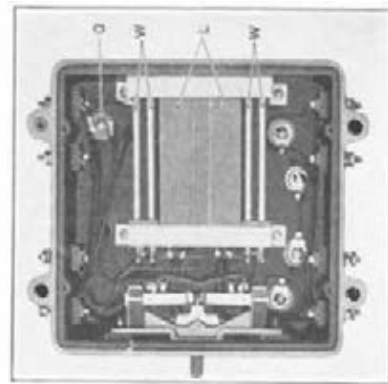
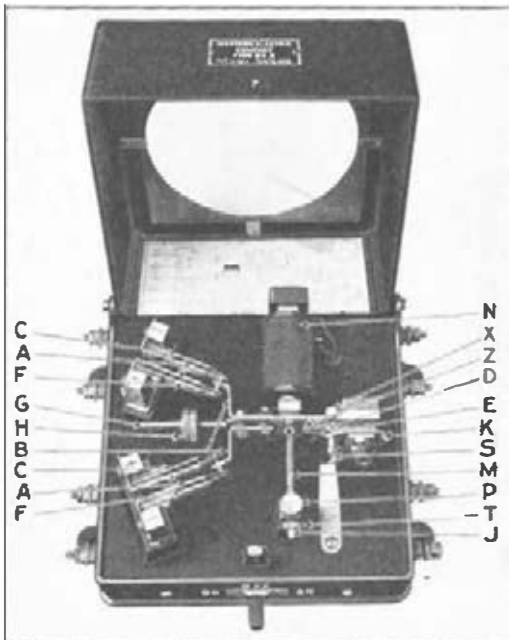


No. 84A Interrupter

Code No.

- 84A** The operating coil of this interrupter is wound for current from a 24 volt storage battery. Ringing current is derived from a 100 volt battery of dry cells. The current available for ringing is positive and negative pulsating (61 volts on A.C. meter) and alternating current (83 volts).
- 84C** The operating coil is wound for current from a 36 volt storage battery; it is otherwise the same as the No. 84A.
- 84D** The operating coil is wound for current from a two-cell Edison BSCO primary battery. Dry cells are used for supplying ringing current, which is alternating only, at 83 volts, when a 100 volt dry cell battery is used.
- 84E** Similar to the No. 84A model but operating coil wound for two cell of Edison BSCO primary battery. Furnishes positive and negative pulsating and alternating current for ringing.
- 84F** This model is designed to take both operating and ringing current from a 24 volt storage battery. It delivers alternating current only. When used exclusively for A.C. ringing, no dry cells are required; superimposed ringing currents may be obtained when 30-40 volt batteries are associated with it. These superimposing batteries may be either dry cell or storage batteries.
- 84G** Designed to operate on a 36-volt central office battery; otherwise same as the No. 84F model.

INTERRUPTERS (Continued)



Bottom View

Types 84A, C, D, E, F and G Interrupters

PIECE PART LIST

When ordering give piece part number indicated in column under type of Interrupter for which new piece part is wanted.

	Name	84A	84C	84D	84E	84F	84G
A	Inner Ringing Spring...	P- 46665	P- 46665	P-103970	P-106359	P-169848	P-169848
B	Vibrator Arm.....	P- 46651	P- 46651	P- 46651	P-46651	P-169847	P-169847
C	Back Ringing Spring...	P- 46667	P- 46667		P-106356		
D	Inner Magnet Spring...	P- 46668	P- 46668	P- 46668	P- 46668	P-149853	P-149853
E	Outer Magnet Spring...	P- 46669	P- 46669	P- 46669	P- 46669	P-149851	P-149851
F	Front Ringing Spring...	P- 46666	P- 46666		P-106358		
G	Armature Arm.....	P- 46673	P- 46673	P-103975	P- 46673	P-149865	P-149865
H	Weight Nut.....	P- 46650	P- 46650	P-103972	P-103972	P- 46650	P- 46650
J	Spiral Spring Adjusting Screw.....	P- 46648	P- 46648	P- 46648	P- 46648		
K	Adjusting Plate (Assembly).....	P- 46656	P- 46656	P- 46656	P- 46656		
L	Condenser.....	No. 21J	No. 21J	No. 21J	No. 21J	No. 21E	No. 21E
M	Spiral Spring.....	P-106011	P-106011	P-106011	P-106011		
N	Magnet Coils.....	P-132829	P-128185	P-133769	P-132828	P-132829	P-128185
O	Resistance Across Contacts.....	No. 21B	No. 21B	Spl. No. 21 P-103977	Spl. No. 21 A-38625	No. 21B	No. 21B
P	Spring Adjusting Screw Lock Nut.....	P-123818	P-123818	P-123818	P-123818		
R	Stiffening Spring.....					P- 46620	P- 46620
S	Magnet Spring Adjusting Screw.....	P- 39625	P-39625	P- 39625	P- 39625	P- 39625	P- 39625
T	Spring Adjusting Screw Nut.....	P- 46649	P- 46649	P- 46649	P- 46649		
U	Contact Spring Adjusting Clamp.....					P-149849	P-149849
V	Adjusting Clamp Screw..					P-149856	P-149856
W	Resistance in Series with Condenser.....	No. 18AC	No. 18AC	No. 18AC	No. 18AC		
X	Pivot Screw.....	P- 46654	P- 46654	P- 46654	P- 46654		
Y	Reed.....					P-147480	P-147480
Z	Bumper Pin.....	P- 48913	P- 48913	P- 48913	P- 48913	P-147489	P-147489

Western Electric

INTERRUPTERS

Interrupter Ringing Outfits



No. 2 Interrupter Ringing Outfit.
with 2 Extra Edison Batteries

INTERRUPTER RINGING OUTFIT No. 1

This outfit has been designed for magneto switchboard service and constitutes a complete ringing equipment which makes use of one interrupter and one set of batteries each for ringing and operating.

It consists of:

1 No. 84E interrupter for furnishing alternating and positive and negative pulsating current.

1 No. 1440 battery cabinet, oak finish, for holding one set of operating and ringing batteries.

1 No. S-502 type, Edison 400 ampere hour battery for operating interrupter.

3 No. 62A protectors with 2 ampere fuses.

100 feet No. 14 B.R.C. wire.

INTERRUPTER RINGING OUTFIT No. 2

This outfit is intended for magneto switchboard service and constitutes a complete ringing equipment which makes use of two sets of both ringing and operating batteries. It provides one complete reserve ringing outfit for emergency service. The outfit consists of:

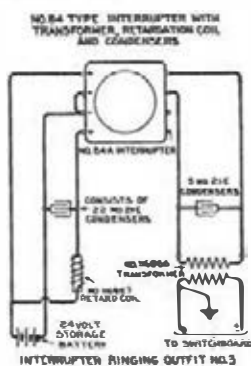
2 No. 84E interrupters for furnishing alternating and positive and negative pulsating current.

1 No. 1441 battery cabinet, oak finish, for holding two sets of ringing and operating batteries.

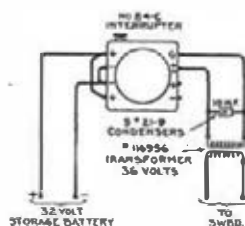
2 No. S-502 type, Edison 400 ampere hour batteries for operating interrupter.

6 No. 62A protectors with 2 ampere fuses.

100 feet No. 14 B.R.C. wire.



Circuit Schematic



INTERRUPTER RINGING OUTFIT
Circuit Schematic

INTERRUPTER RINGING OUTFIT No. 3

This outfit is intended for use in central battery central offices for furnishing straight alternating ringing current only. It makes use of an interrupter, transformer, retardation coil and condensers, and operates from a 24 volt storage battery or 18 cells of dry battery. In operating from dry batteries or any source of current other than storage battery and which is supplying at the same time current for other purposes, the retardation coil and condensers may be omitted. The small amount of current required makes the outfit economical from a maintenance standpoint.

The No. 3 outfit will ring fifty 1600 ohm bells at the far end of a 400 ohm line.

It consists of:

1 No. 84A interrupter for furnishing alternating current only.

1 No. 116956 transformer.

1 No. 116957 retardation coil.

27 No. 21E condensers.

INTERRUPTER RINGING OUTFIT No. 4

To Operate from 32 Volt Farm Power and Light Plant

This outfit is designed for use with a 32 volt farm power and light plant and will furnish straight alternating ringing current only. An interrupter, a transformer and a condenser are used.

The amount of current for operation is small and this fact makes the outfit economical from an operating standpoint. It will ring fifty 1600 ohm bells at the far end of a 400 ohm line.

This outfit consists of:

1 No. 84C interrupter.

5 No. 21D condensers.

1 No. 116956, 36 volt transformer

JACKS

Singly Mounted—Welded Frame Jacks

The following singly mounted, electrically welded frame type jacks replaces the corresponding punched frame types as indicated in the code number listings. The terminals of the jacks are regularly arranged to accommodate two No. 19 B. & S. gauge wires. Mounting screws are furnished.



No. 215 Jack

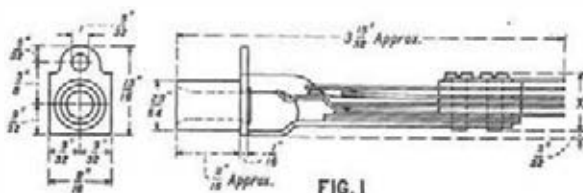


FIG. 1

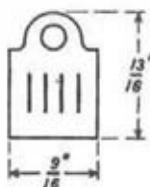


Fig. A

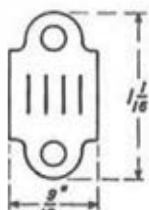


Fig. B

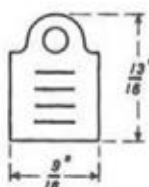


Fig. C

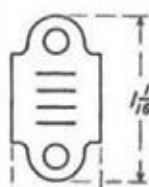
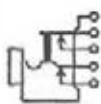


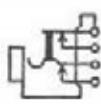
Fig. D



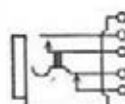
No. 215



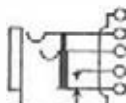
No. 216

No. 217
220, 235No. 218
219, 231

No. 221

No. 225
No. 234

No. 226



No. 227



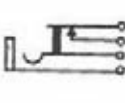
No. 230, 233



No. 232



No. 236



No. 237



No. 240



Nos. 241, 249



No. 242



No. 243



No. 244



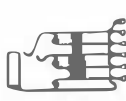
No. 245



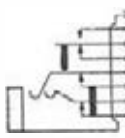
Nos. 246, 238



Nos. 248, 239



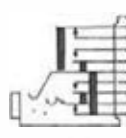
No. 267



No. 280



No. 281



No. 284



No. 285



No. 289



No. 290



No. 291



No. 293



No. 297A



No. 300A



No. 303A

JACKS

Singly Mounted—Welded Frame Jacks (Continued)

Code letters A, B, C and D of the code numbers listed below indicate the number of mounting lugs (single or double) and their arrangement with respect to the plane of the springs (horizontal or vertical) as illustrated in figures A, B, C and D on the preceding page.

Fig. 1, together with Figs. A, B, C and D, show the general design and dimensions of welded frame type jacks.

JACKS FOR USE WITH PLUG Nos. 47, 116, 137, 141, 144, 151, 153, 154, 209, 217 AND 218

These jacks will mount on $\frac{5}{8}$ inch horizontal centers. For vertical centers, the "A" and "C" type jacks will mount on $\frac{5}{8}$ inch in double horizontal rows with lugs in opposite directions and $\frac{7}{8}$ inch when mounted in double horizontal rows with lugs in same direction. The "B" and "D" types will mount on $1\frac{1}{8}$ inch vertical centers.

Code No.			Code No.		
Fig. "A" Type	Fig. "C" Type	Replaces Jack No.	Fig. "B" Type	Fig. "D" Type	Replaces Jack No.
215A	216C	204	219B	219D	175
216A	217C	209	220B	220D	176
217A	218C	207	221B	221D	173
218A	219C	155	225B	225D	177
219A	220C	154			
220A	221C	152			
221A	225C	156			
225A	226C				
226A	227C	206			
227A	230C	146	230B	230D	167
230A	231C	147	231B	231D	168
231A	232C	148	232B	232D	169
232A	233C	149	233B	233D	170
233A	234C	151	234B	234D	172
234A	235C	153	235B	235D	174
235A	236C	189	236B	236D	188
236A	237C	185			
237A					
303A					

JACKS FOR USE WITH No. 109 TYPE PLUG

The mounting centers for these plugs are the same as outlined for the above jacks.

Code No.			Code No.		
Fig. "A" Type	Fig. "C" Type	Replaces Jack No.	Fig. "B" Type	Fig. "D" Type	Replaces Jack No.
246A		126	246B		
248A		134	248B	248D	
249A		143	249B		

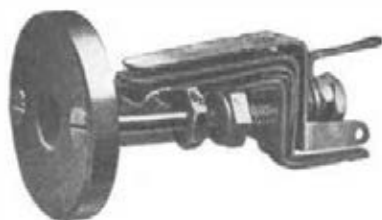
JACKS FOR USE WITH Nos. 110, 150, 202 AND 213 TYPE PLUGS

Code No.			Code No.		
"A" Type	"C" Type	Replaces Jack No.	"B" Type	"D" Type	Replaces Jack No.
238A	238C	150	238B	238D	178
239A	239C	160	239B	239D	179
240A	240C	161	240B		180
241A	241C	162	241B		181
242A	242C	163	242B		182
243A		165	243B		184
244A					
245A			245B		
280A	280C		280B		
284A					
285A					
300A					
			289B		
			290B		
			291B		
			293B		

*Note. Same vertical centers as noted above.

JACKS (Continued)

Singly Mounted—Miscellaneous Types



No. 77



No. 77

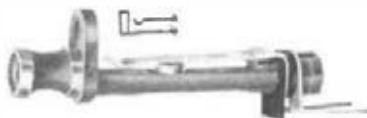


Nos. 78 & 190



No. 190

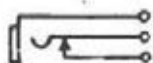
Code No.	Description
77	Operator's telephone set. Makes one separate contact when a No. 148 plug is inserted; has tip ring and sleeve terminals.
78	Same as No. 77 jack, except that the make contact is omitted. Diameter of mounting plate $1\frac{1}{8}$ inches.
190	This jack is intended for use in restaurants and similar locations where it is desirable to move a desk stand from place to place. The No. 148 plug is used with this jack; it is provided with tip, ring and sleeve connections. The cover is $1\frac{1}{8}$ inches square and 1 inch deep, and is finished black. The base and cover are slotted to allow wires to be brought in from wire moulding.



No. 99 Jack



No. 224 Jack



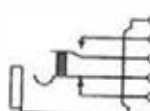
No. 200



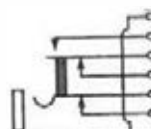
No. 201



No. 208



No. 203



No. 224

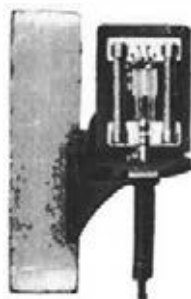
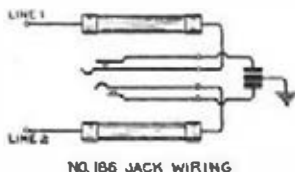
The Nos. 200, 203, 208 and 224 are fibre insulated jacks having micanite bushings. They will mount on any thickness of wood from $\frac{3}{4}$ to $\frac{7}{8}$ inch, the jack shank being threaded and the jack held in place by means of a nickel finished nut.

Code No.	Mounting Centers, Inches		Used with Plugs	Used in Jack Boxes
	Horizontal	Vertical		
99	$\frac{5}{8}$	$\frac{3}{8}$	47A, B & 116 137 & 144	.....
200	$\frac{1}{8}$	1	1A, 47 & 116	.....
201	$\frac{1}{8}$	$1\frac{1}{4}$	1A, 47 & 116	.....
203	$\frac{1}{8}$	$1\frac{1}{4}$	1A, 47 & 116	.....
208	$\frac{1}{8}$	$1\frac{3}{8}$	1A, 47 & 116	385, 386, 389
224	$\frac{1}{8}$	$1\frac{1}{2}$	1A, 47 & 116	385, 386, 389

JACKS AND JACK BOXES



No. 186 Jack



No. 186 Jack—Open

Code
No.
186

A jack designed for mounting on poles as a means of connecting a portable telephone to the line. Has a cast frame and cover; black rust-proof finish. The plug hole is protected against insects by covering with spring flap; equipped with:

- Two 500 volt 1 ampere D and W fuses
- Two No. 1 protector blocks
- Two No. 2 protector blocks
- Two No. 3 protector micas

187

A lock will be supplied when specified as a separate item. This jack is used with the No. 146 plug. Same as No. 186 jack except that it is not equipped with protective apparatus.



No. 345A Jack Box

Jack Boxes

No. 345 Type



No. 385A Jack Box

Code
No.
345A

Description

Oak box primarily for use in train dispatching circuits at dispatcher's office and is so arranged that two headsets can be connected to the line at the same time. Equipped with 1 No. 30 jack mounting, 2 No. 237C jacks and 2 No. 221C jacks. Approximate dimensions, length 5½ inches, width 4¾ inches, depth 2 inches.

CORDLESS JACK BOXES

Oak boxes with nickel trimming for miscellaneous purposes. Each box is equipped with hinge cover and a No. 1A plug attached by means of a dummy cord. The No. 389 type is split and hinged on a line midway between the upper and lower jack levels.

Telephone jack boxes Nos. 385A, B, 386A, B, C and 389A are so arranged that one telephone line can be terminated in each jack. A telephone set can be connected to any of these lines by inserting the plug in the proper jack.

Telegraph jack boxes Nos. 385C, D, 386D, E, F and 389B are so arranged that one telegraph line can be looped through each jack. Resonator set can be connected to any of these lines by inserting the plug in the proper jack. When this is done, the calling set is disconnected.

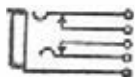
Code No.	Line Equipment	Capacity	Equipped with Jacks	Service	Dimensions, inches		
					Width	Height	Depth
*385A	2	3	208	Telephone	4½	3¼	6¼
385B	3	3	208	Telephone	4½	3¼	6¼
*385C	2	3	224	Telegraph	4½	3¼	6¼
385D	3	3	224	Telegraph	4½	3¼	6¼
*386A	4	6	208	Telephone	6¼	2¾	7½
*386B	5	6	208	Telephone	6¼	2¾	7½
386C	6	6	208	Telephone	6¼	2¾	7½
*386D	4	6	224	Telegraph	6¼	2¾	7½
386E	5	6	224	Telegraph	6¼	2¾	7½
386F	6	6	224	Telegraph	6¼	2¾	7½
389A	12	12	208	Telephone	7½	4⅝	6¼
389B	12	12	224	Telegraph	7½	4⅝	6¼

*No. 17C apparatus blank, illustrated in the center jack position on the cut of the No. 385A jack box, is furnished in all unequipped positions.

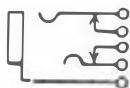
JACKS AND JACK FASTENERS



No. 110 Jack Mounting with No. 141 Jack



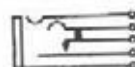
No. 50



No. 141



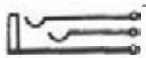
No. 229



No. 295



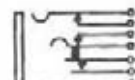
No. 92



No. 193



No. 275



No. 308

Jacks for Mounting in Strips

These jacks are designed for mounting in groups in jack mountings, a few of which are listed under "Jack Mountings." In ordering, the code number of the jack and the code number of the jack mountings should be given as well as the total number of jacks and mountings required.

The number of jacks to be mounted per strip should be specified and the numbering desired, as they will otherwise be furnished unnumbered.

These jacks are not supplied unmounted.

Code No.	Used with Plug No.	Used with Jack Mounting	No. per Strip
49	110	1-2-34-77	5, 10 and 20
50	110	1-2-34-77	5 and 10
92	109	18-19-113	10 and 20
141	110	109-110-112	10 and 20
193*	110	117-118-119 120-122-123 125-127	10 and 20
229	109	145	10
275	110	109-110-112 115-116-136 137	10 and 20
295	110	107-108-109, 110 112, 115, 116, 131 136 or 137	10 and 20
308	110	109-110-116-131 136-137	10 and 20

*The No. 119 tool is designed for extracting and replacing the sleeve of the No. 193 jack.

Jack Fasteners



No. 16



No. 19

These fasteners serve the purpose of holding either jack mountings or lamp socket mounting in place on the switchboard frame. They are made of brass.

The No. 103 tool listed under "Tools" should be used in placing and removing fasteners.

Code No.	Used on
16	No. 92 jack sections having drilled stile strips.
18	No. 92 jack sections having drilled stile strips and where fire screens prevent the use of No. 16.
19	Nos. 49 and 193 jack sections having drilled stile strips on 1 inch centers.

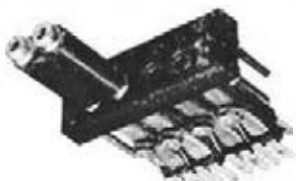
JACK MOUNTINGS

For central battery exchanges it is customary to have the multiple jack strips in each panel separated into groups of five rows by thin white holly strips. Each group consists of one hundred jacks numbered 0 to 99. Each strip has 20 jacks and is divided into four smaller groups (each having five jacks) by a distinctive mark so that an operator may readily choose the proper jack. It is also usual to furnish these jack mountings with a groove on the lower edge for marking the jacks for various purposes such as signifying that several adjoining jacks are connected to one private exchange, etc. This groove is shown in the illustration of the No. 113 jack mounting.

In ordering, specify the number of jacks and the Code No., the Code No. of the jack mounting with the number per strip, together with the numbering desired. If the holly strips are to be attached to the upper edge of any of the jack mountings, the order should specify which ones.

JACK MOUNTINGS—(NOT ARRANGED FOR NUMBER PLATES)

The Nos. 30, 78 and 80 jack mountings are so designed that the twin plug of an operator's head set may be inserted in each pair of jacks. Mountings will be furnished unnumbered unless otherwise specified.



No. 30 Jack Mounting with
No. 99 Jacks



No. 80 with No. 99 Jacks



No. 109 Jack Mounting with No. 141 Jacks



No. 113 Jack Mounting with No. 92 Jacks

Code No.	Used With Mounting Jack No.	Ordinarily Used with Plug No.	No. of Jacks per Strip	Mounting —Face Dimensions, Ins.— Length	Width
1	50	110	10	9 1/8	7 1/8
18	92	109	10	7 1/8	3 3/8
30	99-152	137	4	3 3/8	1 1/4
77	50	110	5	9 3/8	7 1/8
78	99-152	137	6	5 1/8	1 1/4
80	99-152	137	2	2 3/8	1 1/4
109	141	110	10	11 1/8	7 1/2
112	141	110	20	11 1/8	1 1/2
113	92	109	20	7 1/8	3 3/8
114	49	110	20	9 1/8	7 1/8
115	141	110	20	10 1/2	1 1/2
116	141	110	10	10 1/2	1 1/2
*118	193	110	20	9 1/8	7 1/8
*119	193	110	20	9 1/8	7 1/8
*120	193	110	20	9 1/8	7 1/8
*122	193	110	20	11 1/8	7 1/8
127	193	110	10	9 1/8	7 1/8
128	155 or similar jack	47	10	6 1/8	1 1/4
129		47	20	6 1/8	2 1/8
130		47	10	6 1/8	1 1/4
133		47	30	21 1/4	1 3/8
*136	141	110	10	11 1/8	1 1/2
138	92	109	10	7 1/8	3 3/8
141	50	110	10	9 1/8	7 1/8
143	159	110	10	9 1/8	1
145	229	109	10	7 1/8	1 1/8
158	99-152	47	4	3 3/4	1 1/4
167	49	110	10	11 1/8	7 1/8
172	215	47	10	7 1/8	2 1/8
173	92	109	5	7 1/8	3 3/8
182	221	47	2	2 3/8	1 1/4
186	241-242	110	20	23	1 1/2

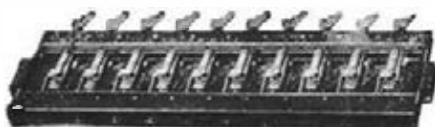
*Note. Lower edge grooved.

JACK MOUNTINGS

(Continued)



No. 148 Jack Mounting



No. 19 Jack Mounting with No. 92 Jacks



No. 110 Jack Mounting with No. 141 Jacks

JACKS WITH MOUNTINGS—ARRANGED FOR NUMBER PLATES

These mountings are not numbered. In ordering, specify the number of jacks required, the code number of the jacks, the code number of the mounting, and the number of jacks to be mounted per strip. The proper number of jacks should be ordered to fully equip the mounting.

Code No.	Used with Jack No.	Ordinarily used with Plug No.	No. of Jacks per Strip	—Face Dimensions,— Ins.		For No. Plates	Material
				Length	Width		
2	50	110	10	10½	½	32-59 types	Hard rubber Metal mounting with hard rubber face Hard rubber
19	92	109	10	7 ¾	¾	30-60 types	
34	50	110	5	9 ⅛	⅞	32-59 types	
110	141	110	10	11 ⅞	½	5B	Hard rubber
134	154	47	15	21¾	1⅝	21B	
135	156	47	30	21¾	1⅝	21B	
*137	141	110	10	11 ⅞	½	5B	Metal mountings with hard rubber face
*139	92	109	10	7 ¾	¾	30-60-types	
142	50	110	10	9 ⅛	⅞	31-32-59 types	Hard rubber
146	218 or similar jacks	47	20 (two rows)	6 ¾	2⅝	No. 8K designated strip and 130A number plate	Hard rubber with brass mounting lugs
147	218 or similar jacks	47	10	6 ¾	1¼	No. 130	
184	218	47	24	16 ½	1¼	23	Hard rubber with brass mounting lugs

No. 148 JACK MOUNTING

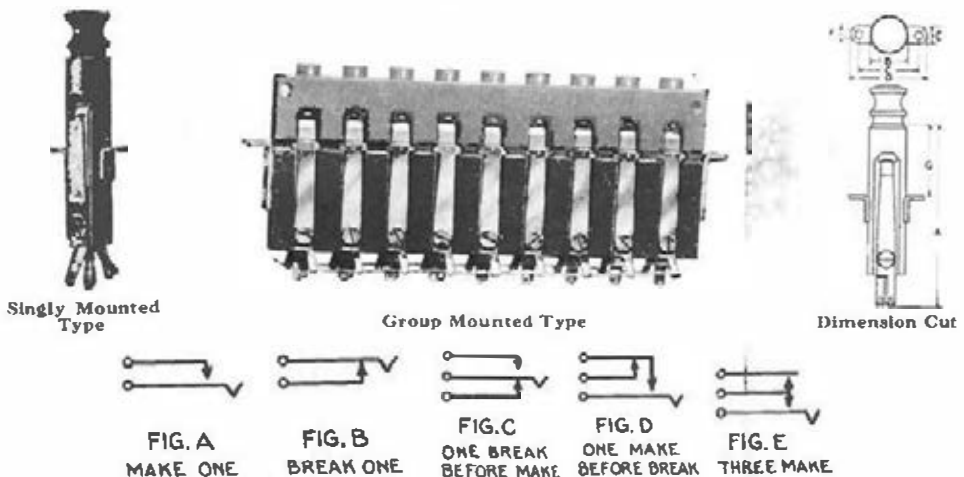
This ~~ebony~~ finished wood box is primarily designed for mounting a No. 218 or similar type jack on the side of a desk. Two wood screws with washers are provided for fastening it in place. The overall dimensions are length, 5 inches, width 2⅞ inches, and depth 1 ¾ inches.

No. 151 JACK MOUNTING

Oak box with hard rubber top, arranged for four No. 221 or similar type jacks primarily for use with mounting plates on distributing frames.

*Note. Lower edge grooved.

KEYS



The above contact spring arrangements represent the normal or unoperated contact spring positions of the keys listed below.

Singly Mounted Type Keys

LOCKING TYPE

(Button locks up when depressed to operated position)

Code No.	No. of Springs	Spring Arrangement	Dimensions, Inches (See Dimension Cut)						*G
			A	B	C	D	E	F	
92B	6	2 sets Fig. C	$3\frac{3}{4}$	$\frac{1}{2}$	$1\frac{1}{4}$	$1\frac{1}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$1\frac{1}{4}$
92D	9	3 sets Fig. C							
92AA	6	2 sets Fig. D							
424B	6	3 sets Fig. A	$3\frac{3}{4}$	$\frac{1}{2}$	$1\frac{1}{4}$	$1\frac{1}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$1\frac{1}{4}$
424C	7	2 sets Fig. A and 1 Fig. E							
424E	12	6 sets Fig. A							

NON-LOCKING TYPE

(Regular Push Button Operation.)

Code No.	No. of Springs	Spring Arrangement	Dimensions, Inches (See Dimension Cut)						*G
			A	B	C	D	E	F	
92A	6	2 sets Fig. C	$3\frac{3}{4}$	$\frac{1}{2}$	$1\frac{1}{4}$	$1\frac{1}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$1\frac{1}{4}$
92J	6	2 sets Fig. B and 1 set Fig. A							
92R	8	4 sets Fig. A							
92T	6	2 sets Fig. A and 1 set Fig. B							
92W	6	2 sets Fig. D							
92Y	4	2 sets Fig. A							
188D	6	2 sets Fig. C	$3\frac{3}{4}$	$\frac{1}{8}$	$\frac{1}{2}$	$1\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$1\frac{1}{4}$
188E	4	2 sets Fig. A							
424A	6	3 sets Fig. A	$3\frac{3}{4}$	$\frac{1}{2}$	$1\frac{1}{4}$	$1\frac{1}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$1\frac{1}{4}$
424D	8	2 sets Fig. E and 1 set Fig. A							
464A	2	1 set Fig. B	$3\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{8}$	$1\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
464B	2	1 set Fig. A							

Group Mounted Type Keys

These are group mounted type, push-button, order wire keys for use with various key mountings. The keys are equipped with red colored plunger buttons. Key mountings are listed elsewhere.

LOCKING TYPE

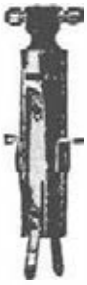
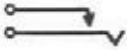
Code No.	No. of Springs	Spring Arrangement	Key Mounting Code Numbers
248A	4	2 sets Fig. A	273, 283, 290, 292, 295, 296, 297

NON-LOCKING TYPE

Code No.	No. of Springs	Spring Arrangement	Key Mounting Code Numbers
69A	4	2 sets Fig. A	233, 235, 303, 304, 312, 315, 323, 324, 341
183A	2	1 set Fig. B	211, 212, 213, 232, 260, 291, 294, 332, 333
242B	6	3 sets Fig. A	273, 283, 290, 292, 295, 296, 297, 298, 300, 304, 308, 310, 312, 319, 329, 336
492A	2	1 set Fig. A	342, 343, 344 and 346

*Arranged for thickness of shelf as indicated.

KEYS

No. 272 & 406
TypesFIG. A
MAKE ONENo. 377, 378 & 382
TypesFIG. B
BREAK ONENo. 375
TypeFIG. C
ONE BREAK
BEFORE MAKENo. 370, 392, 393,
395 & 488 TypesFIG. D
ONE MAKE
BEFORE BREAK

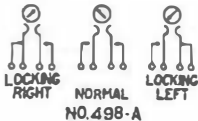
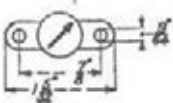
The above contact spring arrangements represent the normal or unoperated contact spring positions of the keys listed below.

Keys Equipped with Rotating Cams

Singly mounted metal shell keys having hard rubber rotating cam which when operated, breaks and makes contacts and locks in its operated position, otherwise having same construction as No. 92 type keys.

Code No.	No. of Springs	Contact Spring Arrangement	Key Shell Mounting
272A	6	2 sets Fig. C	$\frac{1}{8}$, $\frac{1}{4}$ or $1\frac{1}{4}$ inch as specified
272C	9	3 sets Fig. C	
272D	12	4 sets Fig. C	
272F	6	2 sets Fig. C	
272G	3	1 set Fig. C	$\frac{7}{8}$ or $1\frac{1}{4}$ inch as specified $\frac{3}{8}$, $\frac{1}{2}$ or $1\frac{1}{4}$ inch as specified
406A	2	1 set Fig. B	
406C	4	2 sets Fig. A	

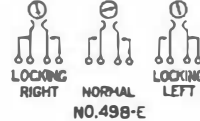
Rotating Button Type Keys



NO. 498-A



NO. 498-B NO. 498-C NO. 498-D



NO. 498-E



NO. 498-F

Single mounted rotating type keys. Buttons of Nos. 498A and 498E are arranged to rotate 90 degrees to right or left. Buttons of Nos. 498B, C and D types are arranged to rotate 90 degrees to the right only. Each button is engraved with an arrow to indicate its rotated position. The color of each button is red with the exception of the No. 498F button which has a black color. Otherwise having same construction as above No. 272 type keys.

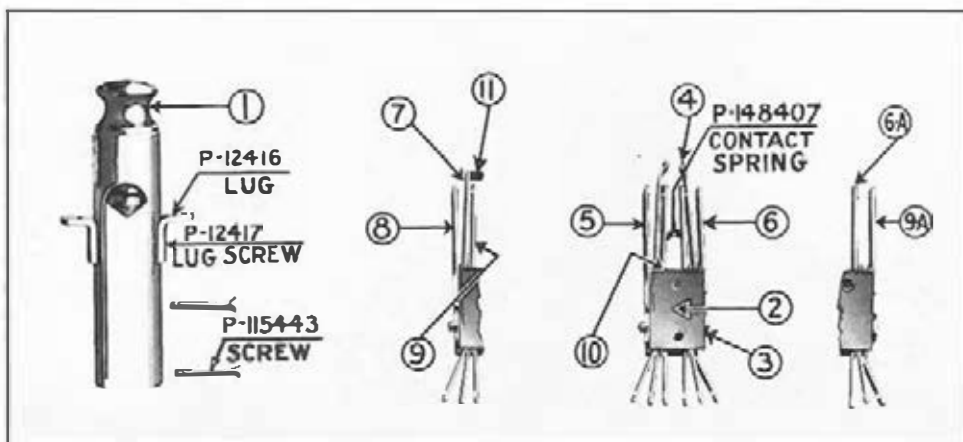
Code Nos. 498A, 498B, 498C, 498D, 498E, 498F.

Plunger Type Keys
FOR USE WITH KEY LEVERS

The following plunger type keys each have but one plunger rod for its operation. The Nos. 370A and 375A keys are push button types. All other keys listed below are locking or non-locking in operation according to the type of key lever used. (Key levers are listed elsewhere.)

Code No.	No. of Springs	Spring Arrangement	Code No.	No. of Springs	Spring Arrangement
370A	18	6 sets Fig. C	392F	24	8 sets Fig. C
375A	6	2 sets Fig. C	392G	17	7 sets Fig. B and 1 set Fig. D
377A	4	2 sets Fig. A	393A	9	3 sets Fig. C
378A	6	2 sets Fig. C	393D	10	4 sets Fig. B, 1 set Fig. A
378C	6	2 sets Fig. D	395A	8	2 sets Fig. C, 1 set Fig. A
378D	6	2 sets Fig. C	488A	16	4 sets Fig. D, 1 each of A and B
378E	6	2 sets Fig. D	488B	16	2 sets Fig. C, 5 sets Fig. A
382B	7	1 each Figs. A, B and C	488C	18	6 sets Fig. C
392A	12	4 sets Fig. C	511A	20	10 sets Fig. A
392D	14	4 sets Fig. C, 1 set Fig. B	511B	30	10 sets Fig. C

KEYS



Replacement Parts for Push Buttons and Rotary Lever Keys Nos. 92, 188, 272, 406, 424 and 464 Types

	(1)	(2)	(3)	(4)	(5)	(6) & (6A)
Key No.	Plunger or Cam Block	Spring Mounting Block	Mounting Block Screw	Plunger Springs	Contact Springs with Mounting Block Screw Head (3) at Right	Springs with Mounting Block Screw Head (3) at Right
2A	P-143908	P-166912	P-163582	P-19297	P-148403	P-148698
92B	P-143909	P-166906	P-163582	P-19297	P-148403	P-148698
92D	P-143909	P-166906	P-163585	P-111381	P-148403	P-148675
992J	P-143908	P-166912	P-163582	P-19297	P-149572	P-148535
92R	P-143908	P-166912	P-163589	P-147982	P-39347	P-142468
92T	P-143908	P-166912	P-163582	P-113884	P-149572	*****
92Y	P-143908	P-166912	P-163582	P-19297	P-148253	P-148698
188D	P- 42188	P-166918	P-163595	P-19297	P-149332	P-149335
188E	P-163928	P-166922	P-163595	P- 16583	P-147930	P-147931
272A	*P-131698	*P-167372	P-163582	P-113884	P-147881	P-148338
272C	*P-131698	*P-167372	P-163585	P-111381	P-147881	P-148675
272D	*P-131698	*P-167372	P-163585	P-111944	P-147881	P-148675
272F	*P-131698	*P-166926	P-163584	P-129761	P-147881	P-148338
272G	*P-131698	*P-167372	P-163582	P- 19297	P-147881	P-148338
406A	*P-131698	*P-167372	P-163582	P- 16583	P-148536	P-147887
406C	*P-131698	*P-166926	P-163582	*P-113884	P-149170	P-148338
424A	P-143908	P-166912	P-163589	P- 29620	P-148235	P-148673
424B	P-143909	P-166906	P-163589	P- 29620	P-148235	P-149566
424C	P-143909	P-166906	P-163589	P-111381	P-148235	P-148656
424D	P-143908	P-166912	P-163589	P-107721	P-148235	P-149416
464A	P-100050	P-165497	P-163595	P-100172	P-149198	P-148485
464B	P-100050	P-165497	P-163595	P-121480	P-148336	P-100009

Key No.	(7)	(8)	(9) and (9A)	(10)	(11)	
	Contact Springs (With Mounting Block Screw Head (3) at Right)			Hard Rubber Insulators		
				Large	Small	
92A	*****	*****	*****	P-109716	P-109717	
92B	*****	*****	*****	P-109716	P-109717	
92D	P-148699	P-148535	P-148675	P-162422	P-162420	
92J	P-163471	*****	P-163471	P-162422	P- 23975	
92R	P-142469	P-162430	*****	P-162422	P-162420	
92T	P-163471	P-148535	*****	P-162422	P-162420	
92Y	*****	*****	*****	P-109716	P-109717	
188D	*****	*****	*****	P-109716	P-109717	
188E	*****	*****	*****	P-109716	P-109717	
272A	*****	*****	*****	P-109716	P-109717	
272C	P-147893	P-148698	P-147894	P-162422	P-162420	
272D	P-147894	P-148698	P-149565	P-162422	P-162420	
272F	*****	*****	*****	P-129760	P-129759	
272G	*****	*****	*****	P-109716	P-109717	
406A	*****	*****	*****	P-109716	P-109717	
406C	*****	*****	*****	P-109716	P-109717	
424A	P-148693	P-148537	*****	P-162422	P-162420	
424B	P-148693	P-148537	*****	P-162422	P-162420	
424C	P-148693	P-148537	P-147903	P-162422	P-162420	
424D	P-149420	P-149513	P-147903	P-162422	P-162420	
464A	*****	*****	*****	P-109716	P-109717	
464B	*****	*****	*****	P-109716	P-109717	

*Note. The following parts are not included with the above cams, but must be ordered separately:

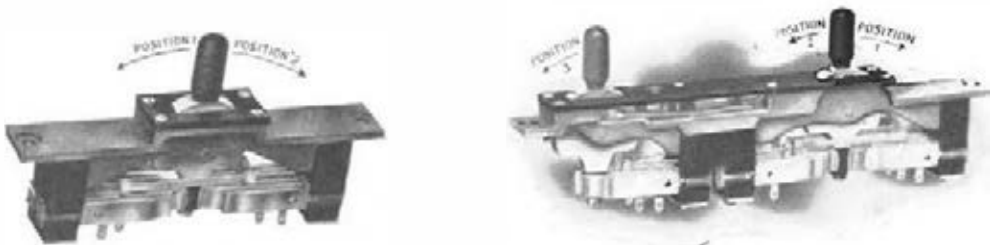
Cam Stud
P-131696

Cam Stud Nut
P-131697

Stop Pin
P-32819

Lever Type Keys

FOR LISTENING AND RINGING SERVICE ON SWITCHBOARDS



No. 104A

No. 102A

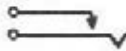


FIG. A
MAKE ONE

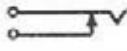


FIG. B
BREAK ONE.

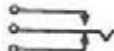


FIG. C
ONE BREAK
BEFORE MAKE

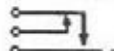


FIG. D
ONE MAKE
BEFORE BREAK

The above contact spring arrangements represent the normal or unoperated contact spring positions.

Single Lever Type

Size of top $1\frac{1}{2} \times \frac{3}{4}$ inches

Size of top 1/2 x 1 1/4 inches				Corresponding
Code No.	No. of Contacts	Contact Spring Arrangement		Key Space Code No.
		Position 1	Position 2	
LOCKING IN BOTH POSITIONS				
136A, *136B	6	2 sets Fig. C	2 sets Fig. C	104B
150A	14	2 sets Fig. C	2 sets Fig. C and 1 of Fig. A	104E
150B, 196A	16	2 sets Fig. C and 1 set Fig. A	2 sets Fig. C and 1 set Fig. A	104E
155A	6	.....	2 sets Fig. C	104B
198A	12	2 sets Fig. C	3 sets Fig. A	104B
247A	12	2 sets Fig. C	2 sets Fig. A and 1 set Fig. B	104B
249A	12	3 sets Fig. A	3 sets Fig. A	104B
369A	12	2 sets Fig. A and 1 set Fig. B	2 sets Fig. A and 1 set Fig. B	104B
*415A	20	2 sets Fig. A and 1 set each Figs. A and B	2 sets Fig. A and 1 set each Figs. A and B	104AC
NON-LOCKING IN BOTH POSITIONS				
115A	6	2 sets Fig. C	.....	104B
*135A	12	2 sets Fig. C	2 sets Fig. C	104B
135B	12	2 sets Fig. C	2 sets Fig. C	104B
COMBINED LOCKING AND NON-LOCKING				
*104A	10	2 sets Fig. C	2 sets Fig. A	104B
*177A	12	2 sets Fig. C	2 sets Fig. A and 1 set Fig. B	104B
178A	14	2 sets Fig. C	2 sets Fig. D and 1 set Fig. B	104E
184B	12	2 sets Fig. C	2 sets Fig. C	104B
*264A	14	2 sets Fig. C	2 sets Fig. C and 1 set Fig. A	104E

Double Lever Type

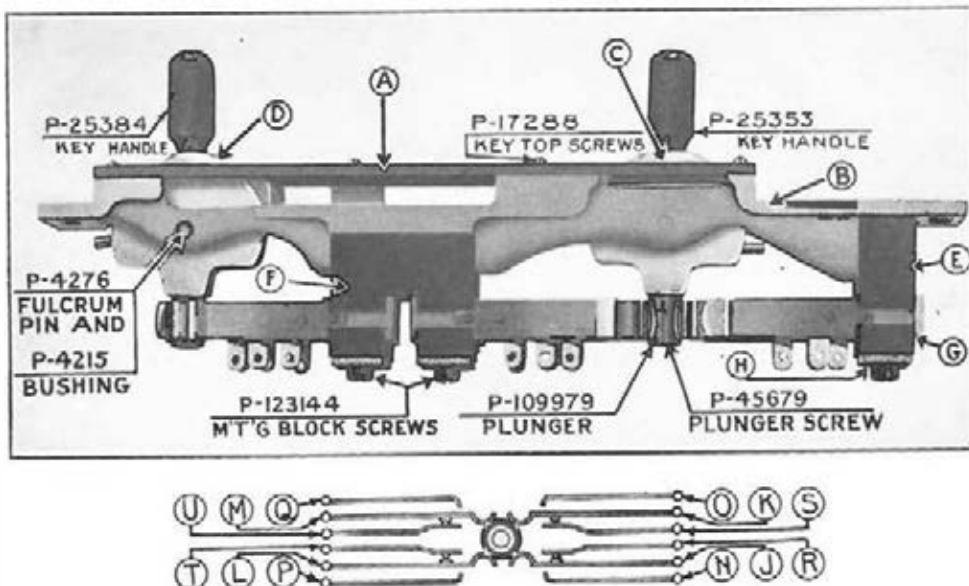
Size of top $5\frac{1}{4} \times \frac{3}{4}$ inches

Code No.	No. of Contacts	Contact Spring Arrangement			Corresponding Key Space Code No.
		Position 1 Non-Locking	Position 2 Locking	Position 3 Non-Locking	
†*102A	16	2 sets Fig. C	2 sets Fig. A	2 sets Fig. C	102B
†*103A	12	2 sets Fig. C	.....	2 sets Fig. C	103A
†*110A	18	2 sets Fig. C	3 sets Fig. A	2 sets Fig. C	102B
† 110D	19	2 sets Fig. C	2 sets Fig. B, 1 of C	2 sets Fig. C	102H
118A	6	.....	.....	2 sets Fig. C	102B
118B	6	.....	.....	2 sets Fig. C	102H
121A	6	.....	2 sets Fig. C	.....	102B
123A	6	2 sets Fig. C	.....	.....	102B
*131A	10	2 sets Fig. C	2 sets Fig. A	.....	102B
156A	18	2 sets Fig. C	3 sets Fig. A	2 sets Fig. C	102B
164A, *164B	12	2 sets Fig. C	3 sets Fig. A	.....	102B
165A	12	2 sets Fig. C	.....	2 sets Fig. C	102B
256B	18	2 sets Fig. C	2 sets Fig. A, 1 of B	2 sets Fig. C	102B

Note: * These keys have common strap wire connections between main springs.

† These keys equipped with indicators to show which ringing lever was last operated.

KEYS AND PARTS FOR SINGLE AND DOUBLE LEVER TYPE KEYS



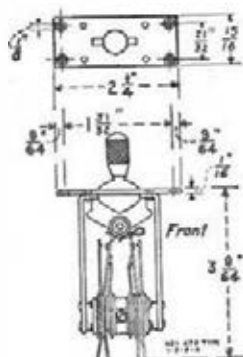
Symbol	A	B	C	D	E	F	G	H	I
Key No.	Key Top Plate	Key Base	Lever Assembly	Lever Assembly	Spring Mounting Block	Spring Mounting Block	Spring Clamp Block	Spring Clamp Plate	Spring Separator
102 A, B, C	P-163323	P-122755	P- 25363	P- 25360	P- 4252	P- 4305	P- 4254	P-112188	.....
103A	P-163323	P-122756	P- 25360	P- 25360	P- 4252	P- 4305	P- 4254	P-112188	P- 4264
104A	P-122730	P-122757	P- 25355	P- 25360	P- 33686	P- 4305	P- 33688	P-112188	.....
110A	P-163323	P-122755	P- 25363	P- 25360	P- 33547	P- 4305	P- 33548	P-112188	P- 5802
110D	P-163324	P-122755	P- 25363	P- 25360	P- 4252	P- 4305	P- 33548	P-112188	P- 4264
115A	P-122730	P-122757	P- 25354	P- 25354	P- 16730	P- 4254	P- 4254	P-112188	.....
118 A, B	P-122734	P-122762	P- 25356	P- 25354	P- 4252	P- 16730	P- 4254	P-112188	.....
121A	P-122737	P-122762	P- 25355	P- 25355	P- 4252	P- 16730	P- 4254	P-112188	.....
123A	P-122737	P-122762	P- 25355	P- 25355	P- 4252	P- 16730	P- 4254	P-112188	.....
131A	P-122737	P-122762	P- 25355	P- 25355	P- 4252	P- 16730	P- 4254	P-112188	.....
135 A, B	P-122730	P-122757	P- 25362	P- 25362	P- 4252	P- 4252	P- 4254	P-112188	P- 4264
136A	P-122730	P-122757	P- 25358	P- 25358	P- 4252	P- 4252	P- 4254	P-112188	P- 4264
150A	P-122731	P-122761	P- 25358	P- 25358	P- 33547	P- 4252	P- 33548	P- 5802	.....
155A	P-122730	P-122757	P- 25356	P- 25356	P- 4252	P- 4252	P- 33688	P-112188	.....
156A	P-122733	P-122762	P- 25355	P- 25354	P- 33686	P- 4305	P- 33688	P-112188	P- 33495
164A	P-122737	P-122762	P- 25355	P- 25354	P- 33686	P- 16730	P- 33688	P-112188	.....
165A	P-122733	P-122762	P- 25354	P- 25354	P- 4305	P- 4305	P- 4305	P-112188	.....
177A	P-122730	P-122757	P- 25355	.....	P- 33686	P- 4252	P- 33688	P-112188	P- 4264
178A	P-122731	P-122761	P- 25355	.....	P- 33547	P- 4252	P- 33548	P- 5802	P- 4264
184 A, B	P-122730	P-122757	P- 25355	.....	P- 4252	P- 4252	P- 4254	P-112188	P- 4264
198A	P-122731	P-122761	P- 25358	.....	P- 33547	P- 4252	P- 33548	P- 5802	.....
198A	P-122730	P-122757	P- 25358	.....	P- 33686	P- 4252	P- 33688	P-112188	.....
247A	P-122730	P-122757	P- 25358	.....	P- 33686	P- 4252	P- 33548	P-112188	.....
249A	P-122730	P-122757	P- 25358	.....	P- 33686	P- 4252	P- 33688	P-112188	P- 33495
256B	P-122733	P-122762	P- 25355	P- 25354	P- 33686	P- 4305	P- 33688	P-112188	.....
264A	P-122731	P-122761	P- 25355	.....	P- 33547	P- 4252	P- 33548	P- 5802	.....
369A	P-122730	P-122757	P- 25358	.....	P- 33686	P- 4252	P- 33688	P-112188	P- 4264
415A	P-122731	P-122766	P- 25358	.....	P-129820	P-129820	P-129821	P- 8216	.....

CONTACT SPRING PARTS

Symbol	J	K	L	M	N	O	P	Q	R	S	T	U
Key	Plunger Springs				Main Contact Springs							
104A	P-148505	P-148505	P-148508	P-148686	P-129033	P-129034	P- 17132	P- 17131	.....	.....	P-129032	P-129031
115A	P-148507	P-148507	P-148508	P-148686	P- 17131	P- 17132	P- 17132	P- 17131	.....	.....	P-129032	P-129031
135A, B	P-131275	P-131276	P-131275	P-131276	P-129033	P-129034	P-129034	P-129033	P-131273	P-131274	P-131274	P-131273
136A	P-131275	P-131276	P-131275	P-131276	P-129033	P-129034	P-129034	P-129033	P-131273	P-131274	P-131274	P-131273
150A	P-131275	P-131276	P-131275	P-131276	P-129033	P-129034	P-129034	P-129033	P-131273	P-131274	P-131274	P-131273
155A	P-148423	P-148422	P-148508	P-148686	P-129033	P-129034	P- 17132	P- 17131	P-148365	P-148366	P-129032	P-129031
156A	P-147934	P-148503	P-148508	P-148686	P-129033	P-129034	P- 17132	P- 17131	P-148365	P-148366	P-129032	P-129031
177A	P-147934	P-148503	P-148508	P-148686	P-129033	P-129034	P- 17132	P- 17131	P-148365	P-148366	P-129032	P-129031
178A	P-148506	P-148506	P-148508	P-148686	P-129033	P-129034	P- 17132	P- 17131	P-148365	P-148366	P-129032	P-129031
184A, B	P-147937	P-147938	P-147937	P-147938	P-129033	P-129034	P-129034	P-129033	P-148365	P-148366	P- 33494	P-148361
198A	P-148422	P-148423	P-131275	P-131276	P-129033	P-129034	P-129034	P-129033	P-148365	P-148366	P-131274	P-131273
247A	P-148422	P-148423	P-131275	P-131276	P-129033	P-129034	P-129034	P-129033	P-148365	P-148366	P-131274	P-131273
249A	P-148422	P-148423	P-148422	P-148423	P- 17133	P-129034	P-129034	P-129033	P-148365	P-148366	P-148366	P-148365
254A	P-148506	P-148506	P-148508	P-148686	P-129034	P-129033	P- 17132	P- 17131	P-148444	P-148443	P-148444	P-148443
369A	P-148422	P-148513	P-148422	P-148513	P-129033	P-129034	P-129034	P-129033	P-148365	P-148366	P-148366	P-148365
415A	P-148511	P-148512	P-148512	P-148511	P-148368	P-148371	P-148371	P-148368	P-148494	P-148493	P-131274	P-131273

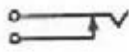
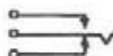
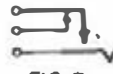
KEYS

Lever Type

General dimensions of
No. 479 type

Replacement Parts

Keys have black finished metal tops. Four No. 4 oval head wood screws are furnished with each key for mounting.

FIG. A
MAKE ONEFIG. B
BREAK ONEFIG. C
ONE BREAKFIG. D
ONE MAKE
BEFORE BREAK

The above contact spring arrangements represent the normal or unoperated contact spring position of the keys listed below.

Lever Type Keys—No. 479

LOCKING TYPE

Locking in one or both positions

Code No.	No. of Contacts	Contact Spring Arrangement							
		Position 1				Position 2			
		Figures				Figures			
479B	10	2	..	..	2	1	..	..	1
479F	5	..	..	..	..	..	..	..	..
479G	8	2	..	..	..	2	..	..	..
479H	12	..	..	..	2	..	..	..	2
479K	12	..	..	2	..	..	..	2	..
479AP	5	..	..	..	..	1	1	..	..
479AS	10	..	..	..	..	5	..	..	..
479AU	12	..	..	..	..	..	..	4	..
479AW	20	2	..	2	..	2	..	2	..
479BA	17	..	1	2	..	2	1	1	..
479BB	10	1	..	1	..	1	..	..	1
479BJ	14	..	2	1	..	2	1	..	..
479BL	13	1	1	2	..	1	..	..	..
479BN	24	..	..	4	..	..	..	4	..
479BR	14	..	1	3	..	1	..	..	..
479CJ	14	..	..	2	..	1	..	2	..
479CK	12	2	..	..	..	4	..	..	..
479CP	22	2	1	2	..	4	1	..	..
479CT	16	..	2	2	..	..	..	2	..
479CW	18	..	..	4	..	..	..	2	..
479CY	16	2	2	..	..	2	2	..	..
479DA	16	4	..	..	..	4	..	..	..
479DU	22	..	1	3	..	..	1	3	..

NON-LOCKING TYPE

Non-Locking in one or both positions

Code No.	No. of Contacts	Contact Spring Arrangement							
		Position 1				Position 2			
		Figures				Figures			
479J	7	..	2	1	..	..	2	1	..
479AA	16	1	..	..	2	1	..	..	2
479AB	8	1	..	..	2	..	..	..	..
479BC	6	1	..	..	..	1	..	..	..
479BD	8	2	..	..	..	2	..	..	..
479BF	14	..	1	2	..	..	2	..	..
479BH	7	1	..	..	..	..	..	1	..
479BS	14	1	3	..	..	..	2	..	..
479BU	11	..	2	..	..	2	1	..	..
479BW	12	..	..	2	..	..	..	2	..
479CG	14	1	..	2	..	..	2	..	..
479CS	12	..	..	2	..	..	2	..	..

COMBINATION LOCKING-NON-LOCKING
TYPES

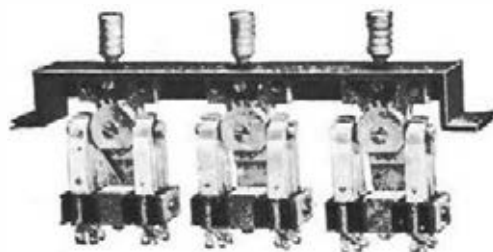
		Locking				Non-Locking			
		Figures	Figures	Figures	Figures	Figures	Figures	Figures	Figures
479A	10	2	1	..	..	2	..	..	..
479C	8	2	..	..	..	2	..	..	..
479D	14	2	1	..	..	1	..	2	..
479E	12	2	..	..	..	1	..	2	..
479T	8	..	1	..	..	..	1	..	..
479AG	14	..	1	2	..	..	2	..	..
479CH	16	1	1	2	..	..	2	..	..
479CM	12	..	2	..	..	1	..	2	..
479DN	14	1	..	2	..	..	2	..	..

KEYS

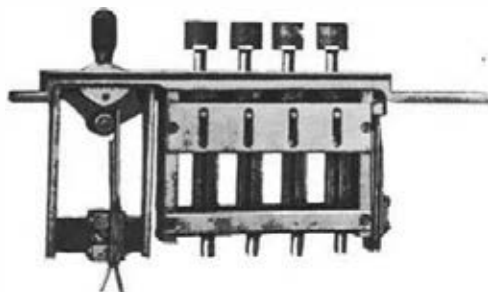
Lever Type Keys

No. 501 TYPE

The No. 501 key is a lever type key similar in construction to the No. 479 type but arranged for mounting in the universal type of keyshelf, also may be used for general purposes, keys are equipped with black handles and may be obtained with various spring combinations. Moving lever forward operates rear set of springs and vice versa. Mounting screws are furnished.



No. 251E



No. 510 Type Key

NO. 251 TYPE

Combined listening, ringing and switching keys for use in connection with 3 x 7 cordless private exchangeswitchboards.

Code No.	Description
251E	All listening keys locking, make three and break two keys when operated. Ringing key non-locking makes two and breaks two contacts when operated.
251F	All keys are locked in operated position and all make two and break two when operated.
251G	Same as No. 251F except for method of strapping.

NO. 510 TYPE

The No. 510 Type keys are for use in Western Electric switchboards employing Harmonic Ringing Systems.

Replaces No. 468 type key for new and additional equipments.

When ordering 468 type keys for replacement purposes the code number of the key now used should be given. This number is stamped on the frame of each key. Our factory will then either make shipment, or suggest a suitable 510 type key if advisable. Consists of four-party restoring type harmonic ringing key unit and a lever key unit mounted in a base $7\frac{1}{8}$ inches long having a hard rubber key top $5\frac{1}{4}$ x .840 inches.

Code No.	Description
510A	For use as a one-way, individual, four party manual ringing key with listening combination are ranged for circuits with flashing recall on both cords.
510C	For use as a one-way four-party machine ringing key with way down contacts, flashing recall on both cords and manual listening.
510D	For use as a one-way four-party machine ringing key with way down contacts, flashing recall on both cords and automatic and listening out features.
510E	For use as a one-way automatic two-party locking key with way down contacts, flashing recall on both cords and manual listening.
510F	For use as a one-way automatic two-party machine ringing key with way down contacts, flashing recall on both cords and automatic listening and listening out features.

KEYS



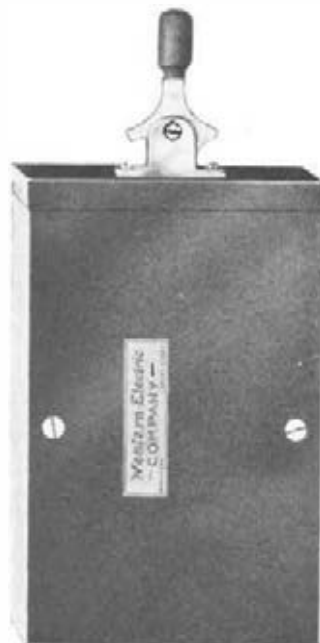
No. 465C. Bottom View



No. 6000B



No. 6000A



No. 6002A

Mounted Type Keys

Code No.	Description
465A	Push button type key mounted in oak box. Size of box $4\frac{1}{8} \times 3\frac{1}{8} \times 1\frac{1}{2}$ inches. Non-locking. Makes three and breaks one contact when operated.
465C	Non-locking. Makes two and breaks one contact when operated. Similar to No. 465A.
465D	Non-locking. Makes one and breaks one contact when operated. Similar to No. 465A.

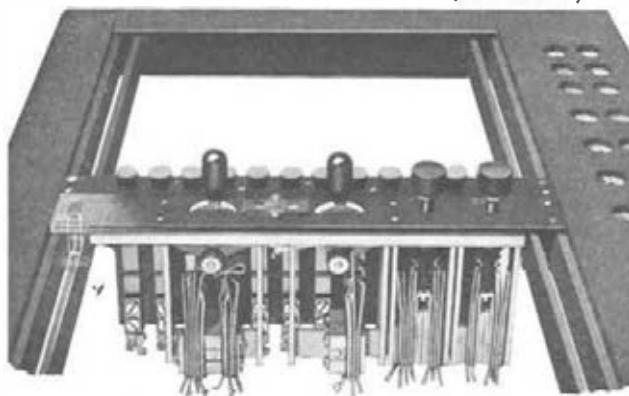
No. 6000 TYPE

6000A	Wooden box equipped with 1 No. 377A key and 1 No. 6A key lever. Size of box (including key lever) $4\frac{3}{4} \times 3\frac{5}{8} \times 1\frac{1}{2}$ inches. Locking. Makes two contacts when operated. For use in dispatcher's telephone circuits.
6000B	Wooden box (No. 334 key mounting) equipped with 1 No. 136B key. Size of box $6\frac{1}{4} \times 3\frac{7}{8} \times 2\frac{7}{8}$ inches. Locking in both positions. Makes two and break two contacts in both positions when operated. For use in railroad service for connecting a telephone to any one of three separate lines.

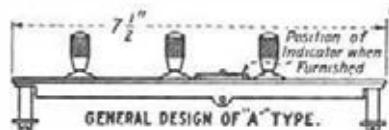
No. 6002 TYPE

6002A	Wooden box equipped with 1 No. 378A key and 1 No. 23A key lever. Ebonized finish. Intended for use as a switching key to connect a telephone instrument on either one or both of two lines. Size of box $5\frac{1}{2} \times 3\frac{7}{8} \times 1\frac{5}{8}$ inches.
6002B	Wooden box equipped with 1 No. 378A key and 1 No. 6A key lever. Ebonized finish. Intended for use as a switching key to connect a telephone instrument on either one of two lines. Dimensions same as No. 6002A.
6002C	Wooden box equipped with 1 No. 375A key. Ebonized finish. Intended for use as a ringing key at sub-stations. Dimensions same as No. 6002A.
6002D	Wooden ebonized box equipped with 1 No. 393A key and 1 No. 6 key lever. Makes three and breaks three contacts (acts same as a 3 pole, double throw switch). The box is similar to that shown for the No. 6002A key except that its dimensions are $6\frac{1}{8} \times 3\frac{1}{2} \times 2\frac{3}{4}$.
6002E	Wooden, ebonized box equipped with 1 No. 136A key which is of the three position type and makes two and breaks two contacts when the lever is thrown to the left or to the right. The dimensions of the box are $6\frac{1}{8} \times 3\frac{1}{2} \times 2$ inches. The Key Lever is located in the center of the box face having dimensions of $2 \times 6\frac{1}{8}$ inches.
6003A	Wooden box equipped with a push button type key. Size of box $6\frac{1}{8} \times 3\frac{7}{8} \times 2\frac{7}{8}$ inches. Non-locking. Makes three and breaks two contacts when operated. For operating a No. 62A interrupter.

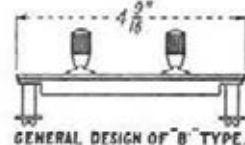
KEYS (Continued)



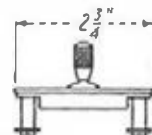
A2 and A3 type keys in universal key shelf



GENERAL DESIGN OF "A" TYPE.



GENERAL DESIGN OF "B" TYPE.



GENERAL DESIGN OF "C" TYPE.

UNIVERSAL TYPE KEYS

Universal type keys are arranged to mount in a Universal type key shelf, which, instead of being drilled and tapped for a definite location for each key, is provided with two mounting slots running lengthwise of the key shelf and registering with a mounting stud at each end of the key as shown in the illustration above.

Involving these Universal keys they have been divided into three types according to the length of the base: A type, 7 1/2 inches; B type, 4 9/16 inches; C type, 2 3/4 inches.

All of these types of keys are made in a variety of models mounting lever key units, and push button key units in varying numbers and combinations.

Key units are supplied mounted with or without indicators which show the last key operated. The units are manufactured in non-locking for the lever units in both locking and non-locking arrangements.

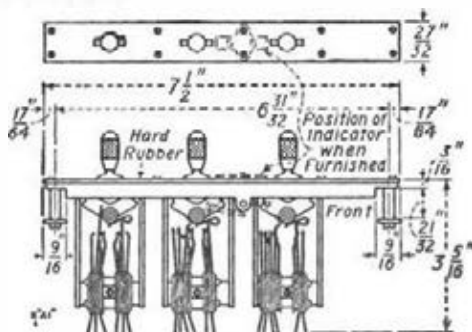
Universal type keys of the same length base will mount in any key shelf designed for that length of key and apparatus blanks can be supplied either to take the place of keys at non-equipped positions in the switchboard, or to fill the space remaining in the Universal key shelf after the required keys have been placed in it.

Several hundred forms of the Universal key are available, and it is, therefore, not practicable to list them all in this catalogue.

The list of Universal type keys given below is not complete or comprehensive and is not intended to be a guide in the selection of the actual keys required, but will serve for identification of Universal key types referred to in switchboard specifications or proposals.

Western Electric equipment using this type of key will be found to contain complete information for obtaining replacement, and in placing orders for this purpose, or for extension to the existing equipment, the customer should refer to the code number, which is stamped upon the keys already in service, or to the information given in the drawings accompanying the equipment.

The cuts following show four "A" type keys, two "B" type keys and one of the "C" type keys. It should be clearly understood that the illustrations and the information on Universal type keys is not complete and that keys are available in this type of construction to meet a wide range of service conditions and requirements.



General design and dimensions of "A1A" type

"A1" Type Keys. Arranged for mounting in a universal type key shelf with "A" type keys and "A" type key spaces.

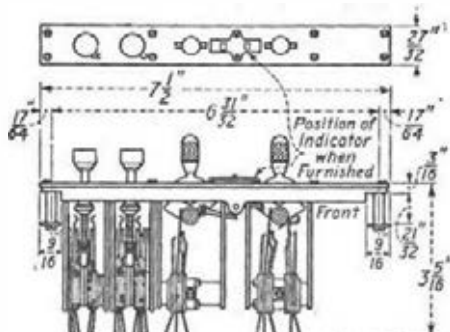
Equipped with one, two or three lever type key units as required.

Moving lever forward operates rear set of springs and vice versa

"A2" Type Keys. Arranged for mounting in a universal type key shelf with "A" type keys and "A" type key spaces.

Equipped with one or two lever type key units and one or two push button key units as required.

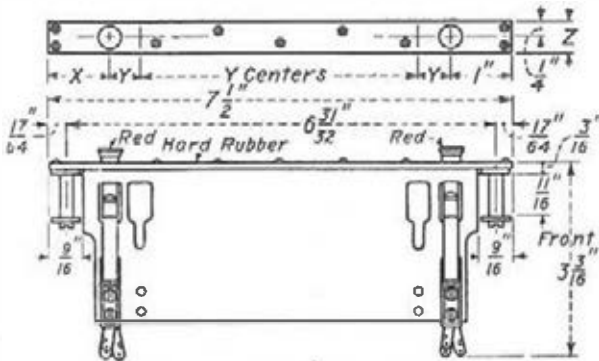
Moving lever forward operates rear set of springs and vice versa.



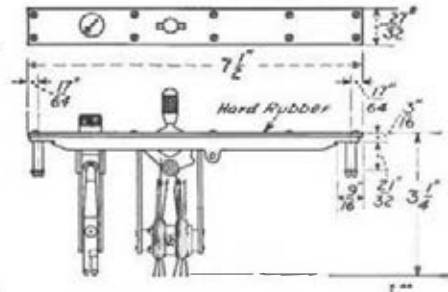
General design and dimensions of "A2A" type

KEYS

(Continued)



General Design and Dimensions of A-3A Type



General Design and Dimensions of A-4B Type

Universal Type Keys

"A-3" Type Keys. Call circuit keys arranged for mounting in a universal type key shelf with "A" type keys and "A" type key spaces.

Furnished with red, unengraved, flat top buttons unless otherwise specified.

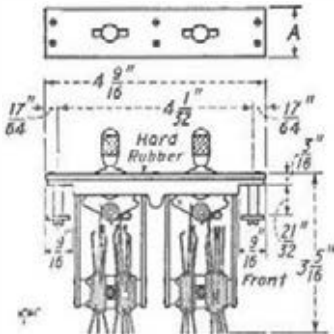
When specified will be furnished with cupped head red buttons.

"A-4" Type Keys. Keys arranged for mounting in a universal type key shelf with "A" type keys and "A" type key spaces.

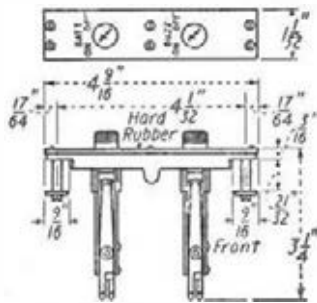
Equipped with lever type and rotating plunger type key units as indicated under the individual keys.

Moving lever forward operates rear set of springs and vice versa.

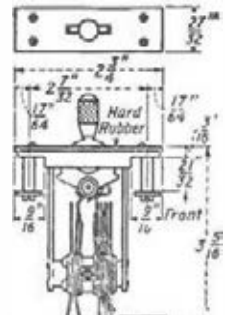
Springs of rear unit are operated by rotating plunger through 90 degrees.



General Design and Dimensions of B-1C Type



General Design and Dimensions of B-2A Type



General Design and Dimensions of C-1A Type

"B-1" Type Keys. Keys arranged for mounting in a universal type key shelf with "B" type keys and "B" type key spaces.

Equipped with one or two lever type key units as indicated under the individual keys.

Moving lever forward operates rear set of springs and vice versa.

"B-2" Type Keys. Keys arranged for mounting in a universal type key shelf with "B" type keys and "B" type key spaces.

Equipped with one or two rotating plunger type key units as indicated under the individual keys.

"C-1" Type Keys. Arranged for mounting in a universal type key shelf with "C" type keys and "C" type key spaces.

Moving lever forward operates rear set of springs and vice versa.

"C-2" Type Keys. Arranged for mounting in universal type key shelf with "C" type keys and "C" type key spaces.

Equipped with one or two push buttons having color of buttons as required.

KEY LEVERS, MOUNTINGS AND SPACES

Key Levers

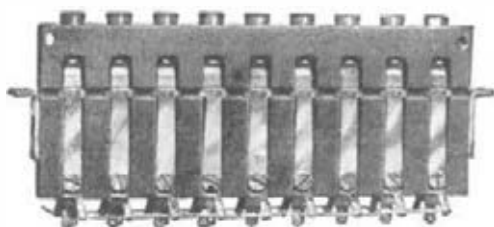


No. 6A

Code No.	Operated Position of Lever	Description
6A	Vertical	Used with lever type keys. Black handle, metal parts nickel plated. Locking.
6B	Vertical	Same as No. 6A, except red handle.
14A	Horizontal	Otherwise same as No. 6A.
23A	This is a double throw lever, locking in all positions and is used with lever type keys. When the lever is in the vertical position, all contacts are open; when the lever is thrown to the left the inner contacts are closed, and when the lever is thrown to the right the outer contacts are closed.	



No. 23A



Side View of No. 69A Keys Mounted in a Typical Key Mounting



No. 303 Key Mounting Equipped With No. 69A Keys

Key Mountings

The following are a few standard mountings for Nos. 69A and 242B order wire keys.

A complete line of mountings arranged for use with any of our standard keys are manufactured; further information will be supplied upon request.

Also refer to listings under "Group Mounted Type" keys.

Code No.	Number of Keys per Strip	Size of Top Inches	Keys Used With
233	10	$7\frac{3}{8} \times \frac{1}{2}$	69A
235	10	$9\frac{3}{8} \times \frac{1}{2}$	69A
303	8	$6\frac{1}{8} \times \frac{1}{2}$	69A
304	10	$6\frac{1}{8} \times \frac{5}{8}$	69A
312	12	$6\frac{1}{8} \times \frac{5}{8}$	69A & 242B
315	4	$3\frac{1}{8} \times \frac{1}{2}$	69A
323	10	$6\frac{1}{8} \times \frac{1}{2}$	69A
324	12	$6\frac{1}{8} \times \frac{5}{8}$	69A & 242B
341	12	$6\frac{1}{8} \times \frac{1}{2}$	69A

Key Spaces

These are intended for use in place of keys where the full equipment of keys for which the key shelf is arranged is not installed or to fill in space between two keys. Key spaces can be furnished which correspond to our standard keys in respect to the method and the size and finish of top.

The following list represents a few of the most commonly used key spaces.

Code No.	Size of Top Inches	A Corresponding Key	Code No.	Size of Top Inches	A Corresponding Key
102B	$5\frac{1}{4} \times \frac{3}{4}$	102A	104B	$1\frac{1}{2} \times \frac{3}{4}$	104A
102AH	$5\frac{1}{4} \times \frac{13}{16}$	227A	251B	$7\frac{5}{8} \times 1\frac{1}{4}$	251E
102AJ	$5\frac{1}{4} \times \frac{11}{16}$		479A	$2\frac{1}{4} \times \frac{11}{16}$	479 Type

LAMPS AND SOCKETS

Lamps



No. 2

The manufacture of switchboard lamps is a highly refined and specialized art. The Western Electric Company has been active in this field for many years and the problems involved have been studied continuously and extensively in its Research and Engineering Laboratories. Methods of manufacture and special treatments for filaments have been perfected which give the lamps long life, uniform quality and high illuminating power. A bright, dependable signal can only be obtained by the use of a lamp of the best quality. Western Electric lamps represent the latest development of the art and will give the highest class of service.

The No. 2 type switchboard lamps are $1\frac{3}{4}$ inches in length and .3075 inch (approximately $\frac{1}{16}$ inch) in diameter. The bulb is made from clear glass and is tipless.

Every lamp is tested for current consumption and for illuminating power.

Code No.	Voltage	Current Consumption		Used with Lamp Sockets Number
		Minimum Amperes	Maximum Amperes	
2A	4	.17	.21	12, 13, 30, 34
2B	4	.27	.31	12, 13, 30, 34
2C	15	.09	.12	12, 13, 30, 34
2E	20	.09	.12	12, 13, 30, 34
2F	12	.097	.12	12, 13, 30, 34
2G	24	.075	.115	12, 13, 30, 34
2H	6	.27	.31	12, 13, 30, 34
2J	24	.0225	.0375	12, 13, 30, 34
2K	30	.09	.12	12, 13, 30, 34
2L	10	.24	.26	12, 13, 30, 34
2N	6	.12	.16	12, 13, 30, 34
2P	8	.085	.10	12, 13, 30, 34
2R	18	.09	.12	12, 13, 30, 34
2T	35 to 37	.025	.0375 (35 V.)	12, 13, 30, 34
2U	24	.035	.045	12, 13, 30, 34
2W	18	.035	.045	12, 13, 30, 34
2Y	48	.028	.036	12, 13, 30, 34
2AC	18	.18	.30	12, 13, 30, 34
2AD	36	.18	.30	12, 13, 30, 34

The No. 2 lamps are now standard for use in the No. 16 type lamp sockets instead of the No. 4 lamps previously used. To permit of this, an adapter has been designed which may be inserted into the mounting through the lamp cap opening. The No. 2 type lamp together with a sufficient number of adapters should be ordered when replacements of No. 4 type lamps are to be made. In ordering specify:

Lamp Socket Adapter per D-12279



No. 13



No. 34

Lamp Sockets

Mounted Singly

These sockets are made of brass and are supplied with nickel silver springs, which are insulated with hard rubber. They mount individually and can, therefore, be ordered entirely separate from their mountings. The springs are insulated from the frame. The lamp mounts close to the lens of the lamp cap, giving the greatest possible amount of useful illumination.

Code No.	Used with Lamp No.	Used with Lamp Cap No.	Used with (Thickness of Shelf in Ins.)
13	2	2 & 72	$\frac{7}{8}$ inch
34	2	4	$\frac{3}{4}$, 1, $1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{1}{2}$ inches.
41A	2	2 & 72	$\frac{9}{8}$ inch.

Mounted in Strips

These sockets are made of brass, and have nickel silver springs with hard rubber insulation. They are equipped in mountings containing 5, 10 or 20 sockets per strip and will not be supplied as a separate item, but must be ordered in connection with lamp socket mountings. (See description under Lamp Socket Mountings.)

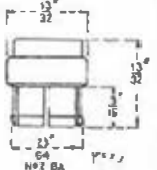
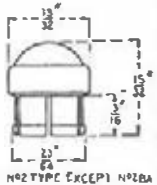
Code No.	Used with Lamp No.	Used with Lamp Cap No.	Suitable for Lamp Mounting No.
12	2 type	2 & 72	102, 117, 122, 123, 125, 136, 137, 144
30	2 type	8	102, 118, 122, 123, 125, 134

LAMP SOCKET CAPS

The lenses of Western Electric lamp socket caps are thick and substantial, being made from specially selected and treated glass. These lenses are held firmly in place in the cap cases by spinning the edges over the lenses. The cases are slotted to give a spring fit for the cap in a socket.

No. 2 and 72 Type—Used with Nos. 12 and 13 Lamp Sockets—Diameter $\frac{1}{2}$ Inch

Code No.	Symbol	Color	Code No.	Symbol	Color
2A		White opalescent	2AA		Red
2B		White opalescent	2AB		White opalescent
2C		White opalescent	2AC		Red opalescent
2D		White opalescent	2AF		White opalescent
2E		White opalescent	2AG		White opalescent
2F		White opalescent	2AH		White opalescent
2G		White opalescent	2AJ		White opalescent
2H		Red opalescent	2AK		White opalescent
2J		White opalescent	2AM		White opalescent
2K		White opalescent	2AN		White opalescent
2L		Green opalescent	2AP		White opalescent
2M		White opalescent	2AS		White opalescent
2N		Red opalescent	2AT		White opalescent
2P		Jeweled red	2AU		White opalescent
2R		Jeweled blue	2AW		White opalescent
2S		Jeweled green	2AY		White opalescent
2T		Red opalescent	2AZ		Red opalescent
2U		Amber opalescent	2BC		White opalescent
2W		Blue opalescent	2BD		White opalescent
2Y		Green opalescent	2BE		Green opalescent



2BA—Black Numbers on White Background. Numbered as Specified in Order.

No. 72 type (Translucent numbers on black background)

Code No.	72A,	72B,	72C,	72D,	72E,	72F,	72G,	72H,	72J,	72K.
Symbol	O,	1,	2,	3,	4,	5,	6,	7,	8,	9.

No. 4 Type—Used with No. 4 Type Lamp Sockets—Overall Diameter $\frac{1}{4}$ Inch

Used in the No. 34 lamp socket for all such special cases as pilot signals, fire alarms, supervisor's signals, and for other classes of work in which the mounting of a large signal is desirable.



Code No.	Symbol	Color	Code No.	Symbol	Color
4A		White opalescent	4D		Red
4B		Jeweled red	4F		Green
4C		Jeweled green	4G		White opalescent

No. 8 Type—Used with No. 30 Lamp Socket—Overall Diameter $\frac{1}{4}$ Inch

Code No.	Symbol	Color	Code No.	Symbol	Color	Code No.	Symbol	Color
8A		White opalescent	8K		White opalescent	8AB		Green opalescent
8B		Clear	8L		Green opalescent	8AC		Red opalescent
8D		Red opalescent	8R		White opalescent	8AD		White opalescent
8E		White opalescent	8T		White opalescent	8AE		White opalescent
8F		White opalescent	8U		White opalescent	8AF		White opalescent
8G		White opalescent	8W		Jeweled red	8AG		White opalescent
8H		White opalescent	8Y		Green opalescent	8AH		White opalescent
8J		White opalescent	8AA		Red			

LAMP SOCKET MOUNTINGS

In ordering, specify the number of lamp sockets and the code number, together with the code number of the lamp socket mounting. The proper number of lamp sockets should be ordered to fully equip the mountings.

Lamp socket mountings when equipped with No. 12 lamp sockets may have numberings stamped on the face of the strip, if desired, but will be furnished unnumbered unless otherwise specified in the order.



No. 12 Lamp Socket with No. 102 Mounting



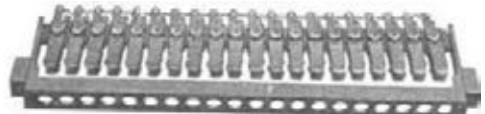
No. 12 Lamp Socket with No. 136 Mounting



No. 12 Lamp Socket with No. 137 Mounting



No. 30 Lamp Socket with No. 118 Mounting



No. 30 Lamp Socket with No. 102 Mounting

LAMP SOCKET MOUNTINGS
Not Arranged for Number Plates

Code No.	Arranged for Lamp Sockets Nos.	No. per Strip	Face Dimensions, Ins.		Will mount with Jack Mountings Nos.	Type of Switchboard Used with
			Length	Width		
**102	12 and 30	20	9 $\frac{1}{8}$	$\frac{7}{8}$	118 and 120	No. 1
105	12 and 30	10	7 $\frac{1}{4}$	$\frac{7}{8}$	64 and 86	
118	30	20	7 $\frac{1}{4}$	$\frac{7}{8}$	113	No. 1
**123	12 and 30	20	10 $\frac{1}{2}$	$\frac{7}{8}$	115	No. 9
**125	12 and 30	10	10 $\frac{1}{2}$	$\frac{7}{8}$	116	
136	12	10	11 $\frac{1}{8}$	$\frac{7}{8}$	109 and 110	No. 1962, No. 10
*137	12	20	11 $\frac{1}{8}$	$\frac{7}{8}$	108 and 112	No. 1962, No. 10
***138U	12	12	7 $\frac{1}{2}$	$\frac{1}{2}$		
*144	12	20	11 $\frac{1}{8}$	$\frac{7}{8}$	122 and 125	No. 1
117	12	5	9 $\frac{1}{8}$	$\frac{7}{8}$	77	

*Nos. 137 and 144 are the same except that on the No. 137 the lamp sockets are mounted on $\frac{1}{2}$ inch centers and on the No. 144 on $\frac{3}{4}$ inch centers.

**The mounting is made of hard rubber when supplied with No. 12 Lamp Sockets and is of metal when used for No. 30 Lamp Socket.

***Mounts with "A3" keys.



No. 122 with No. 12 Lamp Socket



No. 134 with No. 12 Lamp Socket

LAMP SOCKET MOUNTINGS
Arranged for Number Plates

Code No.	Arranged for Lamp Sockets Nos.	No. per Strip	Face Dimensions, Ins.		Arranged for Plates Nos.	Will mount with Jack Mountings Nos.	Type of Switchboard Used with
			Length	Width			
122	12	10	9 $\frac{1}{8}$	$\frac{7}{8}$	31A, 59B	117	No. 1
132	12	10	10 $\frac{1}{2}$	$\frac{7}{8}$	31A, 59B	116	No. 9
134	12	10	7 $\frac{1}{4}$	$\frac{7}{8}$	60D, 108A	18, 19	No. 1

LINE POLES



No. 3 Line Pole



End Section with Spreaders Extended No. 3 Line Pole



Part of End Section with Spreaders Closed No. 3 Line Pole



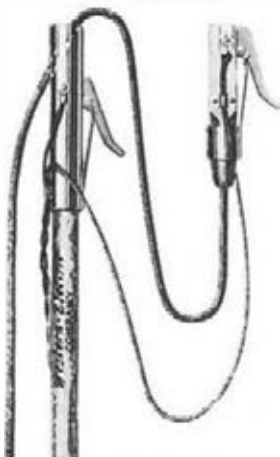
No. 4 Line Pole



Part of End Section Showing Method of Clamping to Wire No. 4 Line Pole



No. 5 Line Pole



Part of End Section Showing Free Clamp No. 5 Line Pole

Line Poles

The line poles here listed are intended primarily for connecting portable telephones to open wire lines. They are made of hard wood and are in three sections, each approximately 6 feet in length. The joints are made of seamless brass tubing and are arranged so that the sections are securely locked together when the line pole is in use. The poles are so designed that the middle joint may be omitted if desired, thereby reducing the length of the line pole from 18 to 12 feet.

Contact with the line wires is made by means of a connecting clamp which consists of a metal hook equipped with a spring. When the hook engages the line wire the spring forces the wire into contact with the hook and at the same time scrapes the wire slightly so that a good contact is obtained.

Code No.	For Making Contact With	Cord	Description
3	2 metallic conductors.	100 feet of two conductor cord equipped with cord tips.	The top section is equipped with two arms hinged at the lower end. These are each equipped with a connecting clamp and are of such length that they will span wires spaced up to 2 feet horizontally.
4	1 metallic conductor (grounded line)	100 feet of single conductor cord equipped with cord tips.	The top section has one connecting clamp only.
5	2 metallic conductors.	100 feet of two conductor cord equipped with cord tips.	The top section is equipped with two connecting clamps. One of these is fixed to the pole and the other free but under control of the user by means of a long cord. This is intended for making connections between two line wires spaced up to 5½ feet, either horizontally or vertically.

MESSAGE REGISTERS AND COUNTERS



No. 10A



No. 12004



No. 12005

Manually Operated Counters

This mechanically operated, nickel-finished message register is primarily designed for making traffic peg counts. It is $1\frac{1}{4} \times 1\frac{1}{4}$ inches at the base, and mounts in a socket which is flush in the top of the switchboard key shelf or the socket can be supplied mounted in a portable mahogany finished base ($2\frac{3}{4} \times 2\frac{3}{4}$ inches). The mechanism is strong and compact. The plunger being on the top of the case, is easily located by the operator and its action when depressed clearly indicates when the register has counted. The numbers appear in white on a black background and are easily read. The counter is of the cumulative type, registering up to 9,999 and then repeating, and it cannot be reset. This non-resetting feature increases the accuracy of readings through the elimination of errors in setting and also saves time in operating.

Code No.	Description
10A	Message register (counter only)
12004	Portable base for No. 10-A message register.

Code No.
12005

Description
Flush socket for permanently mounting No. 10-A message register.

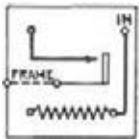


FIG. 1

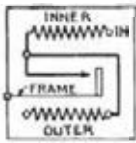


FIG. 2



No. 5L

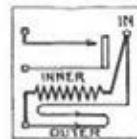


FIG. 3

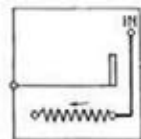


FIG. 4

Electrically Operated Registers

Electrically operated counters, primarily designed for use in connection with special central office circuits, and usually operated by means of a push button key mounted in the switchboard key shelf.

The Nos. 5H and 5P are designed for use in making peg counts, and the No. 5L is designed for association with an individual subscriber's line, and when so used is controlled by the switchboard operator to register the number of calls over that line.

The Nos. 5H and 5L may be arranged so as to give simultaneous peg count service and individual line call registering.

These message registers mount on steel mounting plates as listed under the heading of "mounting plates." The overall dimensions are $5\frac{1}{8}$ inches long (including terminals), $1\frac{1}{8}$ inches high and $1\frac{1}{2}$ inches wide.

Code No.	Windings	Rated Resistance (Ohms)	Operates on	Non-Operate on	Wiring Fig. No.
5H	Single	.21	1.4 amps.	1.25 amps.	Fig. 1 (Frame Connection)
5L	{ Inner Outer	{ 37.5 463. }	*25.5 volts	23.9 volts	Fig. 2
5M	Single	280.	.036 amp.	.032 amp.	Fig. 1 (No Frame Connection)
5P	{ Inductive Non-Inductive Combined	{ 355. 600. 223. }	.070 amp.	.060 amp.	Fig. 3
5S	Single	5.	.306 amp.	.208 amp.	Fig. 4
5T	Single	1000.	.028 amp.	.023 amp.	Fig. 4
5U	Single	1000.	.028 amp.	.023 amp.	Fig. 1 (Frame Connection)

Note. *With both windings in series.

MOUNTING PLATES

The term "Mounting Plates" refers in general to a milled steel plate arranged for mounting relays, resistances, condensers and message registers. These mounting plates must not be confused with mountings for drops, keys, lamp sockets, etc., which are listed elsewhere under their respective titles.

Plates of different capacities and sizes other than those listed can be furnished, also plates arranged for mounting combinations of relays, resistances, etc., information on which will be furnished upon request.



Punched Frame Type



Drilled Plate Type

Mounting Plates for Relays

These plates are available in punched frame and drilled plate types. All punched frame types are equipped with dust-proof covers and are recommended when individual relay covers are not furnished or where the relays are to be mounted in an exposed location.

PUNCHED FRAME TYPE—RELAY MOUNTING

Galvanized finished metal plates $1\frac{3}{4}$ inches in width, with black finished dust-proof covers $3\frac{1}{2}$ inches in depth.

For mounting A and E types of relays on the centers specified, which also conforms with the mounting centers of the particular A or E type relays to be mounted.

Code No.	Relays Per Plate	Mounting Centers	Length, Inches	Will mount interchangeably with mounting plates
*737A	20	$\frac{3}{4}$	19	600 Type
737B	10	$1\frac{1}{2}$	19	600 Type
737C	20	$\frac{3}{4}$	19	600 Type
†737D	10	$1\frac{1}{2}$	19	600 Type
737F	16	1	19	600 Type
745A	24	$\frac{3}{4}$	$21\frac{5}{8}$	606, 607 and 756
745B	18	1	$21\frac{5}{8}$	606, 607 and 756
745C	20	$\frac{7}{8}$	$21\frac{5}{8}$	606, 607 and 756
745E	18	1	$21\frac{5}{8}$	606, 607 and 756
750A	24	$\frac{3}{4}$	23	602 Type
750B	18	1	23	602 Type
750C	20	1	23	602 Type

*Provided with battery and ground clips.

†Provided with ten terminal punchings.

DRILLED PLATE TYPE—RELAY MOUNTING

Black finished steel plates $\frac{7}{8}$ inch thick, not equipped with covers unless otherwise indicated. When ordering, specify the exact code number of relays to be mounted, as each position must be drilled for the particular relay specified.

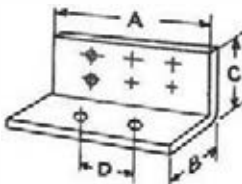
Code No.	Relays Per Plate	Mounting, Inches			May be ordered Drilled for Relays
		Centers	Length	Width	
734A	17	$1\frac{1}{4}$	$16\frac{1}{2}$	$1\frac{1}{4}$	Nos. 189, D, E or K Relays. Has Cover
600A	10	$1\frac{3}{4}$	19	$1\frac{3}{4}$	Nos. 89, 101, 105, 108, 114, 118, 124, 163, 172, 174 and 198.
600N	8	$2\frac{1}{4}$	19	$1\frac{3}{4}$	No. 186A Relays.
600R	10	$1\frac{3}{4}$	19	$1\frac{3}{4}$	B Type Relays has wood cleat with 10 terminals.
600AA	10	$1\frac{5}{8}$	19	$1\frac{3}{4}$	Same as specified for 600A. Has Cover
600AT	12	$1\frac{3}{8}$	19	$1\frac{3}{4}$	Nos. 44, 186A and 199 Relays.
600BB	15	1	19	$1\frac{3}{4}$	A or E Types of Relays.

MOUNTING PLATES

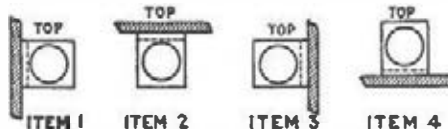
Mounting Plates for Relays (Continued)

DRILLED PLATE TYPE—RELAY MOUNTING (Continued)

Code No.	Relays Per Plate	Mounting, Inches			May be ordered Drilled for Relays
		Centers	Length	Width	
740A	10	1 $\frac{5}{8}$	19	5 $\frac{7}{8}$	No. 203A relays. Has Cover
748A	10	1 $\frac{3}{4}$	19	2 $\frac{1}{2}$	Nos. 190 and 196 Relays
606A	10	1 $\frac{3}{4}$	21 $\frac{5}{8}$	1 $\frac{1}{2}$	Same as 600A.
606B	10	1 $\frac{3}{4}$	21 $\frac{5}{8}$	1 $\frac{1}{2}$	Same as 600A. Has Cover
606T	15	1 $\frac{1}{2}$	21 $\frac{5}{8}$	1 $\frac{1}{2}$	B, G, H or J Types of Relays
606Y	15	1 $\frac{1}{2}$	21 $\frac{5}{8}$	1 $\frac{1}{2}$	B, G, H or J Types of Relays
734A	17	1 $\frac{1}{2}$	21 $\frac{5}{8}$	1 $\frac{1}{2}$	Nos. 189 D, E or K Relays. Has Cover
735A	20	1 $\frac{1}{2}$	21 $\frac{5}{8}$	1 $\frac{1}{2}$	No. 189 Relays. Has Cover
609A	10	1 $\frac{3}{4}$	23	1 $\frac{1}{2}$	Same as specified 600A
609C	10	1 $\frac{3}{4}$	23	1 $\frac{1}{2}$	Same as specified 600A. Has Cover
609P	20	1	23	1 $\frac{1}{2}$	A or E Type Relays
609R	14	1 $\frac{3}{8}$	23	1 $\frac{1}{2}$	Nos. 44, 186A and 199 Relays
609W	10	2 $\frac{1}{8}$	23	1 $\frac{1}{2}$	Same as specified for 600A. Has Cover
709A	15	1 $\frac{1}{2}$	23	1 $\frac{1}{2}$	No. 186A Relays
627A	10	1 $\frac{3}{4}$	26	1 $\frac{1}{2}$	Same as specified for 600A
627C	20	1	26	1 $\frac{1}{2}$	A or E Type Relays. Has Cover
677A	15	1 $\frac{5}{8}$	27	1 $\frac{1}{2}$	Same as specified for 600A
677B	15	1 $\frac{5}{8}$	27	1 $\frac{1}{2}$	Same as specified for 600A. Has Cover
677P	22	1	27	1 $\frac{1}{2}$	A or E Type Relays. Has Cover
677S	30	$\frac{3}{4}$	27	1 $\frac{1}{2}$	A or E Type Relays. Has Cover



Dimensions



Drilling Positions

ANGLE TYPE RELAY MOUNTING

~~Black~~ Finished $\frac{1}{8}$ -Inch Steel

In ordering this angle type relay mounting plate, it is necessary to give the exact code numbers of both the mounting plate and relay to be mounted, also in which one of four positions the relay is to be mounted by specifying the particular item number shown above.

These plates are for all types of relays that come within the plate dimensions.

Code No.	No. of Relays	Dimensions, Inches			
		A	B	C	D
628A	1	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2 $\frac{1}{2}$	1 $\frac{1}{4}$
628D	2	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2 $\frac{1}{2}$	1 $\frac{1}{4}$
709A	1	2 $\frac{1}{2}$	1 $\frac{1}{2}$	2 $\frac{1}{2}$	1 $\frac{1}{4}$
850A	1	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2 $\frac{1}{2}$	1 $\frac{1}{4}$

Mounting Plates for Resistances

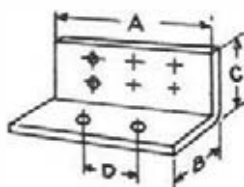
RELAY RACK TYPE

1 $\frac{1}{2}$ Inches in Width

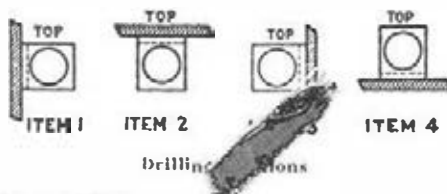
Code No.	Resistances Per Plate	Mounting Centers	Length, Inches	Mounts Resistances
601A	10	1 $\frac{3}{4}$	19	Nos. 18 or 19 Types
601B	20	$\frac{7}{8}$	19	Nos. 18 or 19 Type
601C	40	$\frac{7}{8}$	19	Nos. 18 or 19 Type
601D	30	$\frac{7}{8}$	19	Nos. 18 or 19 Types
601J	10	1 $\frac{3}{4}$	19	No. 1 Type
607C	20	$\frac{7}{8}$	21 $\frac{5}{8}$	Nos. 18 or 19 Types
644A	20	$\frac{7}{8}$	10 $\frac{3}{4}$	Nos. 18 or 19 Types

MOUNTING PLATES

Mounting Plates for Resistances (Continued)



Dimensions



Drilling Positions

ANGLE TYPE

Black Finished— $\frac{1}{8}$ -Inch Steel

In ordering this angle type resistance mounting plate, it is necessary to give the exact code numbers of both the mounting plate and resistance to be mounted, also in which one of four positions the resistance is to be mounted by specifying the particular item number as shown above.

Code No.	No. of Resistances	Centers	Dimensions, Inches				For Resistances
			A	B	C	D	
629A	5	$\frac{1}{8}$	$1\frac{3}{4}$	$1\frac{1}{4}$	$2\frac{3}{4}$	$1\frac{3}{4}$	18 or 19 Types
629B	3	$\frac{1}{8}$	$1\frac{3}{4}$	$1\frac{1}{4}$	$2\frac{3}{4}$	$1\frac{3}{4}$	18 or 19 Types
629C	8	$\frac{1}{8}$	$1\frac{3}{4}$	$1\frac{1}{4}$	$2\frac{3}{4}$	$1\frac{3}{4}$	No. 1 Type only
682A	2	$\frac{1}{8}$	$1\frac{3}{4}$	$1\frac{1}{4}$	$1\frac{1}{8}$	$\frac{3}{4}$	18 or 19 Types
690A	6	$\frac{1}{8}$	$1\frac{3}{4}$	$1\frac{1}{4}$	$3\frac{3}{4}$	$1\frac{3}{4}$	18 or 19 Types
701A	1	$\frac{1}{8}$	$1\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	18 or 19 Types
873A	8	$\frac{1}{8}$	$1\frac{3}{4}$	$1\frac{1}{4}$	$4\frac{3}{4}$	$1\frac{3}{4}$	18 or 19 Types

Mounting Plates for Condensers

RELAY RACK TYPE

In ordering mounting plates for condensers, it is necessary to give the exact code numbers of both the mounting plate and condensers to be mounted.

Code No.	No. of Condensers	Mounting, Inches			To Mount Condensers
		Centers	Length	Width	
609AG	20	$1\frac{1}{8}$	23	$1\frac{3}{4}$	.....
737E	5	$3\frac{1}{4}$	19	$1\frac{3}{4}$	59A
756A	8	$2\frac{1}{4}$	$21\frac{5}{8}$	$1\frac{3}{4}$	21AR
756B	6	$3\frac{1}{4}$	$21\frac{5}{8}$	$1\frac{3}{4}$	59 Types
804D	3	$3\frac{1}{8}$	$17\frac{1}{8}$	$3\frac{1}{2}$	60 Types
827D	3	$3\frac{1}{8}$	$17\frac{1}{8}$	$3\frac{1}{2}$	60 Types
854A	10	$\frac{1}{8}$	$21\frac{5}{8}$	$1\frac{3}{4}$	21 Types
877E	6	$1\frac{3}{4}$	12	$1\frac{3}{4}$	90 Types
888C	7	$1\frac{3}{4}$	14	$1\frac{3}{4}$	90 Types



Mounting Plates for Message Registers

RELAY RACK TYPE

Black Finished Steel Mounting Plates $\frac{3}{8}$ Inch Thick and $1\frac{1}{4}$ Inch Wide

Code No.	Registers Per Strip	Mounting, Inches		Drilled for Message Registers
		Centers	Length	
†628A	1	$1\frac{1}{8}$	$33\frac{3}{4}$	No. 5 Type as required
623B	20	$1\frac{1}{8}$	$33\frac{3}{4}$	Nos. 5L, 5S and 5T
623C	20	$1\frac{1}{8}$	$33\frac{3}{4}$	No. 5H
671B	10	$1\frac{1}{8}$	19	No. 5H
671C	10	$1\frac{1}{8}$	19	Nos. 5L, 5S and 5T
743A	20	$1\frac{1}{8}$	$35\frac{5}{8}$	Nos. 5L, 5S and 5T
743B	20	$1\frac{1}{8}$	$35\frac{5}{8}$	No. 5H
785A	15	$1\frac{1}{8}$	27	No. 5 Type as required
848A	12	$1\frac{1}{8}$	23	No. 5 Type as required
*890A	11	$1\frac{1}{8}$	$21\frac{5}{8}$	No. 5 Type as required

†Angle tip mounting plate order for drilling positions as described under relay angle mounting plates.

* $1\frac{1}{4}$ -inch width plate.

Western Electric

NUMBER PLATES

155



No. 1B



No. 5B



No. 23C



No. 30A

Number Plates

Code No.	Description	Size, Inches	Used in
*1B	White ivory with engraved black numbers; $\frac{7}{8}$ inch high.	$\frac{5}{8}$ diam.	Wooden stile casings and panel numbers.
*5B	Hard rubber, black face, with white engraved characters $\frac{3}{8}$ inch high.	$\frac{1}{2} \times \frac{1}{8}$	110 jack mounting.
*12B	White ivory, black engraved characters; $\frac{1}{8}$ inch high	$\frac{3}{8}$ diam.	Plug shelves and key shelves to designate plugs and keys.
*21B	Hard rubber, black face with white engraved characters; $\frac{5}{8}$ inch high.	$1\frac{1}{8} \times \frac{5}{8}$	135 jack mounting.
*23A *23C	Aluminum plates with engraved black characters; $\frac{3}{8}$ inch high. Escutcheon pins furnished for mounting. ($\frac{1}{4}$ inch figures when specified.)	$\frac{3}{4}$ diam.	Flat iron stile casings.
*23D	Aluminum plate with engraved black characters; $\frac{3}{8}$ inch high. Machine screws furnished for mounting.	$\frac{3}{8} \times \frac{1}{4}$	No. 19 jack mounting.
**30A **31A	Metal holders with a celluloid cover; furnished with numbers printed on paper sheets of 0 to 511, inclusive, etc., as specified in order.	$1\frac{7}{8} \times \frac{5}{8}$	Nos. 2 and 17 jack mountings and Nos. 2C, 50A, 50B designation strips.
*32A	Celluloid face, white, with engraved black characters; $\frac{5}{8}$ inch.	$1\frac{7}{8} \times \frac{5}{8}$	2 and 34 jack mountings.
59B	Hard rubber with nickel finish and white characters.	$1\frac{7}{8} \times \frac{5}{8}$	2 and 34 jack mountings.



No. 60D



No. 108A



No. 128B

*60D	Hard rubber, black face with white numbers; $1\frac{1}{8}$ inch high.	$\frac{3}{4} \times \frac{1}{4}$	19 jack mounting.
*102A	White celluloid face with black engraved characters; $\frac{1}{8}$ inch high.	$\frac{3}{4} \times \frac{1}{4}$	19 jack mounting.
*107B	Aluminum disc with a dull, satin finish and black characters; $\frac{1}{4}$ inch high. Furnished with escutcheon pin for mounting.	$\frac{1}{2}$ diam.	Used on stile casings.
**108A	Metal number plate arranged to hold a strip of printed figures, black finish. Numbers are furnished as printed sheets of 0 to 511, inclusive, etc.	$\frac{3}{4} \times \frac{1}{2}$	19 jack mountings.
**109A 126A	Marked "Out of Service."	$\frac{3}{4} \times \frac{1}{2}$	2 jack mountings.
128B	Metal, black finish, paper card with celluloid covering.	$2\frac{1}{2} \times 1\frac{1}{4}$	Used in No. 50 type coin collectors.

*Engraved as specified in order.

**Numbers from 0 to 9727, inclusive, are furnished on printed sheets, 512 numbers to a sheet. Sheets desired must be specified in order.

For number plates for machine switching, telephone dials, see listing of "Dial Number Plates."

PLUGS



Nos. 109 & 110



No. 47



No. 148



No. 146



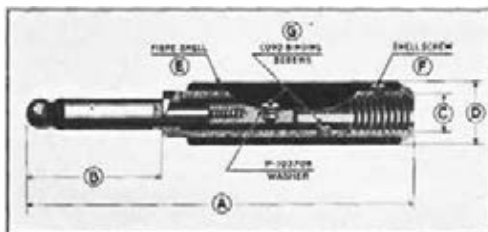
No. 151



FIG. 1



FIG. 2



Dimensions and Replacement Parts

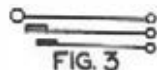


FIG. 3



FIG. 4

Plugs

Code No.	Con-ductors	Dimensions				Used with Jack Nos.	Used with Cords	Notes	Replacement Parts (See Cut)		
		A	B	C	D				E	F	G
1A	Fig. 1	3/4	1 1/4	1/4	1/4	Same as for 47A Plug	512	{ Shell Frame Fully Insulated	P-146711	P-82233	P- 84662
3A	Fig. 2	3/4	1 1/4	1/4	1/4	Same as for 47A Plug	536		P-147704	P-162652	P-162653 & 4
47A	Fig. 2	3/4	1 1/4	1/4	1/4	{ 99, 200, 201-203, 208 to 237, incl. 281, 297-303A	{ 516-570 637-857 768	{ 47A has Red Shell 47B has Black Shell	P- 81335 P-110576	P- 82233 P- 82233	P- 82239 P- 82239
47B											
109	Fig. 3	3/4	1 1/4	1/4	3/4	92-292-246-248-249	447	*Has Red Shell	P- 81319	P- 81212	P- 82341
110	Fig. 3	3/4	1 1/4	1/4	1/2	{ 49-50-70-141 238 to 295 incl.	{ 448-515 517-518 635-723, 726 728	*Has Red Shell	P- 81200	P- 81299	P- 82341
116	Fig. 1	3/4	1 1/4	1/4	1/4	Same as for 47 Plug	{ 510, 511 513, 519	{ Red Shell Red Shell Has Cord Bushing	P- 81335 P- 81335	P- 82233 P- 82233	P- 84662 P- 82239
136	Fig. 2	3/4	1 1/4	1/4	1/4	99-152	369		P- 81335	P- 82233	P- 84662
144	Fig. 1	3/4	1 1/4	1/4	1/4	Same as for 47 Plug	524	{ 1330, 1331 Tel. Plug	P- 81200	P- 81299	P- 82341
145	Fig. 2	3/4	1 1/4	1/4	1/4	186	Spl. 493 509		P-143217	P-127343	
146	Fig. 2	3/4	1 1/4	1/4	1/4	186	509				
148	Fig. 3	2 1/4	1	1/4	1/4	77, 78, 190	{ 538, 539, 545, 735	Replaces 85	P-134310	P-135465	P-135464
150	.....	3/4	1 1/4	1/4	1/4	Same as for 110 Plug	None required	{ For plugging out signals in lines in trouble	P-141633	P-124071	.....
151	.....	3/4	1 1/4	1/4	1/4	Same as for 47 Plug	None required		P-141307	P-123581	.....
153A	Fig. 4	4 1/4	1 1/4	1/4	1/4	Same as for 47 Plug	None required	See Note 1	P-143232	{ P- 81299	.....
153B									P-143233		
153C									P-143234		
165	Fig. 2	2 1/4	1 1/4	1/4	1/4	Same as for 47 & 110	None required	See Note 2	P-203388	P- 82233	P- 82239
221												Fig. 2	3/4	1 1/4	1/4	1/4	Same as for 47	Same as for 47	{ Has large red insulating shell

Note 1. The No. 153 type plug has a resistance unit connected so that when the plug is inserted in a jack the resistance unit is bridged across the tip and sleeve spring. The resistance unit will carry 70 ampere continuously without injury. The values are as follows: No. 153A plug, 400 ohms. No. 153B plug, 600 ohms. No. 153C plug, 800 ohms. Used in Morse circuits for limiting the amount of battery current.

Note 2. No. 165 is a wooden dummy for opening jacks which use the Nos. 47, 110 or 116 plug.

*The following shells can be furnished for the Nos. 109, 110 and 116 plugs when specified on order:

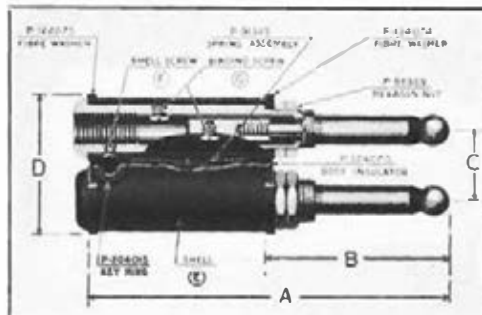
Plug No.	Gray Shell	Black Shell
109	P-90065	P-91143
110	P-107882	P-107872
116	.....	P-110576

PLUGS

(Continued)



No. 137



No. 141



137A152



141A&B



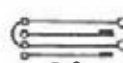
141-C



211 & 213



217



218

Twin Plugs

When an operator's headset is to be used at a switchboard, it is convenient to wire two adjacent jacks for providing the necessary connections into the switchboard circuit and to use a twin plug in these two associated jacks in order that the necessity for the operator handling two separate plugs may be avoided. This practice is now standard and the Nos. 30, 78 and 80 jack mountings are designed for use with jacks so mounted that a twin plug may be inserted only in those jacks which are to be used together.

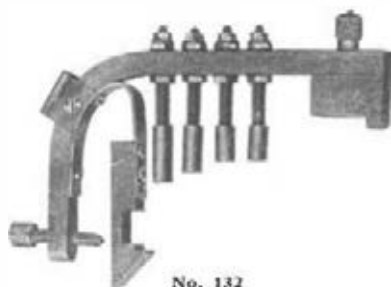
These plugs (excepting the Nos. 141 type) include a self-adjusting or flexible feature which allows sufficient movement of each plug in the shell to take up any slight off-centering present in the jacks.

Code No.	Conductors (Each Plug)	Dimensions				Used with Jack Nos.	Used with Cords No.	Used for	Replacement Parts See Cut		
		A	B	C	D				E	F	G
137	2	3 1/4	1 1/4	5/8	1 1/4	99, 236, 281, 297 and 215 to 237	{ 87, 254, 371, 555, 562; 68, 708, 748, 749, 848	Standard operator's head telephone Black shell (see Note 1) Red shell Black shell (see Note 2) Same as No. 137 but has ridges in shell to identify one side from other No. 19C Test Set	P-124076	P-124071	P- 82239
141A 141B 141C	2 2 2	3 1/4	1 1/4	5/8	1 1/4	99, 236, 281, 297 and 215 to 237	{ 520, 694, 761, 855, 857		P-113782	P-113784	.....
152	2	3 1/4	1 1/4	{ 5/8 to 1 1/4 }	1 1/4	99, 236, 281, 297 and 215 to 237	{ 87, 550, 568, 579, 674		P-142984	P-124071	P- 82239
186 211	2 3	1 3/4 3 1/4	1 1/4 1 1/4	1/4 1/4	1 1/4 1 1/4	No. 19C Test Set 49	747	No. 19C Test Set	P-205776 P-163952	P-158989 P- 81299	..... P- 82341
213	3	3 1/4	1 1/4	1/4	1 1/4	{ 49, 50, 70, 141, 259, 280, 274, 275, 295 and 238 to 245 }	.....	.....	P-164090	P- 81299	P- 82341
218	2	3 1/4	1 1/4	5/8	1 1/4	{ 99, 236, 281, 297, and 215 to 237 }	.....	{ Operator's telephone with breast transmitter, otherwise same as No. 137 }	P-167562 Cord Conductor	P-124071	P- 82239 P-167563

Note 1. No. 141A plug has brass frames of the two plugs electrically connected to the two plug sleeves, the tips are separately insulated.

Note 2. No. 141C has tip conductors as well as plug sleeves connected electrically.

PLUGS, PLUG SEATS AND PLUG TROUBLE CAPS



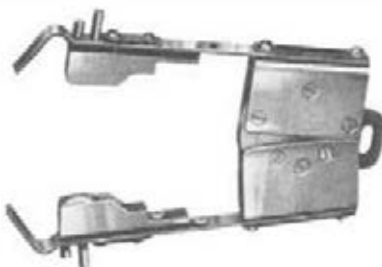
No. 132



No. 135



No. 13 Plug Seat



No. 206



No. 1A Trouble Cap

Test Plugs

Code No.	No. of Conductors	Ordinarily Used with Cords Nos.	Used with	Notes
132	4	556	Nos. 35, 36, 38 and 39 terminal strips.	Used for connecting service observing equipment to subscribers' line at the Intermediate Distributing Frame.
135	2	...	Nos. 67 and 73 heat coils and Nos. 4, 65, 78, 82, 84, 87, 89, 1168 and 1169 type protectors.	This plug is used at the protectors to reverse the polarity of a subscriber's line on which there is a ground on the ring side; the subscriber is given temporary service by battery feed over the tip side of the line.
206	4	716 733	Nos. 1168, 1169, 1268, 1269 and similar type protectors which mount on 1/2 inch centers.	Used for connections at the protectors of the Main Distributing Frame for testing line in or out of office.
225	4	716 733	Nos. 73A, 75A, 1077A, 1177A and similar type protectors which amount on 3/8 inch centers.	

Plug Seats

These red fiber plug seats are furnished complete with No. 4 round head wood screws, 1/2 inch long, for mounting.

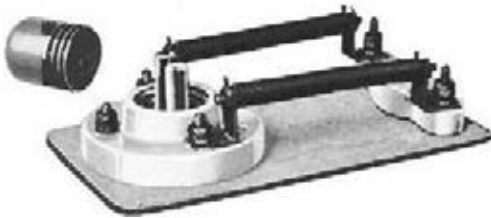
Code No.	Mount on Center, Ins.	Used With Plug Nos.	Code No.	Mount on Center, Ins.	Used With Plug Nos.
12	3/4	110	16	..	43-141
13	3/4	109	17	..	133
15	1 1/8	47			

Plug Trouble Caps

Split fibre tubes, 1 inch long, which will slip over plugs. They are used as temporary markers for cord circuits in which there is trouble.

Code No.	Color	Used with Plug Nos.	Code No.	Color	Used with Plug Nos.
1A	Black	109	2A	Black	47 and 110
1B	Red	109	2B	Red	47 and 110

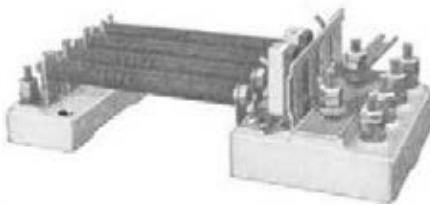
PROTECTORS



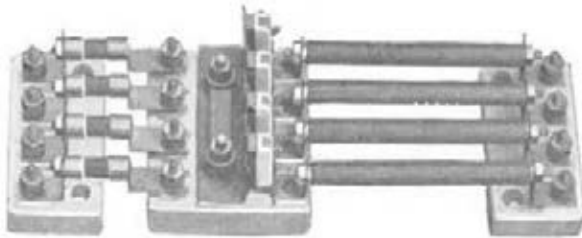
No. 58AP



No. 60AP



No. 1079AP Protector



No. 1079AP Protector With 60A Fuse and 80A Protector Mounting
(see footnote)

Telephone Set Protection

Protection of central office and magneto telephone sets against lightning and abnormal electric currents is an important feature of telephone practice. The protector must be simple in construction so that the parts can be easily replaced when necessary, and reliable in operation in order that it may give the desired protection when needed. Western Electric fuses act at one and one-half times their rated current values and open space cut-out protectors will discharge across their air-gaps at a definite voltage value because of the accurate manufacture of the protector blocks.

The wide application of carbon block cut-out (air gap) protectors makes particularly important the use of protector blocks requiring minimum attention for renewal and cleaning. The following types of protectors are designed to reduce maintenance and give the highest grade of protective service. Each protector has a porcelain base and is equipped with our new design Nos. 26 and 27 protector blocks. These blocks embody several advances in construction and operation as described in detail under "Protector Blocks."

Code No.	Line Protection	Consists of			Protects Central Battery and Magneto Telephones Against
		Protector Mountings	Protector Blocks	Fuses	
*58AP	2-Wire	1 No. 29B (Brass Cap P-143604) 1 No. 16 1 No. 48	2 No. 26 2 No. 27	2 No. 11C (7 amp.)	{ High potential (lightning) and abnormal currents.
60AP	2-Wire	1 No. 49B	{ 2 No. 26 2 No. 27 }	.....	{ High potential currents (lightning).
76AP	2-Wire	1 No. 29B (Brass Cap P-143604)	{ 2 No. 26 2 No. 27 }	.....	{ Same as 58AP, less Nos. 16 and 48 protector mountings and fuses.
**1079AP	4-Wire	{ 1 No. 79A 1 No. 80A }	4 No. 26 4 No. 27	4 No. 11C (7 amp.)	{ High potential (lightning) and abnormal currents for group mounting. Fuses mount on 1/8 inch centers. Common connecting ground strips are furnished for interconnecting two or more units.

Note. *Two No. 60A fuses and one No. 16 protector mounting may be used with the No. 58AP protector as a sneak current arrester for private branch exchange protection.

**Four No. 60A fuses and one No. 80 protector mounting may be used with the No. 1079AP protector as a sneak current arrester for private branch exchange protection.

PROTECTORS

(Continued)



No. 1078A Protector



20 No. 1269A

Telephone Exchange Protection

These protectors are designed for Central battery and local battery exchange protection against high potential (lightning), abnormal and sneak currents, in accordance with the type selected.

No. 1078 TYPE PROTECTOR

The No. 1078A protector consists of a fuse mounting so designed that the fuses are mounted on $\frac{1}{8}$ inch centers. It is supplied in standard lengths of 42, 62, 82 and 102 protectors per strip. The base of the protector mounting is designed to act as a fanning strip.

In ordering, the number of protectors per strip should be specified and, if they are to be mounted on a distributing frame, sufficient information for the drilling desired should be given. If the frame is one which we have furnished and installed, the name of the exchange and the location of the protectors on the frame will be sufficient.

Code No.	Consists of
1078A	1 No. 7A fuse (7 ampere) and No. 78A protector mounting. (For one wire protection). Specify number of protectors per strip required.

NO. 1268 AND NO. 1269 TYPE PROTECTORS

Each protector provides for one pair of wires. The No. 1268 type protector terminals are so arranged that the line wires may be connected directly at one side of the protector and jumpers, extending to a switchboard cable terminal block, connected to the terminals on the other side of the mounting. These units are used on Type "A" main distributing frames.

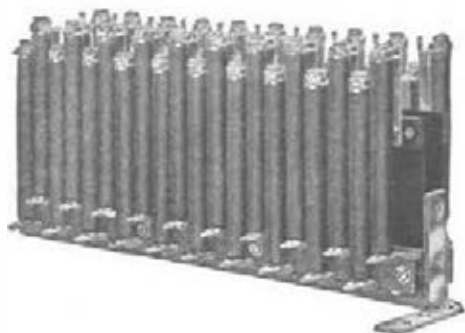
The No. 1269 type is similar to the No. 1268, except that the terminals are arranged for connecting the switchboard cable wires directly to one side, jumpers being used from the other side of the protector to an outside line terminal block. These units are used on Type "B" main distributing frames.

Both the No. 1268 and No. 1269 type Protectors may be mounted on walls or partitions by means of the No. 736A Mounting Plate. Where required, one or more of these mounting plates should be ordered as indicated under "Protector Mounting Plates."

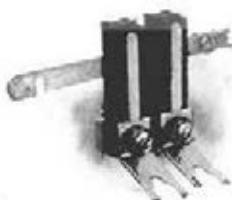
These protectors are identical in construction with the Nos. 1168 and 1169 types respectively, but differ in that they are equipped with the new No. 26 and No. 27 protector blocks.

Code No.	Furnished Only in Strips of	Consists of		
		Protector Mounting	Protector Blocks	Heat Coils
1268A	20 Protectors	1 No. 68A	2 No. 26, 2 No. 27	2 No. 76A
1268B	23 Protectors	1 No. 68B	2 No. 26, 2 No. 27	2 No. 76A
1269A	20 Protectors	1 No. 69A	2 No. 26, 2 No. 27	2 No. 76A

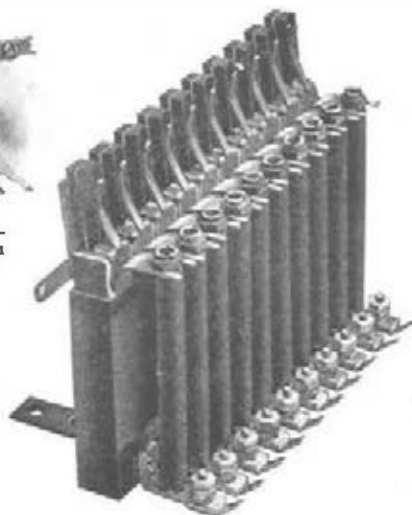
PROTECTORS



No. 77B



No. 17B with Connector and Section of Ground Strip



No. 1074A Protector

Protectors for Cable Terminals

These protectors are listed for maintenance purposes only. For new equipments, refer to listings under "Cable Terminals."

Code No.	Number Per Strip	Protector Mounting	Protector Blocks	Protector Mica	Fuse	Protects Against
77B	40 or 50	1 No. 56			1 No. 7A (7 amp.)	Abnormal currents
1074A	As required	74A	1 No. 19 1 No. 20	1 No. 11	1 No. 7A (7 amp.)	High potential and abnormal currents
1075A	As required	75A			1 No. 7A (7 amp.)	Abnormal currents
*17B	See Ground Strips below	1 No. 15	2 No. 19 2 No. 20	2 No. 11		Used with No. 1075A

*If new type protector blocks are required, order No. 15 protector mounting, equipped with Nos. 26 and 27 protector blocks.

Ground Strips for No. 17B Protector

These tinned brass strips are $\frac{3}{8}$ in. wide and $\frac{1}{8}$ in. thick. They are provided with screws for mounting No. 17 type protectors on $1\frac{1}{8}$ in. centers and each strip has a screw and washer connection for a No. 8 B.W.G. copper ground wire. The end of the strip is bent over and slotted to hold the ground wire in position. For an illustration of the method of using these strips, see the No. 17 protector listing.

Connector P-100332, which is $2\frac{3}{8}$ in. long with two slotted holes on $1\frac{3}{8}$ in. centers, will be supplied when required for connecting two ground strips together, but must be ordered as a separate item.

Code No.	Will Mount
1A	13 No. 17 Protectors
1B	16 No. 17 Protectors
1C	26 No. 17 Protectors

Large Carbon Block Protector

Code No.

86B Consists of a porcelain base having two-line terminals and one ground terminal, three large carbon blocks (which are so placed as to form a high voltage protector) and a metal cover.

Telephone lines against high potential and abnormal currents.



No. 86B Protector, Cover Removed

PROTECTORS AND PROTECTOR BLOCKS



No. 144585 Vacuum Arrestor

Metal Vacuum Tube Arresters

List No.	Consists of	Description	Use
144585	1 Porcelain base—List No. 144584 1 Vacuum arrester tube—List No. 140116	{ Base has 1 terminal for the ground connection, 1 terminal for the line and 1 terminal for connectin to instrument }	Protection against high voltage (lightning)
148057	1 Porcelain base—List No. 148056 1 Vacuum arrester tube—List No. 140116	{ Base has 1 round terminal and 1 line terminal }	Protection against high voltage (lightning)
144584	Base for mounting one vacuum arrester tube	{ Porcelain; three terminals, $6\frac{3}{4}$ in. x 1 in., and $2\frac{1}{8}$ in. overall height }	Used in No. 144585 vacuum tube arrester
148056	Base for mounting one vacuum arrester tube	{ Porcelain; two terminals $5\frac{3}{4}$ in. x 1 in. and $2\frac{1}{8}$ in. overall height }	Used in No. 148057 vacuum tube arrester
140116	Vacuum arrester tube	{ Single pole. This tube must be mounted in vertical position }	Used in No. 144585 and No. 148057 vacuum tube arrester



No. 1



No. 2



No. 19



No. 20

Protector Blocks

Nos. 1, 2 and 5 TYPES

Code No.	Description	Protector Micas	Used With Protectors
1	Plain carbon block with fuse metal.	No. 3 and No. 12	Nos. 1168 and 1169 types
2	Grooved carbon block without fuse metal.	No. 3 and No. 12	Nos. 1168 and 1169 types
5	Grooved carbon block with fuse metal.	No. 3 and No. 12	Nos. 1168 and 1169 types

No. 9 TYPE

The No. 9 Protector Block is a paraffined wood dummy which is used in place of the No. 1 and No. 2 Protector Blocks when the open-space cutout is to be made non-operative.

Code No.	Description
9	Paraffined wood dummy

Nos. 19, 20 and 25 TYPES

The Nos. 19 and 20 protector blocks are used together and form an open-space cutout suitable for protection against high potential due to lightning. A mica separator is placed between the blocks to secure the necessary air gap, the No. 10 protector mica usually being used for this purpose; when a higher breakdown voltage is desired the No. 11 mica which is twice as thick may be used, thereby raising the voltage necessary to produce an arc across the air gap to approximately double the usual value. An open space cutout having a fusible metal plug in one side may be obtained by using the Nos. 20 and 25 protector blocks and a mica separator.

Code No.	Description	Used With Protectors
19	Plain copper block with two pins.	60B and 80A
20	Grooved copper block with two bushings.	60B and 80A
25	Plain copper block with two pins and fuse metal.	Used in place of No. 19 protector block when fuse metal is desired

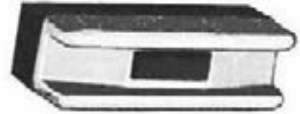
PROTECTOR BLOCKS AND MICAS

Protector Blocks
(Continued)

No. 26



No. 27

Nos. 26 and 27
(Full size)

Nos. 26 and 27 Types

The Nos. 26 and 27 protector blocks are of new design and embody several advances in construction which greatly reduce maintenance costs and provide better telephone service through fewer interruptions of operation. They are used together without a separator (protector mica) and form an open space cutout which will afford the highest grade of protection against high potentials due to lightning. The two blocks differ in construction as follows:

The No. 26 protector block is a solid piece of hard non-dusting carbon. The face of the block is especially ground to present a smooth surface. The No. 26 protector block is mounted on the ground side of the protector mounting.

The No. 27 protector block consists of a porcelain frame with a countersunk hard carbon plug which is fastened in place with low temperature fusing cement. The surface of the frame which bears against the No. 26 block, when assembled in a mounting, is finished by grinding. The air gap between the carbon insert in the No. 27 block and the face of the No. 26 block is held to close limits by this grinding process and the consistent operation of the cutouts at the proper voltage is thereby insured.

Ordinary lightning discharges will cause an arc across the air gap between the carbon blocks but will not heat them sufficiently to melt the cement used for holding the carbon plug in place. A cross with an electric light or power line, however, will cause a discharge or repeated discharges, of such duration that the heating of the carbon insert of the No. 27 blocks will melt the cement holding it in place and allow the mounting spring to push it into direct contact with the No. 26 block, thus permanently grounding the line.

Code No.	Description	Used with Protectors
26	Carbon block	Nos. 12AP, 58AP, 60AP, 76AP, 83A, 1079AP, 1268A and 1269A. 83A protector mounting
27	Porcelain frame with carbon insert }	
30	Porcelain frame with carbon insert }	

The new Nos. 26 and 27 protector blocks are interchangeable with the old combinations of Nos. 1 and 2 protector blocks and No. 3 protector mica both at subscribers' stations and central offices, and are therefore available for improving protective equipment already in service. This practice will result in fewer visits of the trouble man to subscribers' stations and a saving in labor will be effected through a material reduction in time required for cleaning and maintenance purposes at the Central office. All orders for replacements of Nos. 1 and 2 protector blocks and No. 3 protector micas should specify the Nos. 26 and 27 protector blocks; no separator (protector mica) is needed for the new design of block.

In addition to the above replacements, tests on cable protection have shown that Nos. 26 and 27 protector blocks require less attention and replacement due to grounded blocks than the Nos. 19 and 20 blocks with the regulation .010-inch mica separators; therefore, the Nos. 26 and 27 protector blocks can be used advantageously wherever metal (Nos. 19 and 20) blocks are now used.

No. 3
Protector MicaNo. 10
Protector Mica

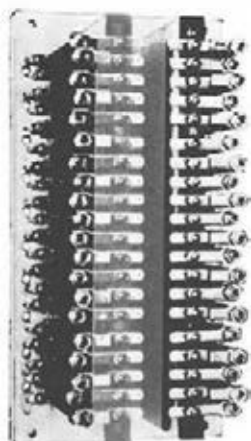
Protector Micras

Code No.	Used with Protector Blocks	Used with Protectors
3	Nos. 1 and 2	Nos. 1168 and 1169 types
10	Nos. 19 and 20	Nos. 60B and 80A
*11	Nos. 19 and 20	No. 17B

*No. 11 mica is twice as thick as the No. 10.

PROTECTOR GROUPS

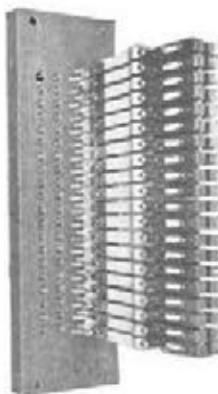
For Distributing Frames



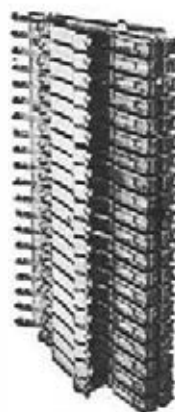
No. 1435U



No. 1435R & Y



No. 1435W



No. 1435T

PROTECTOR GROUPS

These protector groups may be used for either central battery or magneto telephone lines and are intended to mount on various types of distributing frames and cabinets listed elsewhere in this catalog.

They consist of a mounting of proper size, for attaching to the frame, on which the protector apparatus as listed below is assembled:

Code No.	Protects	Consists of	Used With Distributing Frame No.
1435U	20 metallic outside lines against abnormal current.	20 protectors equipped with No. 7A fuses and mounted on a base which serves as a fanning strip.	1420B 1430D, E, F 1431A
1435R	25 metallic outside lines where fuse protection is unnecessary.	A terminal strip mounted on a base which serves as a fanning strip.	
1435Y	20 metallic outside lines where fuse protection is unnecessary.	A terminal strip mounted on a base which serves as a fanning strip.	
1435W	20 metallic inside lines against high potential and sneak currents.	20 No. 1169A protectors mounted on a base which serves as a fanning strip.	
1435T	20 metallic inside lines against high potential and sneak currents.	20 No. 1169A protectors.	1425C

PROTECTOR MOUNTINGS, PUSH BUTTONS



No. 82
Protector Mounting



No. 48
Protector Mounting



No. 83A Protector Mounting

Protector Mountings

Code No.	Description
16	Part of No. 58AP protector, also used as part of mounting for No. 60A fuse.
48	An asbestos pad $8 \times 4\frac{1}{2}$ inches for use with the No. 58 type protectors.
29B	For use in mounting protective apparatus of the No. 58, 74, 76 or 79 type protectors.
80A	Part of No. 1079 type protector. May also be used in conjunction with No. 60A fuses.
82A	This protector mounting consists of a cast iron galvanized case approximately $11\frac{1}{2} \times 4\frac{3}{4} \times 4\frac{3}{8}$ inches over all with hinged cover and a wooden backboard. It is used for mounting the No. 58 protector at telephone stations located out of doors.
83A	Designed to protect drop wires between the overhead lines and the subscriber's telephone set from lightning. This protector mounting consists of an iron box approximately $8\frac{3}{4} \times 3\frac{1}{2} \times 2\frac{1}{2}$ inches deep with a hinged cover having a No. 84A protector mounted within it. Arranged to mount 10 pairs of Nos. 26 and 30 protector blocks which must be ordered separately. This protector mounting provides for the protection of 5 pairs of wires. The box mounts directly underneath the crossarms on the poles. Two mounting lugs are provided for this purpose.

MOUNTING PLATE FOR PROTECTORS

The No. 736A mounting plate is used with the Nos. 1268 and 1269 type protectors when they are to be mounted on flat surfaces such as walls and partitions. It consists of a supporting bar $\frac{1}{4} \times 1\frac{1}{2}$ inches equipped with angle brackets adapted to fasten to cross strips on the wall, etc., and can be supplied in lengths suitable for use with protectors for from 20 to 243 lines. These mounting plates progress in capacity arranged for 20 or 23 and 40 or 43, etc., protectors each. When ordering, give the code number for the mounting plate and the number of protectors to be mounted per plate.

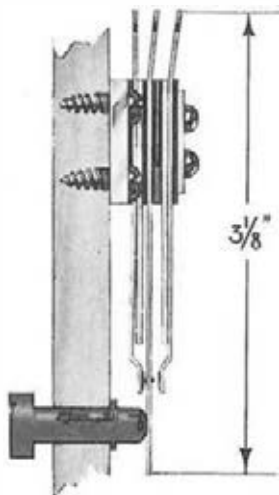
Push Buttons

These push buttons are suitable for general telephone use, but are primarily intended for use in magneto telephones for "central office selective signalling" service. Other uses will be suggested by the descriptive matter in this catalog under "Definition of Terms."

The springs are of nickel silver and are backed up with brass stop springs. The ends of the springs are notched and tinned in order to permit wires being readily soldered to them. The button is made of hard rubber.

Note. The No. 465 type keys consist of push buttons mounted in small wooden boxes suitable for use in connection with telephone apparatus.

See also push buttons listed under "keys" and "Inter-phones."



No. 1006A Push Button

Code No.	Spring Combination	Buttons Furnished For Woodwork Thickness	Principal Use
1002A	Five springs arranged for one break two make contacts.	$\frac{1}{8}$, $\frac{1}{4}$ or $\frac{1}{2}$ inch as specified.	Used in magneto telephones for central office signalling.
1004A	Six springs arranged for two break-make contacts.	$\frac{1}{2}$ in.	Used in magneto telephones for "signalling central secretly."
1006A	Three springs arranged for one break-make contact.	$\frac{1}{8}$, $\frac{1}{4}$ or $\frac{1}{2}$ inch as specified**	Used in magneto telephones for "central office signalling."

*The No. 1004A is in effect two No. 1006A push buttons.

**A button for $\frac{1}{8}$ inch wood will be furnished in cases when orders do not specify the thickness of the wood work with which the push button is desired for use.

RECEIVERS



Section of 143AW or 144AW



Section of 528BW

Western Electric Receivers are as near perfection as scientific research has been able to make them.

The No. 143AW Receiver is the same as the No. 144AW, except that it has a composition case and ear piece. These composition parts will give entire satisfaction under ordinary conditions, but where rough handling is apt to be encountered, the use of the No. 144AW Receiver is recommended. The No. 144AW Receiver is also recommended where high humidity is encountered, for example, in mine service.

The Nos. 143AW and 144AW Receivers are used on telephones and desk stands for standard central battery and local battery service. These receivers weigh 13 oz. and will operate any of our Nos. 140 and 143 type switch hooks and the switch hooks of our standard desk stands. The No. 171W (magnetless) receiver, in view of its light weight (5½ oz.), is suitable only for use with the No. 143M switch hook and No. 1020AH desk stand.

Nos. 143AW, 144AW and 171W receivers are equipped with binding posts that will take either pin (No. 29 types) or flat (No. 62 type) cord tips.

The No. 146AW watch case type receiver is intended principally for use in multiple with the regular receiver furnished on a desk stand or telephone. Equipped with a cut-in switch. Will fit the No. 1A receiver holder, which is designed for use on desk stands. Used on telephones installed in noisy locations or where telephone user has defective hearing.

No cords are included with these receivers and must, therefore, be ordered as separate items. Receiver cords for wall or desk type telephones are listed elsewhere under "Cords."



143AW, 144AW, 171W Equipped with Cord



146AW

Receivers for Standard Central Battery and Local Battery Service

FOR WALL TELEPHONES AND DESK STANDS

Code No.	Type	Resistance Ohms	Repair Parts		
			Outer Shell	Ear Piece	Diaphragm
143AW	Standard	75	P-93518	P-93519	P-95114
144AW	Standard	75	P-94533	P-93520	P-95114
146AW	Watch Case	650	P-99403	P-94545	P-95225

RECEIVER FOR SERIES CENTRAL BATTERY SERVICE

*171W	Magnetless or direct current type	40	P-92613	P-91614	P-95114
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*Bi-polar receiver, not provided with a permanent magnet.

RECEIVERS

(CONTINUED)



No. 528BW



No. 131W



509W (1002C Head Set)

OPERATORS STANDARD TYPE

Code No.	Resistance, Ohms	Shell Material	Includes Head Band
528BW	80	Brass, Black finish	No. 3A

Used with
Cords having No. 80 Cord
Tips at Receiver End
(see head set "Cords").

HAND SET TYPES

Code No.	Resistance, Ohms	Shell Material
131W	70	Brass, Nickel Plate
141W	70	Brass, Nickel Plate

No. 1001 Type Hand Sets
No. 1002 Type Hand Sets

TEST SET TYPE

515W	45	Brass, Black finish
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No. 1017 Type Test Sets

HEAD SET TYPE

509W	1100	Brass, Nickel Plate
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No. 1002C Head Set



No. 186W Receiver



No. 133W Receiver



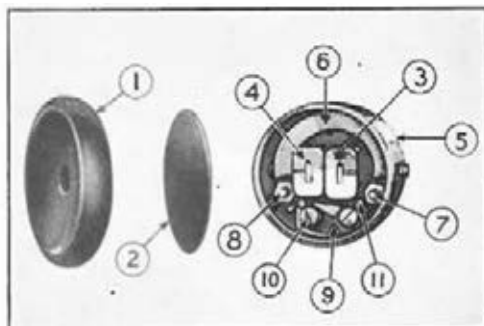
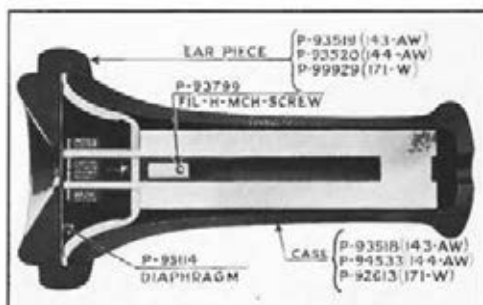
No. 190

RAILWAY TYPE

Code No.	Description	Used with
133W	Insulated bipolar hand receiver with rubber case. (Resistance 70 ohms).	With No. 1314A telephone set.
186W	A metal case, black finish, single head receiver with a rubber ear piece, and No. 3B headband. (Approximate resistance 400 ohms). Replaces No. 156W.	With Nos. 1020AB, BR desk stands, 1293AE, AK, 1317AW, AE telephone sets, 1020C, E, 1048DA, DB, DC, DD, 1048GA, GB, GC, GD arms. With Nos. 546 and 554 cords.
189W	Similar to the No. 186W, except wound to a low resistance. (Approximate resistance 45 ohms). Replaces No. 148W.	With Nos. 1120AB desk stand, 1017B, C, E, 1020A test sets, 1120C, 1148DA, DB, DC, DD telephone arms and 1317BU telephone set. At way stations with No. 501 type desk set boxes, also on No. 565 cords.
190W	Composed of two special No. 189W receivers with a wire type headband. (45 ohms.)	With No. 566 cords with breast transmitter.
191W	Composed of one special No. 189W (45 ohms) and one special No. 186W (400 ohms) receivers with a wire headband.	Replaces No. 147W and 153W receivers.
508W	A concealed binding post hand receiver. Similar in appearance to the No. 143AW (Resistance 550 ohms).	On No. 567 cords multiple connection. Replaces No. 164W receivers.
		On Nos. 1317W, AD, 1293AD, AK and 1336F telephone sets. Replaces No. 163W receivers.

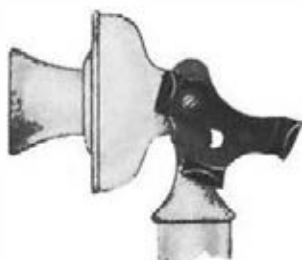
RECEIVERS

Receiver Replacement Parts



Sym- bol	Name of Part	Receiver Code Nos.				
		131W	133W	141W	146W	186W
1	Receiver cap.....	P-81496	P- 90348	P-88295	P-94545	P- 97614
2	Diaphragm.....	P-81525	P- 95118	P-95114	P-95225	P- 95225
3	Right spool assembly.....	P-81492	P- 80724	P-80972	P-90694	P- 97074
4	Left spool assembly.....	P-81493	P- 80723	P-80724	P-90695	.....
5	Case.....	P-90076	P- 90803	P-90143	P-99403	P- 97058
6	Magnet.....	{ P-93903 P-93904	P- 93906	P-87383	{ P-95254 P-95255	{ P- 97066 P- 97064
7	Magnet machine screw.....	P-82028	P- 87411	P-88284	P-99354	P- 97056
8	Nut or binding post.....	.....	P- 93592	P-88289	P-99355	P-132958
9	Receiver block assembly.....	P-81499	.....	P-88291	*****	P- 98974
10	Machine screw.....	P-82027	P-107062	P-88285	P-82324	P- 93540
11	Terminal.....	P-81506	.....	*****	P-97285	P- 97062

Sym- bol	Name of Part	Receiver Code Nos.				
		189W	190W, 191W	528BW	509BW	515W
1	Receiver cap.....	P-145247	P-145248	P-98524	P- 99768	P- 99485
2	Diaphragm.....	P- 95225	P- 95225	P-98387	P- 98387	P- 95225
3	Right spool assembly.....	P-145239	P-145239	P-99087	P-205887	P-145239
4	Left spool assembly.....	.....	.....	P-99088	P-205888	.....
5	Case.....	P-145241	P-145241	P-99202	P- 99848	P- 99491
6	Magnet.....	{ P- 97066 P- 97064	{ P- 97066 P- 97064	{ ***** P-99862	{ ***** P- 99862	{ P- 97066 P- 97064
7	Magnet machine screw.....	P- 97056	P- 97056	P-99541	P- 99541	P- 97056
8	Nut on binding post.....	P-132958	P-132958	P-98752	P- 98752	P-132958
9	Receiver block assembly.....	P- 98974	P- 98974	P-98361	P- 98361	P- 98974
10	Machine screw.....	P- 93540	P- 93540	P-99794	P- 99794	P- 93540
11	Terminal.....	P- 97062	P- 97062	P-98383	P- 98383	P- 97062



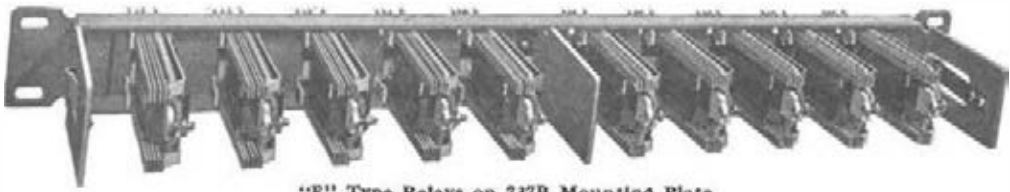
No. 1A Receiver Holder

RECEIVER HOLDER

No. 1 Type

- 1A This is designed for use on No. 1020 type desk stands for holding a No. 146AW Receiver, in cases where this receiver is connected in multiple with the regular desk stand receiver. It is designed so that the receiver may be easily removed but is normally held so firmly that it will not be dislodged accidentally or rattle. This receiver holder is so arranged that it can be mounted by means of the screw which holds the transmitter in place. It has a black finish.

RELAYS



"E" Type Relays on 737B Mounting Plate

Relay Types

The relay is an essential and important piece of telephone equipment and the correct design of this class of apparatus, not only materially affects the quality of service rendered by the entire telephone plant, but also the expense incurred in securing that service. The increasing use of central battery equipments necessitate relays suitable for operation on direct, pulsating, and alternating current in circuits not only calling for a wide variety of spring arrangements and combinations, but also for slow acting as well as fast acting types. Relays of high impedance and those of low impedance have very definite fields of application and polarized relays are necessary for accomplishing certain results. To meet these varying conditions, the Western Electric Company has developed a number of relay types; each type being supplied with the character of windings and arrangement of contacts to meet the requirements of the circuits in which it is to be placed. It is impracticable to catalog them all here, the main types only being described. Further details will be supplied upon request.

Flat Type Relays

The expense of installation, operation and maintenance are reduced to a minimum by the use of standardized forms of apparatus. After careful analysis of the circuit conditions under which relays are most commonly used, the "Flat Type Relay" form of construction has been evolved which lends itself readily to a great variety of slight changes through winding modifications and contact arrangements, producing a relay ideally suited to a multiplicity of applications and requirements. The advantages of Flat Type Relays are briefly indicated below.

1. Efficiency of Operation. Each relay requires the minimum amount of current consistent with the conditions under which it operates. These conditions cover the contact pressures necessary both during operation and in its non-operative position, the speed or time of operation and the requirements as to high or low impedance which its position in the circuit makes necessary. High efficiency is attained through a careful choice of materials and the correct proportioning of the parts.

2. Permanent and Easy Adjustments. All Flat Type Relays have their spring contacts and armature air gaps at the front end of the relay where they are clearly visible while being adjusted when in place on their mountings. The adjustments are permanent over long periods of service, being maintained under widely varied conditions of heat, cold and humidity.

3. Insulation of Contact Springs. "Phenol Fibre" is used for spring insulation. This material in addition to having the high dielectric strength of hard rubber has the advantage of not being affected by heat, moisture or deterioration like rubber.

4. Self Cleaning Contacts. All contacts are so mounted that their surfaces are in a vertical plane, allowing dust to fall out of, rather than settle on, the contacts. Maintenance is reduced by this construction and difficulties due to poor contacts avoided.

5. Armature Suspension. A flat, reed type spring is used for armature suspension in all Flat Type Relays. This feature of design secures a continuous and unvarying magnetic path between the armature and the core. By the selection of suitable springs, extremely sensitive relays are obtained with this type of construction.

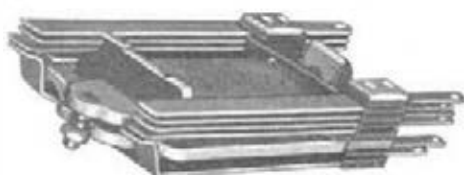
6. Durability of Parts. All steel parts are galvanized. The special alloy steels used are not only the best material, electrically, for the parts in which they are utilized, but are mechanically strong materials from which small parts having great strength may be made. The spool heads are of Phenol Fibre and the windings are highly insulated. All windings will carry continuously without injury, currents greater than required for operation.

7. Small Size and Ease of Mountings. Compact in design, these relays are light in weight and occupy a small amount of space. Their terminals are all at one end and conveniently arranged for making soldered connections. Mounting plates for placing groups of relays under common dust-proof covers and also mounting plates for use when individual cross-talk proof covers are required on each relay, are listed elsewhere as all flat type relays are insulated from their mountings and are fastened in place by means of two screws; their stability and ruggedness when mounted reduces maintenance costs.

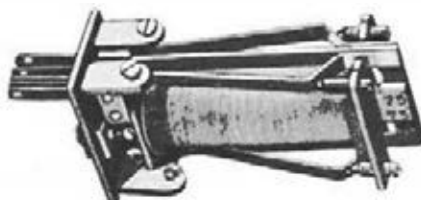
RELAYS

Flat Type Relays—Continued

The "A," "B," "E," "H," and "G" type relays are all of the Flat Type form of construction and can be supplied to meet a great variety of circuit conditions.



"A," "E" & "H" Type Relay



"B" & "G" Type Relay With Cover Removed

"A" TYPE RELAYS

The "A" type relays are designed for use as line and cut-off relays only. These relays will mount on $\frac{3}{4}$ and $\frac{1}{2}$ inch horizontal and $1\frac{3}{4}$ vertical centers. Intended to mount on mounting plates provided with dust-proof metal covers.

"E" TYPE RELAYS

The "E" type relays are designed for heavy duty, all-around purpose telephone relays. The relays are designed for two sets of contact springs which may be duplicates or may differ in contact arrangement, making it possible, in many cases, to use one of these relays where two or more of another style would be required. May be mounted in groups on punched type mounting plates (see listings elsewhere) which are provided with common dust-proof metal covers on $1\frac{3}{4}$ inch vertical and $\frac{3}{4}$ inch or 1 inch horizontal centers (depending upon the number of contact springs). When an individual dust-proof cover for each relay is desired the E1 relay cover should be specified. In this case the relay will mount on $1\frac{1}{4}$ inch horizontal centers and $1\frac{3}{4}$ inch vertical centers.

"H" TYPE RELAYS

The relays of the "H" type are similar to the "E" relays, but have higher impedance due to the laminated construction of their cores. They are each equipped with a cross-talk proof cover and will mount on $1\frac{1}{4}$ inch horizontal and $1\frac{3}{4}$ inch vertical centers.

"B" TYPE RELAYS

"B" type relays differ from the above "A," "E" and "H" types in that they are provided with a micrometer screw adjustment feature which permits of extremely accurate adjustments being made. They are used as supervising relays in switchboard cord circuits and in other places where a sensitive, highly efficient and reliable relay is required. When used as a series supervisory relay, the transmission loss is very low. These relays have superior "flashing" ability and will operate in a line having as high as 1,000 ohms resistance.

"B" type relays are provided with individual covers, each having a removable cap which may be placed in position without affecting the adjustment of the relay. The individual covers are dust proof and cross-talk proof on all "B" type supervisory relays. For purposes in which the cross-talk shielding is not required, dust-proof covers are supplied. These relays may be mounted on $1\frac{1}{4}$ inch horizontal and $1\frac{3}{4}$ inch vertical centers.

The use of a supervisory relay of the "B" type secures the operating advantages which are obtained through sensitive adjustment and small operating current low transmission loss, and reduced maintenance.

"G" TYPE RELAYS

The "G" type relays are provided with micrometer screw adjustment and are otherwise similar to the "B" type relays, but are of higher impedance due to the use of a laminated core. Each relay is equipped with a cross-talk proof shell with removable cap and will mount on $1\frac{1}{4}$ inch horizontal and $1\frac{3}{4}$ inch vertical centers.

"J" TYPE RELAYS

"J" type relays are designed for use with alternating current and are otherwise similar to the "B" type relays but having different core, spool head and adjusting plate characteristics. Each relay is equipped with a metal dust-proof cover with removable cap and will mount on $1\frac{1}{4}$ inch horizontal and $1\frac{3}{4}$ inch vertical centers.

RELAYS AND RELAY COVERS

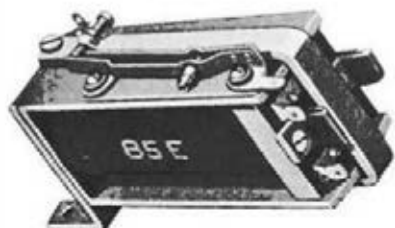
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No. 44 Type



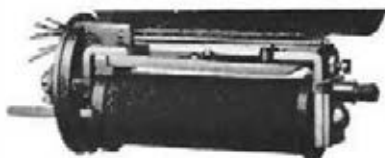
No. 87 Type



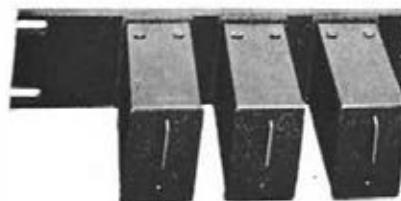
No. 85 Type



No. 114 Type



Nos. 149 & 178 Types



Relay Covers (on Mounting Plate)

NO. 44 TYPE RELAY

The No. 44 type relays are provided with a line coil and a restoring coil. They have the characteristics of a drop. When the line coil is energized, the front armature is released and falls forward, closing a local contact. When the restoring coil is energized, the front armature is returned to the vertical position. Each relay is provided with a cross-talk proof shell.

NO. 85 TYPE RELAY

The No. 85 type relays are slow acting and are designed to operate on either alternating or direct current. They are used in the No. 1533 and No. 6054 type telephones in four party selective ringing systems employing superimposed ringing current. An angle bracket for mounting it in a vertical position is provided on certain types.

NO. 87 TYPE RELAYS

No. 87 type relays close a local circuit only while the line is being rung upon. They have flexible contact springs and heavy armatures of sluggish action so that the local circuit remains closed as long as there is ringing current on the line and are used in trunk circuits between central offices. They are equipped with cross-talk proof covers. One contact is made when the relay is operated. One form of this type of relay has an independent breaking contact.

NO. 114 TYPE RELAY

Relays of the No. 114 type operate on direct current and have one or two operating windings. They are provided with cross-talk proof shells. One contact is made and one broken when the relay is operated.

NO. 149 AND NO. 178 TYPE RELAYS

The No. 149 type relays are slow-release cut-off relays. Equipped with dust-proof metal covers and will mount on $1\frac{3}{4}$ inch centers.

The No. 178 type relays are similar in design to the No. 149 types and in addition are designed for slow operation. Will mount on $1\frac{3}{4}$ inch centers.

NO. 206 TYPE RELAYS

The No. 206 type relays are polarized relays equipped with reed type armatures and in some cases arranged with biasing springs. Equipped with dust-proof covers and will mount mechanically on $1\frac{3}{4}$ inch horizontal centers and $1\frac{3}{4}$ inch vertical centers, but due to sensitiveness to magnetic interference should not be mounted on less than $3\frac{1}{2}$ inch vertical or horizontal centers when used in close proximity to other magnetic apparatus. If relay is adjusted after saturation, it should not be used in circuits whose maximum currents are greater than the saturation.

RELAY COVERS**E1 RELAY COVER**

The E1 relay cover is an individual dust cover for "E" type relays when used on mounting plates without the regular mounting plate cover. Has a black finish and is furnished with a support which attaches to the relay and holds the cover in place. The closest centers on which the "E" type relays will mount when equipped with these covers are $1\frac{1}{4}$ inches horizontal and $1\frac{3}{4}$ inches vertical.

E2 RELAY COVER

The E-2 relay cover has a removable cap which when removed, gives access to the contacts for examination, otherwise same as E-1 relay cover.

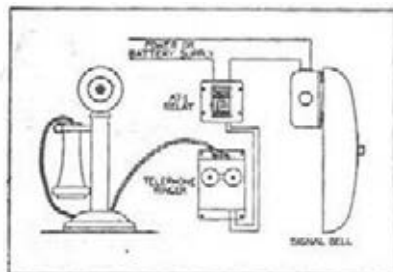
RELAYS

(Continued)

FOR SIGNALLING PURPOSES



Signal Relay



Schematic Wiring Diagram

"Signal" Telephone Extension Relays

Telephone ringing current has not enough energy to operate a more powerful signal but it may be used to operate a relay and this relay, in turn, close a circuit of greater energy, from which the signal may be operated. Signals may be sounded intermittently according to a code in the same manner as with the customary telephone ringer. The Signal Telephone Extension Relay may be used on standard telephone ringing current (alternating) either to replace the existing telephone ringer or, by adding a 2 microfarad condenser (on central battery lines), as an extension to it.

The relay will make and break circuits up to 250 volts A.C. or D.C. Its maximum power capacity is 125 watts and its maximum current capacity is 8 amperes. Under proper line and operating conditions it may be used on lines equipped with either 1000, 1600 or 2500 ohm ringers.

Stamped steel housing, furnished with knockouts (on all sides) for $\frac{1}{2}$ inch conduit. Weatherproof housing when specified.

Code	Dimensions	Weight
Type AT-1	$4\frac{3}{4} \times 4\frac{3}{4} \times 3$ ins.	Net 3 lbs. 9 oz. Shipping approx. 4 lbs.

"Signal" A.C. and D.C. Relays

The Relays covered here are furnished to operate from standard voltages 12 to 250 A.C. and 6 to 250 D.C.

Carrying Capacity—Maximum ratings—

Power Relays—660 watts, 10 amperes, 250 volts.

Heavy Duty Relays—1000 watts, 15 amperes, 250 volts.

Relays can be furnished either single circuit or double circuit. A single circuit relay controls one circuit and has two sets of contacts in series affording a double break. Double circuit relay controls two circuits and has one set of contacts in each circuit affording a single break.

A Front Contact Relay closes one or two circuits when energized.

A Back Contact Relay closes one or two circuits when deenergized.

A Front and Back Contact Relay is a combination of the two preceding relays.

"Signal" A.C. and D.C. Relays means the best in design and construction. Laminated silicon steel magnetic structure. Phosphor bronze contact arms. Self-supporting, form wound impregnated moisture-proof coil. Wiping self-cleaning contacts. Moulded insulating base of approved material. All parts secured to base with brass inserts.

Standard Housing. Stamp steel outlet box, $\frac{1}{2}$ inch knockouts on all four sides, dimensions $4\frac{3}{4}$ inches square, $3\frac{1}{4}$ inches high.

Weatherproof Housing. (When specified.) Cast iron, enamel finish. State whether for open wiring or $\frac{1}{2}$ inch conduit. Connections top, bottom or both. Dimensions $8\frac{1}{2} \times 6 \times 4$ inches high.

Relay Sets. Consisting of telephone extension relays type AT-1 and A.C. and D.C. relays furnished upon application.

Approved by Board of Fire Underwriters—Factory Mutual Laboratories.

Weights: Net $3\frac{1}{2}$ lbs. Shipping $8\frac{1}{2}$ lbs.

Heavy Duty Relays. Standard Front Contact Relay equipped with main copper to copper contacts and an auxiliary copper to carbon contact. The auxiliary contacts make before and break after the main contact which eliminates arcing or burning of the latter.

Type	Description	Type	Description
AF-1	A.C. Front Contact Relay.	DF-1	D.C. Front Contact Relay.
AB-1	A.C. Back Contact Relay.	DB-1	D.C. Back Contact Relay.
AFB-1	A.C. Front and Back Contact Relay.	DFB-1	D.C. Front and Back Contact Relay.
AFH-1	A.C. Heavy Duty Front Contact Relay.	DFH-1	D.C. Heavy Duty Front Contact Relay.

Above relays also furnished in double circuits when specified.

Western Electric

REPEATING COILS

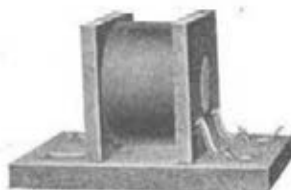
173



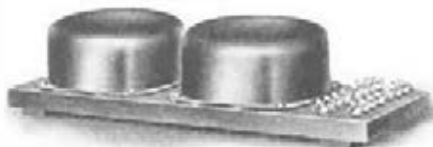
No. 20A



No. 25E



No. 30A



No. 25A



No. 26A

NO. 20 TYPE

The No. 20 type coils are intended for use in operator's telephone set for busy test. The No. 20E is for use at positions equipped with machine ringing trunks provided with mechanical locking keys. The No. 20G and H are for use in "B" operators' anti-side tone set.

Code No.	No. of Coils	No. of Windings Each Coil	Winding Resistances, Ohms			Impedance Ratio	Dimensions, Inches	
			Primary	Secondary	Tertiary		Wood Base	Coil
20A	1	2	277	40	*360	1 to 45	5 1/8 x 1 1/4	.....
20E	1	2	215	29	*365	.....	.....	3 1/4 x 1 3/8
20G	1	2	277	40	..	.....	.....	3 1/4 x 1 3/8
20H	1	2	215	29	29	.....	.....	3 1/4 x 1 3/8

NOS. 25, 26 AND 27 TYPES

The following coils are intended for use in the regular cord circuits and incoming trunk circuits of central battery switchboards.

The No. 25A has terminals for both coils at one end of wood base.

The No. 25C has terminals for both coils distributed at each end of wood base.

The Nos. 26A and 27A are each equivalent to one-half of No. 25A.

The No. 26C is equivalent to one-half of No. 25C.

25A	2	4	2 of 21	2 of 21	.....	1 to 1	10 3/4 x 4	.....
25C	2	4	2 of 21	2 of 21	.....	1 to 1	10 3/4 x 4	.....
26A	1	4	2 of 21	2 of 21	.....	1 to 1	10 3/4 x 4	.....
26C	1	4	2 of 21	2 of 21	.....	1 to 1	10 3/4 x 4	.....
27A	1	4	2 of 21	2 of 21	.....	1 to 1	6 x 4	.....

The following coils are intended for 48-volt battery long distance and incoming toll trunks of central battery switchboards.

The No. 25G has terminals for both coils distributed at each end of the wood base.

The No. 25S has terminals for both coils at one end of wood base.

The No. 25H is equivalent to one-half of No. 25S.

The No. 27D is equivalent to one-half of No. 25G.

Code No.	No. of Coils	No. of Windings Each Coil	Winding Resistances, Ohms			Impedance Ratio	Dimensions, Inches	
			Primary	Secondary	Tertiary		Wood Base	Coil
25G	2	4	2 of 21	2 of 21	2 of 40	1 to 1	10 3/4 x 4	.....
25S	2	4	2 of 21	2 of 21	2 of 40	1 to 1	10 3/4 x 4	.....
26H	1	4	2 of 21	2 of 21	2 of 40	1 to 1	10 3/4 x 4	.....
27D	1	4	2 of 21	2 of 21	2 of 40	1 to 1	6 x 4	.....

The No. 25E coil is intended for use in Nos. 1278 and 1302 types of railway telephone sets. Base of coil provided with mounting lugs.

25E	1	2	42	42	..	1 to 1	3 7/8 x 4 7/8
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NO. 30A TYPE

The No. 30A coil is intended for use in trouble test and tone test circuits.

30A	1	2	385	.018	5 1/2 x 5 1/4
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NOS. 42A AND 54B TYPES

The following coils are intended for use in magneto cord circuits to prevent ringing through.

42A	1	4	35, 53, 72, 90	.....	.....	.....	.....	2 1/4 x 1 5/8
54B	2	4	2 of 6	2 of 6	.....	161	10 3/4 x 4	.....

Western Electric

REPEATING COILS

(CONTINUED)



No. 76A



No. 50A



No. 77A



No. 56A



No. 49A

NOS. 70A, 76A, 77A AND 78A TYPES

The following coils are intended for use in phantom and simplex circuits.

The No. 70A is for use in connection with A.C. selectors.

The No. 76A has two coils mounted on a wood base.

The No. 77A and 78A are each equivalent to one-half of No. 76A.

The No. 78A also consists of two resistance units enclosed in shell, each unit is non-inductively wound and is adjusted to have approximately the same D.C. resistance as the corresponding repeating coil windings. Intended for use at intermediate stations on phantom lines where one side of phantom circuit is terminated. The phantom circuit and the other side circuit going through.

WINDING

Code No.	No. of Coils	No. of Windings Each Coil	Resistances, Ohms			Impedance Ratio	Dimensions, Inches	
			Primary	Secondary	Tertiary		of Wood Base	of Coil
70A	2	..	.....	.....	.....	.....	.....	.....
76A	2	4	2 of 20	2 of 21	.....	1 to 1	10 3/4 x 4	.....
77A	1	4	2 of 20	2 of 21	.....	1 to 1	6 x 4	.....
*78A	..	4	2 of 20	2 of 21	.....	1 to 1	10 3/4 x 4	.....

*Has two resistance units. See above notes.

NO. 49A TYPE

The No. 49A coil is intended for use in **graduated** howler circuit of the No. 12 local test desk and trouble positions of local switchboards. Taps are **brought** out on the secondary winding, dividing the winding in sections to obtain various resistances.

49A	1	2	1.65	31	1 to 15	3 5/8 x 1 3/8
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NO. 56 TYPE

The No. 56 type coils are intended for use in circuits designed for obtaining ringing current for central office storage batteries, in conjunction with No. 84 type interrupters.

Code No.	No. of Coils	No. of Windings Each Coil	Resistances, Ohms			Impedance Ratio	Dimensions, Inches	
			Primary	Secondary	Tertiary		of Wood Base	of Coil
56A	1	3	2 of .85	1 of 22.5	.....	.....	11 x 8 5/8	.....
56B	1	3	2 of 2.35	1 of 27.7	.....	.....	11 x 8 5/8	.....

NO. 50A TYPE

The No. 50A type coil is intended for use in telephone systems operated in connection with high voltage transmission lines.

50A Consists of two windings on a steel core, the windings insulated from each other to withstand 25,000 volts A.C. for one minute. Resistance of inner windings 31 ohms, of outer winding 37 ohms. The coil is enclosed in a cast iron case with two porcelain bushings (large bushing P-143586, small bushing P-143585), for bringing out the leads from each winding. Case is furnished with six-foot leads. Height 20 inches, width 9 1/2 inches, length 11 1/2 inches.

RESISTANCES



No. 18



No. 1



No. 19

No. 1 TYPE

These resistances are small, compact units having one winding on a brass core and are assembled with fiber heads. A brass shell protects the winding from injury. They are mounted by means of a round head machine screw passing through the core. The overall dimensions are: diameter $\frac{1}{4}$ of an inch, length $1\frac{1}{4}$ inches. A mounting screw is furnished with the resistance.

INDUCTIVELY WOUND

Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms
1A	400	1C	500	1E	300	1G	3000	1I	20	1K	30	1M	700
1B	2500	1D	60	1F	1000	1H	200	1J	20	1L	5	1N	350

NON INDUCTIVE WINDINGS

1L	100	1AL	1	1AT	*606	1BH	565	1BT	4500	1CG	1373	1CN	*800	1CY	482
1W	2000	1AM	1.7	1AU	*371	1BL	325	1BW	1917	1CK	2020	1CP	*2700	1DB	5000
1AH	1.4	1AN	120	1BC	*1170	1BP	1595	1CA	1647	1CL	1226	1CS	*3200	1DC	250
1AJ	1.6	1AP	*860	1BD	*1575	1BR	756	1CC	1606	1CM	*200	1CU	*400	1DE	190
1AK	2.4	1AS	*711	1BF	*964										

*These resistances have impregnated windings.

No. 18 TYPE

Resistances of the No. 18 type have a micanite core upon which a single winding is placed. The winding is protected by a covering of sheet mica. The ends of the winding are soldered to tinned terminal posts which are also used for mounting the unit. Each terminal post is provided with two fiber washers and a hexagonal nut.

The overall dimensions are: length, $4\frac{1}{4}$ inches, width, $1\frac{1}{8}$ inches, thickness, $\frac{3}{8}$ inch.

The resistance values do not vary more than plus or minus 5 per cent. from those rated in the table below. In some cases, as noted, the resistance is held to even closer limits. Each resistance will dissipate six watts continuously without injury from heating.

The mounting plates listed elsewhere under the heading of "Mounting Plates," provide for assembling these resistances in compact groups and when so mounted the terminals are conveniently located for making soldered connections.

Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms
18A	37	18L	170	18Y	90	18AJ	400	18BC	470	18CK	440	18DD	12
18B	40	18M	53	18Z	67	18AK	60	18BD	580	18CN	800	18DE	930
18C	83	18N	180	18AA	95	18AL	4	18BF	284	18CP	1260	18DF	290
18D	120	18P	130	18AB	45	18AM	250	18BH	1000	18CS	.6	18DH	700
18E	140	18Q	110	18AC	500	18AN	350	18BJ	1200	18CT	1481	18DJ	15
18F	150	18R	.10	18AD	240	18AR	380	18BK	1300	18CU	.8	18DK	25
18G	200	18S	20	18AE	600	18AT	1600	18BL	750	18CW	1.6	18DN	3200
18H	210	18T	50	18AF	300	18AY	2.4	18BN	340	18CY	1585	18DS	1700
18J	30	18U	100	18AG	226	18BA	2000	18CH	1.2	18DA	1510	18DU	3100
18K	80			18AH	320	18BB	2	18CJ	5	18DB	3000	18EA	9000

No. 19 TYPE

These resistances are similar in construction to the No. 18 Type and may be mounted on $\frac{1}{4}$ inch horizontal centers and $1\frac{1}{4}$ inch vertical centers. They differ from the No. 18 Type in that two windings are provided and the end of each winding soldered to a center terminal. The two outside terminals are used as mounting posts. The resistance values do not vary more than plus or minus 5 per cent. from those rated below and in some cases, as noted, the variation is held to closer limits.

Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms
19A	37 and 37	19AB	210 and 120	19BC	200 and 400	19EA	115 and 115
19B	40 and 40	19AD	150 and 150	19BH	100 and 500	19EF	14 and 14
19C	40 and 83	19AF	140 and 140	19BJ	350 and 350	19EG	600 and 1800
19D	83 and 83	19AG	120 and 160	19BK	40 and 500	19ER	9.5 and 9.5
19E	30 and 30	19AH	240 and 240	19BL	1 and 1	19EW	800 and 800
19F	40 and 90	19AJ	200 and 200	19BM	1000 and 1000	19EY	600 and 600
19G	40 and 100	19AK	70 and 70	19BS	90 and 400	19GA	400 and 600
19H	40 and 120	19AM	50 and 50	19CF	284 and 284	19GG	500 and 1500
19J	10 and 40	19AN	260 and 260	19CC	270 and 270	19GH	7.9 and 7.9
19K	100 and 100	19AP	180 and 180	19CJ	250 and 750	19GJ	425 and 425
19L	60 and 60	19AR	280 and 80	19CN	100 and 200	19GK	300 and 500
19M	20 and 20	19AS	170 and 170	19CP	750 and 1000	19GL	300 and 300
19N	8 and 5	19AU	60 and 170	19DB	.225 and .225	19GM	400 and 1000
19P	20 and 130	19AW	2.5 and 2.5	19DL	50 and 70	19GN	300 and 600
19S	60 and 90	19AY	50 and 2000	19DM	.2 and .4	19HD	250 and 250
19T	25 and 25	19BA	900 and 900	19DN	100 and 100	19HE	300 and 1900
19W	10 and 10	19BE	300 and 2300	19DP	.25 and .5	19HM	110 and 900
19Y	15 and 15	19BC	50 and 300	19DR	1 and 2	19HT	140 and 420
19Z	120 and 120	19BE	30 and 90	19DU	100 and 1000	19JE	1600 and 1600
19AA	90 and 15	19BF	600 and 1600	19DY	500 and 500		

RESISTANCES



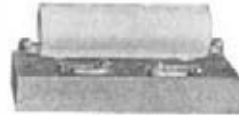
No. 5



No. 34A Resistance



No. 38 Type



No. 31A Resistance

NO. 5 TYPE

Resistances of the No. 5 type have a single winding on a wooden spool. A threaded stud with a hexagonal nut is supplied for mounting. The overall dimensions are: diameter $1\frac{1}{4}$ inches and length, 3 inches.

Code No.	Resistance Ohms	Code No.	Resistance Ohms	Code No.	Resistance Ohms	Code No.	Resistance Ohms
5C	10000	5K	750	5R	40	5AG	200
5J	600	5M	2500	5AC	2000	5AJ	15000

NO. 31A TYPE

A steel tube enamelled resistance is mounted on a maple base 4 inches in length and 2 inches wide. The overall height is $1\frac{3}{4}$ inches. Two screw terminals are provided. 1200 Ohms resistance.

NO. 34 TYPE

Variable resistance windings of this type are brought out at several points and a screw terminal provided for connecting at each point. The core is of brass with a fiber head. The insulation will stand 500 volts A.C. between the winding and the core. A No. 10 round head iron wood screw 3 inches long is furnished for mounting.

Approximate dimensions: diameter, $2\frac{1}{8}$ inches, length overall, $2\frac{3}{8}$ inches.

Approximate resistance in steps (ohms).....	Terminal No.	34A	34B	34C	Code No.	34E	34F	34G	34H
	No.	Resistance Ohms	Resistance Ohms	Resistance Ohms	No.	Resistance Ohms	Resistance Ohms	Resistance Ohms	Resistance Ohms
	1	200	100	4	1000	2000	2900	320	320
	2	400	200	8	800	3200	2500	160	160
	3	800	400	16	500	3400	2200	80	80
	4	1600	800	32	800	3200	1700	40	40
	5	3200	1600	64	1500	2600	1300	20	20
	6	4600	....	500	2300	1900	900	10	10
	7	6400	....	1000	3200	1400	700	....	....
	8	12800	....	1500	....	....	....	....	....
Approximate total resistance (ohms)....	....	30000	3100	3124	10100	17700	12200	630	630

NO. 38 TYPE

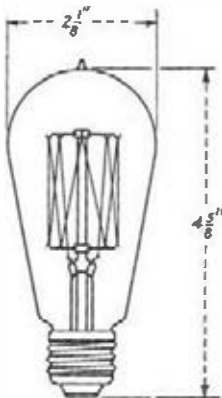
These resistances consist of a single carbon filament winding placed in a spiral groove on a cylindrical lavite core. Each end is fitted with a brass cap which serves both as a mounting lug and as a terminal. The lavite spool is covered, after winding, with insulating and moisture-proofing compound. The overall dimensions are: length, 3 inches; diameter, $\frac{1}{4}$ inch.

Code No.	Resistance Ohms	Code No.	Resistance Ohms
38A	48000	38D	50000
38B	12000	38E	20000
38C	15000		

NO. 6 TYPE RESISTANCE LAMP

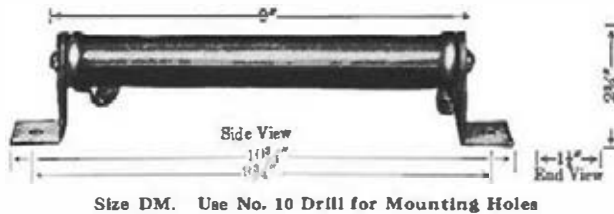
The No. 6 type resistance lamps have Tungsten filaments. They are intended for use in ringing and battery supply leads for protective purposes.

Code No.	Watts	Rated Voltage	Amperes—Current at Listed Voltages							
			125 Volts	120 Volts	110 Volts	72 Volts	70 Volts	30 Volts	24 Volts	20 Volts
6A	10	125	.09	....	....	.06	....	....	.03	....
6B	15	125	.13	....	....	.10	....	....	.05	....
6C	25	125	.22	....	....	.16	....	....	.09	....
6D	25	100	....	....	.22	....	.18	....	.09	....
6E	25	30	....	....	....	....	.68	....	.53	.35
6F	60	115	....	.53	....	....	.38	....	.18	....



N. 6 Type

RESISTOR UNITS—VITROHM

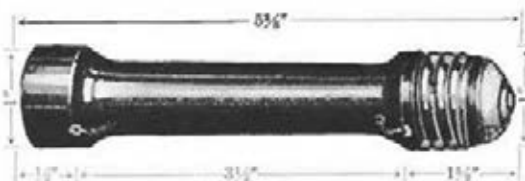


Vitrohm (Vitreous Enameled) Resistor Units

The "DM" size Vitrohm (Vitreous Enameled) Resistor Unit is equipped with brackets suitable for wall or switchboard mounting. Where banks of permanent resistances are required this affords a convenient method of mounting. Individual units arranged in this manner are used for charging small storage batteries, for reducing voltage on pilot lamps or on small motors when these are run on higher than rated voltage.

CAPACITY: 200 WATTS FOR CONTINUOUS DUTY. 500 WATTS FOR 20 SECONDS DUTY

List No.	Ohms (Approx.)	Max. Amp.	Volts at Max. Amp.	List No.	Ohms (Approx.)	Max. Amp.	Volts at Max. Amp.	List No.	Ohms (Approx.)	Max. Amp.	Volts at Max. Amp.
DM-2000	2000	.32	640	DM-62	62	1.80	111	DM-2.5	2.5	8.9	22.2
DM-1500	1500	.36	540	DM-45	45	2.19	99	DM-1.7	1.7	10.8	18.4
DM-1000	1000	.45	450	DM-31	31	2.54	78	DM-1.2	1.2	12.9	15.5
DM-700	700	.53	371	DM-22	22	3	66	DM-.9	.9	14.9	13.4
DM-500	500	.63	315	DM-15	15	3.65	54.7	DM-.6	.6	18.3	11
DM-350	350	.76	266	DM-10	10	4.47	44.7	DM-.4	.4	22.4	9
DM-250	250	.89	222	DM-7	7	5.3	37.1	DM-.3	.3	25.8	7.7
DM-175	175	1.07	187	DM-5	5	6.3	31.5	DM-.2	.2	31.6	6.
DM-125	125	1.27	158	DM-3.5	3.5	7.6	26.6	DM-.15	.15	36.6	5.
DM-90	90	1.49	134								



Vitrohm Ferrule Type

This Vitrohm (Vitreous Enameled) Resistor Unit is equipped with a standard Edison screw base, and is supplied ready for use in all standard Edison sockets. It may be supplied in any resistance from 0.2 ohms to 1000 ohms. The sizes listed are carried in stock at the factory and any other values up to about 2000 ohms may be supplied at short notice.

CAPACITY: 60 WATTS FOR CONTINUOUS DUTY, 210 WATTS FOR 20 SECONDS DUTY

List No.	Ohms. (Approx.)	Max. Amp.	Volts at Max. Amp.	List No.	Ohms. (Approx.)	Max. Amp.	Volts at Max. Amp.	List No.	Ohms. (Approx.)	Max. Amp.	Volts at Max. Amp.
EB-1000	1000	.24	240	EB-62	62	.98	61	EB-3.5	3.5	4.1	14.3
EB-700	700	.29	203	EB-45	45	1.15	52	EB-2.5	2.5	4.9	12.2
EB-500	500	.35	175	EB-31	31	1.39	43	EB-1.7	1.7	5.9	10
*EB-440	440	.37	163	EB-22	22	1.65	36	EB-1.2	1.2	7.1	8.5
EB-350	350	.41	143	EB-15	15	2	30	EB-.9	.9	8.1	7.3
EB-250	250	.49	122	EB-12.5	12.5	2.2	27.5	EB-.6	.6	10	6
*EB-220	220	.52	114	EB-10	10	2.4	24	EB-.4	.4	12.3	4.9
EB-175	175	.59	103	EB-7	7	2.9	20.3	EB-.3	.3	14.1	4.2
EB-125	125	.69	86	EB-5	5	3.5	17.5	EB-.2	.2	17.3	3.5
EB-90	90	.81	73								

* The EB-440 is the resistance equivalent of the 8 candle power, 110 volt carbon lamp. The EB-220 is the equivalent of the 16 candle power, 110 volt carbon lamp.

VITROHM (VITREOUS ENAMELLED) RESISTOR UNITS

These Ferrule Type units are made in various current carrying capacities and with a large number of resistance values. They mount in standard fuse clips. Information will be furnished upon request.

RETARDATION COILS



No. 5AA



No. 8B, K, L, N, P, S



No. 8 C, M, U



No. 5AF



No. 12G



Nos. 12A, 12F, 12L and 12S



No. 12M

No. 5 TYPE

Code No.	No. of Windings	Resistance (Ohms)
5AA	2	74 (each)
5AD	2	25 (each)
5AF	4	330 (total)

Use
In standard composite sets.....
Nos. 51A, 52A and 53A selector apparatus cases...
In phantoming magneto subscribers' circuits...

Size of Coil or Base (inches)
11 x 8 5/8
9 x 9
3 1/2 x 3 1/2

No. 8 TYPE

8B	2	85 (each)
8C	2	85 (each)
8F	3	2 of 35 and 1 of 1,200
8K	2	35 (each)
8L	2	175 (each)
8M	2	165 (each)
8N	2	85 (each)
8P	2	175 (each)
8S	2	175 (each)
8U	2	85 (each)

No. 8C unmounted.....
Mounted.....
Mounted.....
Unmounted.....
Unmounted.....
Mounted.....
8B with mounting lugs.....
8L with mounting lugs.....
Holding coil in No. 380 Sub Set.....
P.B.X. No. 505B switchboard.....

9 1/8 x 1 1/2
10 1/4 x 2
10 1/4 x 2
Battery Supply of P.B.X.
9 1/8 x 1 1/2
Cord Circuits
10 1/4 x 2
9 1/8 x 1 1/2
9 1/8 x 1 1/2
9 1/8 x 1 1/2
10 1/4 x 2

No. 12 TYPE

Code No.	No. of Windings	Resistance (Ohms)
12A	1	165
12E	1	230
12F	1	140
12G	1	2.3
12H	1	.....
12L	1	400
12M	1	2.3
12S	1	100
12U	1	165 and 230
12AC	1	24

Use
{ Operator's telephone circuit in Nos. 1, 9 and 10 switchboards and Nos. 101 and 102 private exchanges.....
Switchboard supervisory circuits.....
Nos. 1312A and 6023A telephone sets. Has a movable core for varying impedance.....
Primary circuit of battery driven ringing machine to choke out noises from the battery. Used with 1/2 ampere 75-volt ringing machines respectively.....
Operator's telephone circuit No. 4 P. B. X.....
Nos. 1314A and E telephone sets.....
Operator's telephone circuit in No. 550 P. B. X.....
{ Operators' telephone of portable emergency cord circuit repeater for 24 or 38 volt battery.....
For use in loud speaking installations in central offices.....

Size of Coil or Base (inches)
6 x 1 3/4
6 x 1 3/4
6 x 1 3/4
3 1/2 x 1 x 1 1/2 high
20 x 3 1/2
6 x 1 3/4
3 1/4 x 1
6 x 1 3/4
6 x 1 3/4
4 1/4 x 1 3/8

NO. 51 TYPE

Code No.	No. of Winding	Resistance (Ohms)
51A	1	520
51B	1	520
51G	2 in parallel	55.5
51H	2 in parallel	55.5
51F	1	45

Use
No. 295AK desk set box and Nos. 1293AD, AE, AK, AL; 1317W, AD, AE and AW telephones....
No. 1336F telephones. Same as No. 51A, except is moisture proofed.....
Inter-phones.....
Inter-phones. Consists of a No. 51G mounted on a base.....
Nos. 101A, B; 102A, B, C and D selector sets....

1 1/8 height
1 1/8 diameter
1 1/8 height
1 1/8 diameter
1 1/8 height
1 1/8 diameter
1 1/8 height
Base 2 x 1 3/8
1 1/8 height
1 1/8 diameter

RETARDATION COILS

(Continued)



No. 44 Type



No. 47



No. 54



Nos. 46M, N, P, T, W and Y



No. 48A Retardation Coil



No. 60 Type

NO. 44 TYPE

Code No.	No. of Windings	Resistance (Ohms)	Use	Size of Base, Ins.
44D	2 on each coil	83 each winding	Toll cord circuits.	10 $\frac{3}{4}$ x 4
44F	4 on each coil	{ 330 each coil—4 windings in series }	A phantom circuit retardation coil.	11 $\frac{3}{4}$ x 4 $\frac{1}{8}$
44K	2 on each coil	145 each winding	Lineman's signalling circuits.	10 $\frac{3}{4}$ x 4

NOS. 46 AND 47 TYPES

The Nos. 46 and 47 types of retardation coils are designed for general use in switchboard circuits. The No. 46 types are arranged for front connections and are equipped with mounting lugs at one end for mounting on 1 $\frac{1}{2}$ inch centers by means of two screws. The overall dimensions are 3 $\frac{1}{8}$ inches long by 1 inch in diameter. The terminal project out $\frac{1}{8}$ of an inch.

The Nos. 47 types differ from the Nos. 46 types only in that they are arranged to mount on mounting plates. The overall dimensions are 3 $\frac{1}{8}$ inches long by 1 inch in diameter. The terminals project out $\frac{1}{8}$ of an inch.

Code No.	Code No.	No. of Windings	Resistance (Ohms)	Code No.	Code No.	No. of Windings	Resistance (Ohms)
46A	47A	1	800	46L	47L	1	400
46B	47B	1	150	46M	47M	2	125 (each)
46C	47C	1	200	46N	47N	2	100 (each)
46D	47D	1	250	46P	47P	2	500 (each)
46E	47E	1	300	46R	47R	1	1500
46F	47F	1	500	46S	47S	1	40
46G	47G	1	750	46T	47T	2	33 (each)
46H	47H	1	350	46W	47W	2	200 (each)
46J	47J	1	900	46Y	47Y	2	1000 (each)
46K	47K	1	1000	46AA	47AA	2	20 (each)

No. 48 AND 49 TYPES

Code No.	No. of Windings	Resistance (Ohms)	Use	Size of Base, Ins.
48A	2 in series	100 (to al)	Grounded composite circuit.	6 x 4
49A	{ 2 inner 2 outer }	37 each 46 each	Intended to remove electrostatic and electro magnet charges from telephone lines. (Similar to No. 48A type)	

No. 54 TYPE

Arranged for back connecting. The shell is 4 $\frac{1}{8}$ inches long and 1 $\frac{1}{2}$ inches diameter. The two mounting holes are on 1 $\frac{1}{2}$ -inch centers.

54A	3	{ 1300 (inner) 85 (outer front) 85 (outer rear)	Combined battery feed and holding coil for No. 550 P.B.X. switchboards.
54B	2	{ 400 (inner) 40 (outer)	Operator's telephone set in No. 550 P.B.X. switchboards.
54C	1	200	In No. 4 P.B.X. switchboards.
54D	2	85 (each)	In No. 505B cordless P.B.X. switchboard as a battery feed coil.

No. 60 TYPE

60A	2	{ .21 .35	{ Intended for use with the Nos. 84F and 84G interrupters to limit the noise in the battery due to the operation of the interrupter.	10 $\frac{1}{2}$ x 3 $\frac{1}{4}$
60B	2	{ 5.3 9.3	{ Used with the Nos. 84F and 84G interrupters to limit the inductive noise in the switchboard wiring and cable.	

RINGERS



Unbiased

Biased to
Prevent
TappingBiased for
Pulsating
Current

means of an eccentric screw. The ringers are used in practically all the magneto telephones.

In the lock-nut type of adjustment a small wrench (for example: the No. 129 tool) is used to alter the position of the armature with regard to the pole pieces and the eccentric screw form of gong adjustment is not employed. Ringers employing the lock-nut method of adjustment are used on central battery telephones.

All ringers employing the single screw form of adjustment are provided with screw terminals, whereas those employing the lock-nut adjustment have soldering terminals.

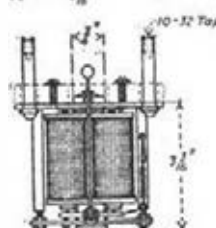
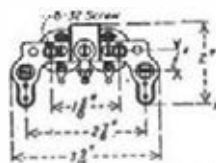
The ringers that are equipped with a biasing spring and armature stop screw or screws are intended primarily for use on pulsating (P.C.) or superimposed current (S.C.). However, such ringers are frequently operated on alternating current (A.C.) particularly in central battery systems.

Ringers equipped with a bias spring but without armature stop screws are intended for use on alternating current where it is desired to render the ringer less sensitive so that it will not tap, due to inductive disturbances, also to prevent operation on pulsating current. (See description of Center Checking Telephones.)

Ringers which are not equipped with biasing springs are suitable for use only on alternating current.



Illustrating General Design of
No. 6 and 8 Type Ringer



Nos. 6 and 8 Type
Ringer also Nos. 42
and 52 Types

NOS. 6, 8, 42 AND 52 TYPES

Code No.	Type of Armature Air Gap Adjustment	Resistance (Ohms)	Biasing Feature	Current Adjusted For	Gong Posts		Gongs	
					Length	Wood Work Thickness	Code No. and Finish	Diameter Ins.
6AG	Lock-nut	*1400	Spring and screw	P.C.	1 1/8	5/8	29A black	2 1/2
6FG	Lock-nut	1600	Spring	A.C.	1 1/8	5/8	29A black	2 1/2
8AG	Lock-nut	*1400	Spring and screw	P.C.	1 1/8	3/8	29A black	2 1/2
42AG	Lock-nut	**1000 and 3000	Spring and screw	P.C. or S.C.	1 1/8	3/8	29A black	2 1/2
52AG	Lock-nut	**1000 and 3000	Spring and screw	P.C. or S.C.	1 1/8	1/8	29A black	2 1/2

*Note. The Nos. 6A and 8A ringers were formerly wound to 1000 ohms resistance instead of 1400 ohms. The 1000 ohm and 1400 ohm ringers have the same impedance and may be used interchangeably in service.

**One spool of the No. 42 and 52 type ringers has a 3000 ohm supplementary non-inductive winding over the regular winding. The two windings are connected in series and the junction brought out to an extra terminal on the spool head for use in connection with an extension bell. These are the equivalent of using a 3000 ohm non-inductive resistance coil in series with a 1000 ohm, Nos. 6 or 8 type ringer.

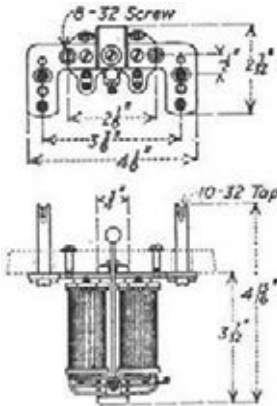
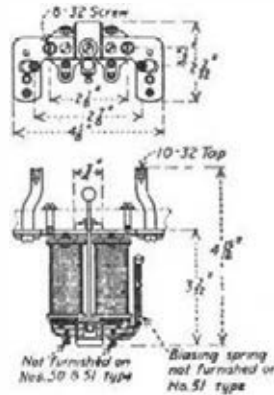
RINGERS



No. 38 Type



No. 51 Type

Nos. 38 and 45 Type Ringer
Also General Dimensions of No. 47 Type
(with Biasing Spring)Nos. 49, 50 and 51 Type
Ringers

NOS. 38, 45, 47, 49, 50, 51 AND 53 TYPES

Code Nos.	Type of Armature Air Gap Adjustment	Resistance, Ohms	Biasing Feature	Current Adjusted for	Gong Posts		Gongs	
					Length, Ins.	Woodwork Thickness, Ins.	Code No. and Finish	Diameter, Ins.
38AC	Single Screw	1000	None	AC	1 1/4	5/8	26A Black	3
38BG	Single Screw	2500	None	AC	1 1/4	5/8	26A Black	3
38FC	Single Screw	1600	None	AC	1 1/4	5/8	26A Black	3
*45BC	Single Screw	2500	None	AC	1 1/4	" "	20 Black	3
47AC	Single Screw	1000	Spring	AC	1 1/4	5/8	26A Black	3
47BG	Single Screw	2500	Spring	AC	1 1/4	5/8	26A Black	3
**49BC	Single Screw	2500	Spring & screw	PC	1 1/4	5/8	29A Black	2 1/2
**50BG	Single Screw	2500	Spring	AC	1 1/4	5/8	29A Black	2 1/2
**51AC	Single Screw	1000	None	AC	1 1/4	5/8	29A Black	2 1/2
**51BG	Single Screw	2500	None	AC	1 1/4	5/8	29A Black	2 1/2
*51FG	Single Screw	1600	None	AC	1 1/4	5/8	29A Black	2 1/2
53AC	Single Screw	1000	None	AC	1 1/8	5/8	29A Black	2 1/2
53BG	Single Screw	2500	None	AC	1 1/8	5/8	29A Black	2 1/2
53FC	Single Screw	1600	None	AC	1 1/8	5/8	29A Black	2 1/2

*Treated to resist the action of moisture and fumes used in mine telephones.

**The Nos. 49, 50 and 51 type ringers have bent gong posts which permit of their use in woodwork drilled for ringers having three inch gongs; for example drilled for the No. 38 type ringer.

RINGERS AND RINGER INDICATORS

(Continued)



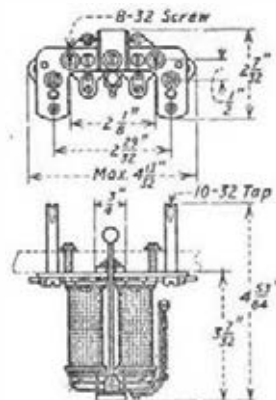
No. 54 Type



No. 41SG Ringer



No. 60 CG Ringer

No. 55 Type Ringers also
General Dimensions of
No. 53 and 54 Types

Nos. 54 AND 55 TYPES

Code Nos.	Armature Adjustment	Resistance (ohms.)	Biasing Feature	For Current	Length	Gong Posts (Ins.) Drilling	Gongs and Finish	Diameter, Ins.
54BG	Single Screw	2500	Spring & screw	PC	1 1/8	5/8	29A Black	2 1/2
55AG	Single Screw	1000	Spring	AC	1 1/8	5/8	29A Black	2 1/2
55BG	Single Screw	2500	Spring	AC	1 1/8	5/8	29A Black	2 1/2
55FG	Single Screw	1600	Spring	AC	1 1/8	5/8	29A Black	2 1/2

HARMONIC RINGERS

41RG	None	1800	None	16 3/4 cycles	1 1/8	5/8	29A Black	2 1/2
41SC	None	460	None	33 1/3 cycles	1 1/8	5/8	29A Black	2 1/2
41TC	None	285	None	50 cycles	1 1/8	5/8	29A Black	2 1/2
41UG	None	200	None	66 2/3 cycles	1 1/8	5/8	29A Black	2 1/2
41WG	None	1800	None	20 cycles	1 1/8	5/8	29A Black	2 1/2
41YG	None	285	None	60 cycles	1 1/8	5/8	29A Black	2 1/2

DIRECT CURRENT RINGER

*60CG	16	26A Black	3
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*Used in No. 160A selector set in A.C. train despatching system. Operates on two dry cells.

GENERAL NOTES ON RINGERS

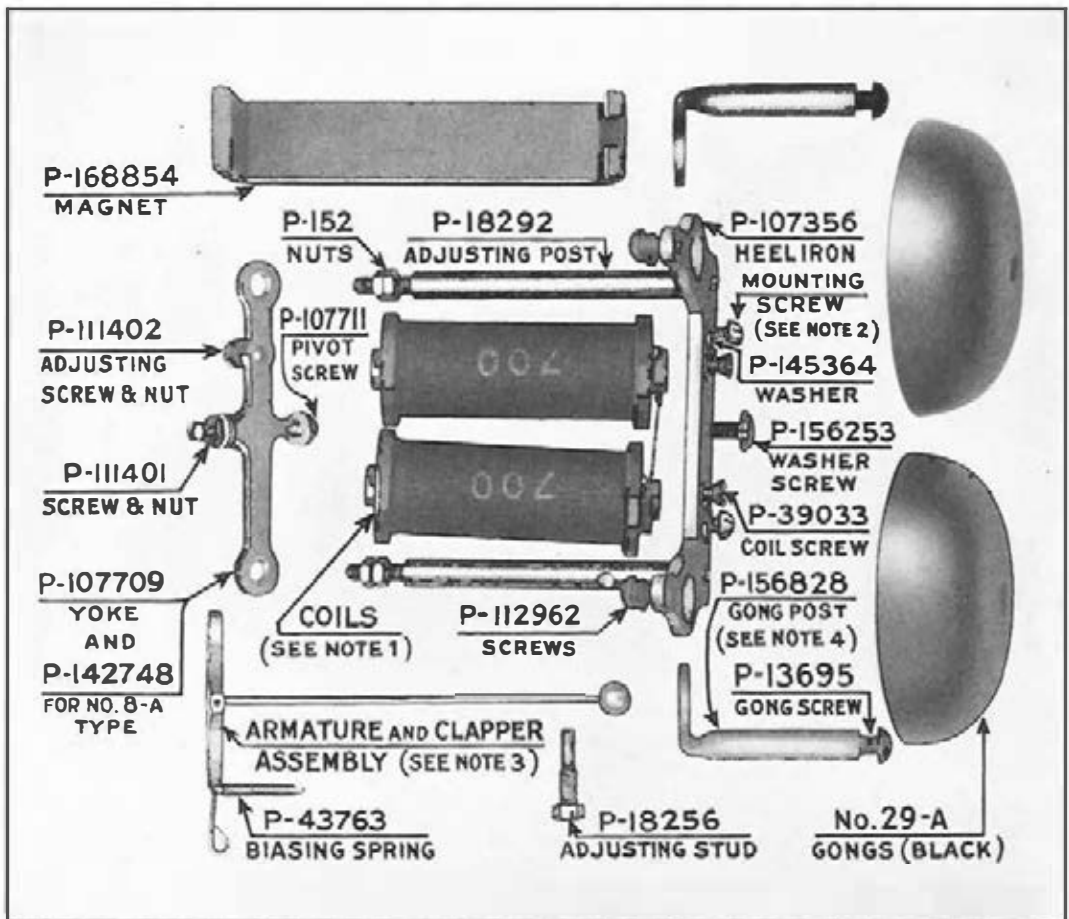
In all cases the length of the gong post is measured from the top of the hel iron to the surface on which the gong rests. This surface is $\frac{1}{8}$ inch lower than the lugs which project through the slots in the gong. Spacers to adapt the ringers to $\frac{1}{4}$ or $\frac{1}{2}$ inch woodwork will be furnished if specified in order. In ordering, specify whether ringer is to be mounted in a wooden or metal type of set.

Ringer Indicator

Code No. 1A—A manually restored indicator, consisting of a metal frame with a slide which is arranged to engage the clapper rod or a ringer.

Operation of ringer exposes a white surface on the frame.

RINGERS



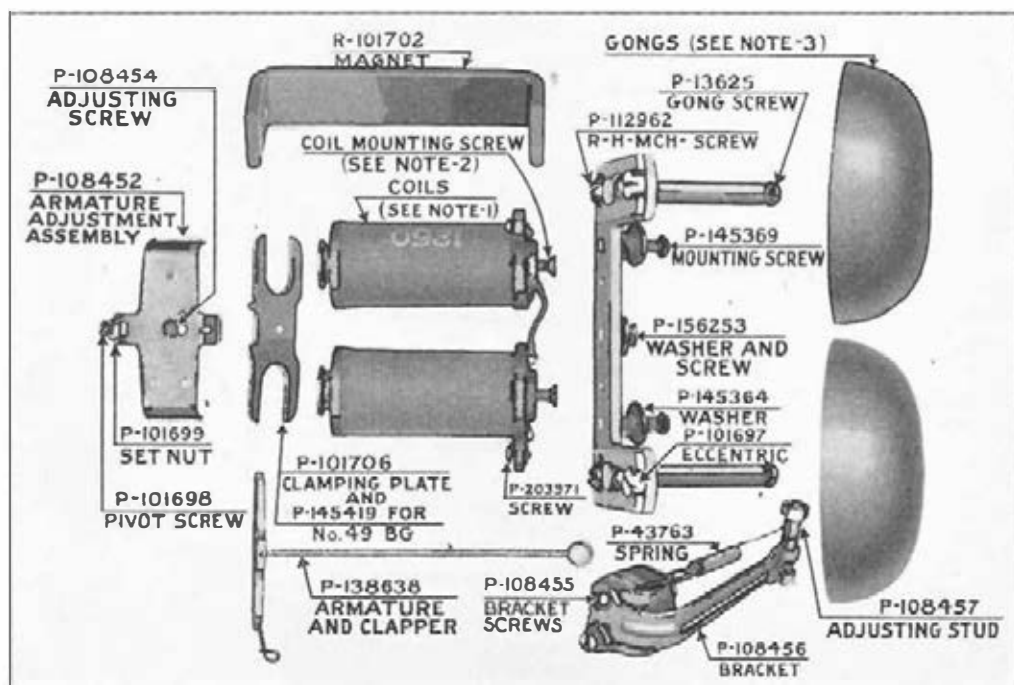
Replacement Parts

Repair parts for the Nos. 6, 8, 42 and 52 typeringers are the same as shown above with the following exceptions:

	Ringer Nos.				
	6AG	6FG	8AG	42AG	52AG
Coils (Note 1)	P-143018 (700 ohms)	P-127016 (800 ohms)	P-143018 (700 ohms)	P-127418 (500 ohms) P-133720 (500-3000 ohms)	P-127418 (500 ohms) P-133720 (500-3000 ohms)
Mounting Screw (Note 2)	P-145365	P-145365	P-145367	P-145366	P-145369
Armature and Clapper Assembly (Note 3)	P-110884	P-110884	P-146329	P-146329	P-146328
Gong Post (Note 4)	P-156828	P-156828	P-156828	P-153242	P-156829

RINGERS

(Continued)



Repair Parts of Ringers

Repair parts for the Nos. 38, 47, 50, 51, 53 and 55 type ringers are the same as shown above with the following exceptions:

Description	Ringer	Ringer
Coils (Note 1)	38AG	38BG
	47AG	47BG
	51AG	49BG
	53AG	50BG
	55AG	51BG
		53BG
		54BG
		55BG
	38FG	51 JG
	47FG	
	51FG	P-133727 (1250 ohms)
	53FG	
	55FG	
		51 JG } P-127280 (25 ohms)

Coil Mounting Screw (Note 2)

35 Type P-109804	38 Type	P-40837	47, 49 Types	P-38973
	51 Type		50, 54 Types	
	53 Type		55 Type	

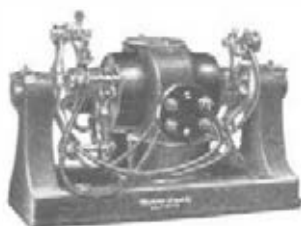
Gongs (Note 3) for various type ringers are listed with the code numbers.

RINGING MACHINES

Western Electric ringing machines are recommended for furnishing ringing current where there is heavy exchange ringing and where the equipment is expected to grow rapidly. These ringing machines are of various types to meet various operating conditions and sizes of exchanges.

Ringing Dynamotors

Ringing dynamotors are for use in exchanges as reserve equipment operated from the central office battery or where direct current power is available. They are in effect rotary transformers or converters, which change the direct current into 20 cycle alternating current and positive and negative pulsating current.



No. 4A Ringing Dynamotor

Type	Length Without Interrupter Inches	Length With Interrupter Inches	Width of Base Inches	Height Inches
4	14	27 $\frac{11}{16}$	7 $\frac{1}{4}$	9 $\frac{1}{4}$
6	16 $\frac{3}{4}$	30 $\frac{3}{4}$	9 $\frac{1}{4}$	11 $\frac{3}{4}$
7	20 $\frac{1}{4}$	34 $\frac{1}{2}$	11	13 $\frac{1}{2}$
9	26 $\frac{1}{4}$	41 $\frac{1}{2}$	12	16 $\frac{1}{4}$

RINGING DYNAMOTORS

Code No.	Type	Primary		Secondary		Starting Box Data				App. Shpg. Wt. Lbs.	Speed Limits
		Im-print Volts Rated	Range Volts	Watts	Amps.	Code No.	App. Shpg. Wt. Res.	App. Shpg. Wt. Amp.	Hand Wheel		
4A	P- $\frac{1}{4}$	20	20-23	38	.5	172	8.6	2.33	121	125	950 to 1200 R.P.M.
4B	P- $\frac{1}{4}$	110	104.5-115.5	38	.5	173	34.3	.32	121	125	950 to 1200 R.P.M.
4C	P- $\frac{1}{4}$	220	209-231	38	.5	174	1160	.19	121	125	950 to 1200 R.P.M.
6A	P- $\frac{1}{4}$	20	20-23	75	1.0	172	9.1	2.2	121	170	950 to 1200 R.P.M.
6B	P- $\frac{1}{4}$	110	104.5-115.5	75	1.0	173	270	.41	121	170	950 to 1200 R.P.M.
6C	P- $\frac{1}{4}$	220	209-231	75	1.0	174	1130	.19	121	170	950 to 1200 R.P.M.
7A	P-1	20	20-23	150	2.0	176	7.2	2.78	121	325	950 to 1200 R.P.M.
7B	P-1	110	104.5-115.5	150	2.0	177	139	.79	121	325	950 to 1200 R.P.M.
7C	P-1	220	209-231	150	2.0	178	530	.41	121	325	950 to 1200 R.P.M.
9A	P-2	20	20-23	300	4.0	180	15.7	1.31	122	470	950 to 1200 R.P.M.
9B	P-2	110	104.5-115.5	300	4.0	181	313	.35	121	470	950 to 1200 R.P.M.
9C	P-2	220	209-231	300	4.0	182	900	.24	121	470	950 to 1200 R.P.M.

Dynamotors can be equipped with interrupters. The interrupters consist of a shaft driven mechanism for providing tone test, busy back, trouble test, howler, etc. Many standard types are available and the one used depends upon the requirements of the installation. Our engineers are always ready to recommend the proper machines to meet your requirements.

Orders or inquiries should read:—

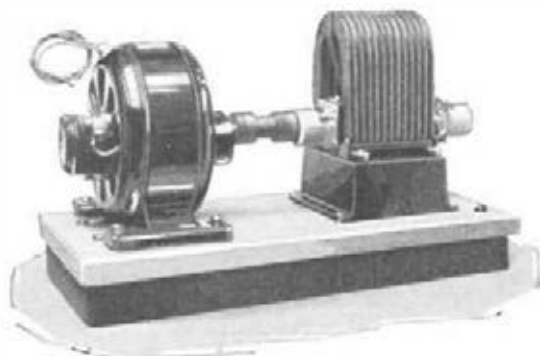
One (4B type P- $\frac{1}{4}$) ringing machine, primary volts (110 D.C.) output (38) watts, equipped with (No. 173) starting box (or (rear of board) mounting and (No. 121) hand wheel. If interrupter is desired, give detailed requirements.

Direct Connected Ringing Sets

Direct Connected Motor Generator Ringing Sets can be furnished to provide alternating current of 20 cycle frequency or with provisions for providing positive and negative pulsating current. A few of these are listed below.

Motor	Generator
Voltage	Watts
Direct Current	
19 to 28	75
19 to 28	150
19 to 28	300
Alternating Current	
Single or Three Phase	
220	75
220	150
220	300

Other sizes and combinations can be furnished when desired. Write us fully outlining your requirements and we will recommend the set best suited to your needs. Be sure and specify the voltage and frequency of the current supply, the power output and voltage of the generator where known. If the required power output is not known give us the number of lines, number of operator's positions and the total number of calls per busy hour.



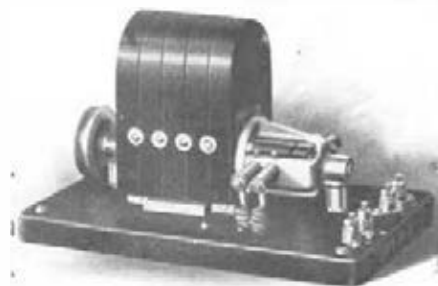
Motor Generator Ringing Set

List No.	Volts Motor	Output Watts	Type
310087	110	15	} Motor—Single phase 60 cycles A.C., 1150 R.P.M. Generator—80 volts, 19 cycles, single phase
310088	220	15	
310093	110	15	} Motor—Single phase, 25 cycles A.C., 1400 R.P.M. *Generator—110 volts, 23 cycles, single phase
310094	220	15	
310081	115	15	} Motor—D.C., 1150 R.P.M. Generator—80 volts, 19 cycles, single phase
310082	230	15	

List No.	No. Bars	Output Watts	Type
310110	12	15	Magneto Generator—80 volts, 19 cycles, single phase, 1150 R.P.M. Belt tightening sub-base and $2\frac{1}{2} \times 1\frac{1}{4}$ inches play pulley.

*This higher voltage is advisable on account of the higher frequency produced by the necessary excess speed of the 25-cycle over the 60-cycle.

No. 16A Magneto Ringing Generator

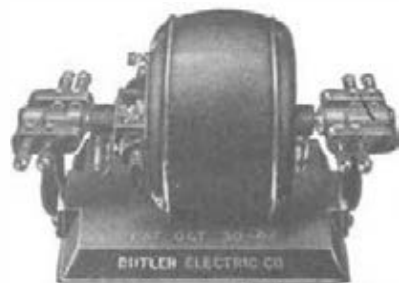


No. 16A

Code No.	Description
16A	A 5 bar, pulsating and alternating current, belt connected power generator. Delivers 106 volts A.C. and 72 volts pulsating at a speed of 1000 R.P.M. Used to furnish power ringing for telephone central offices. Mounted on a wood base 7 x 11 inches. Height, 7 inches. Has a cover for protection against dust and dirt. Equipped with a grooved pulley 2 inches in diameter.

Rotary Pole Changers

These rotary pole changers are in reality rotating interrupters, consisting of a direct or alternating current motor with a commutator for interrupting the current. They are suitable for use in telephone central offices, serving a maximum of 1500 subscribers.



Code No.	Voltage Required to Operate	Power Consumption	Special Transformer Required	Kind of Current Furnished
A-24	24 volts D.C.	8 watts	Yes	A.C. only
A-36	36 volts D.C.	8 watts	Yes	A.C. only
A-110 D.C.	110 volts D.C.	8 watts	No*	A.C. only
A-220 D.C.	220 volts D.C.	8 watts	Yes	A.C. only
A-110 A.C.	110 volts A.C.	8 watts	Yes	A.C. only
A-220 A.C.	220 volts A.C.	8 watts	Yes	A.C. only
S-24	24 volts D.C.	8 watts	Yes	} A.C. and plus. and neg. pos.
S-36	36 volts D.C.	8 watts	Yes	
S-110 D.C.	110 volts D.C.	8 watts	No*	
S-220 D.C.	220 volts D.C.	8 watts	Yes	
S-110 A.C.	110 volts A.C.	8 watts	Yes	
S-220 A.C.	220 volts A.C.	8 watts	Yes	

*Transformer required if one side of lighting circuit is grounded.

Ringing current for A.C. 110 and A.C. 220 must be taken from exchange batteries.

Orders should read:

No. rotary pole changer to operate from volts. cycles with special transformer for volts D.C.

SIGNALS



No. 32A



No. 34A shown in the operated position



No. 4E, No. 2 Mounting



No. 42A Signal on No. 79 Mounting

NO. 4 TYPE

The No. 4 type signal has two coils. When operated, an aluminum signal is lifted into a visible position, it being covered by the mounting when unoperated. The aluminum signal target is supplied numbered in black as per order but will be supplied unnumbered unless otherwise specified. The No. 4A and No. 4E have a local contact which is closed when the signal is operated. The No. 4J is not provided with a local contact; the armature of the No. 4J is provided with a counterweight to balance the target.

This type is used principally as a line signal in private branch exchanges employing magnetic signals and operating on a central battery basis. Mounts on 1 3/8 inch centers.

Code No.	4-A	4-E	4-J	} Used with Signal Mounting Nos. 2, 3, 94A, 95A
Resistance (ohms)	98	500	400	

NO. 32 TYPE

The face of the No. 32 type signal is entirely black in the unoperated positions. When operated, a target is lifted into position so as to register white in the slots in the signal face, thus giving visible indication of operation. These signals have no local contacts. Mounts on 1 1/4 inch centers.

The Nos. 32B and 32C have a single winding; the No. 32A has two windings, one inner inductive winding of 50 ohms and an outer non-inductive winding of 100 ohms. The resistance value given in the table below is for both windings in parallel.

Code No.	32-A	32-B	32-C
Resistance (ohms)	33	50	525

NO. 34 TYPE

The No. 34 type signal has one coil with a single winding. When operated, an aluminum target is displayed as shown in the illustration. In the unoperated position, the opening in the signal face is not filled by the target. The signals will be furnished unnumbered unless otherwise specified, but, if so ordered, they will be supplied with black numbers on the aluminum target. When so desired, No. 129 type number plates may be used with these signals and the number on the target omitted.

Each No. 34 type signal has a single local contact which is closed in the operated position.

These signals are used as line signals in the No. 9 switchboard and in the trunk circuits of the old No. 105 Magneto Switchboard. They will mount on 1 1/2 inch horizontal and 1 3/8 inch vertical centers.

Code No.	34-A	34-B	34-C	34-D	} Used with Signal Mounting Nos. 34, 60, 61, 62, 96, 97
Resistance (ohms)	86	300	900	525	

NO. 41 TYPE

The No. 41 type signal is similar in general construction to the No. 34 type. The coil has two parallel windings; the resistance given below is the value of each individual winding. These signals will mount on 1 1/4 inch horizontal and 1 3/8 inch vertical centers. Numbered in black on the aluminum target when so specified in order but otherwise furnished unnumbered.

Each No. 41 type signal is provided with a cross-talk proof shelf.

This type signal has a local contact, both sides of which are brought out to terminals. The No. 41A signal has this contact normally open; the No. 41B is arranged so that the contact is closed when the signal is in the unoperated position.

These signals are used in the cord circuits of the No. 9 switchboards.

Code No.	41-A	41-B	} Used with Signal Mounting No. 60
Resistance (ohms)	30 (each)	100 (each)	

NO. 42A TYPE

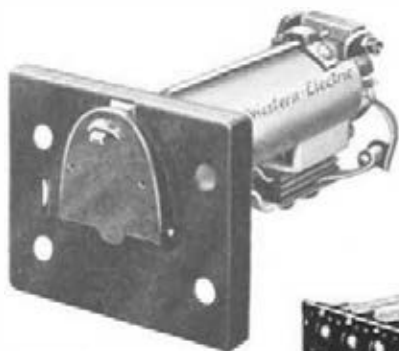
The No. 42 type signal has one coil with a single winding. There are no local contacts. The illustration shows all but three of the signals in the No. 79 mounting in their unoperated position. The aluminum target is lifted into place when the signal is operated as shown in the cut. A designation strip on the mounting is used for numbering the signals.

The mounting centers are: horizontal, 3/4 inch, vertical 3/8 inch.

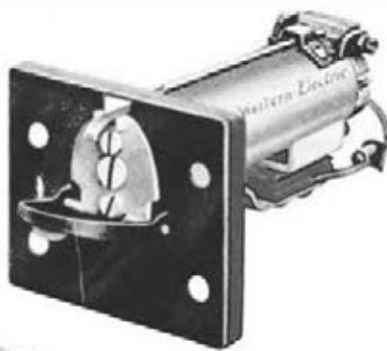
The No. 42 type is used as a busy signal with multiple toll line jack; they mount in the same centers as the jacks.

Code No.	(Resistance Ohms)	Used with Signal Mountings No.
42A	100	75, 77, 78, 79, 82, 83, 105

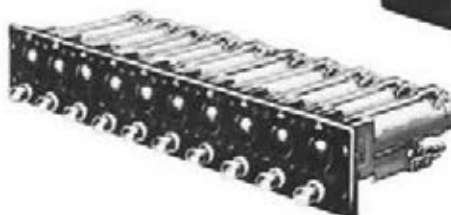
SUPERVISORY SIGNALS AND SIGNAL MOUNTINGS



No. 34C Supervisory Signal
Shutter Restored
(on No. 93A Mounting)



No. 34C Supervisory Signal
Shutter Operated



No. 10C Supervisory Signals on No. 88D Mounting

Supervisory Signals

Code No.	Approximate Resistance, Ohms	Description	Mountings No.
10C	240	A magneto supervisory signal similar to the No. 22 type combined jack and signal, except that the jack springs are omitted and a push button for restoring the signal ball is added.	80D, 81D and 88D
34C	330	A manually restored, electrically operated shutter type magneto supervisory signal, to be used in connection with No. 22 type combined jack and signal or as a line signal.	90A, B, C, 93A, 99A

Note. For replacement parts, refer to No. 22 Type "Combined Jack and Signal" shown elsewhere.



No. 62 Signal Mounting

Signal Mountings

The following mountings are those commonly used with the various classes of signals as listed. They are metal mountings with black finish faces.

Code No.	For Signals	No. of Signals per Strip	Size of Plate, Inches	Code No.	For Signals	No. of Signals per Strip	Size of Plate, Inches
2	4 type	10	15 x $\frac{1}{8}$	82	42 type	10	11 $\frac{3}{8}$ x $\frac{7}{8}$
3	4 type	15	22 x $\frac{1}{8}$	83	42 type	20	11 $\frac{1}{8}$ x $\frac{7}{8}$
34	34 type	20	24 $\frac{1}{8}$ x 1 $\frac{3}{8}$	94A	4 type	5	7 $\frac{3}{8}$ x 1 $\frac{1}{2}$
60	34, 41 type	15	24 $\frac{1}{8}$ x 1 $\frac{3}{8}$	95A	(Mounts 3 No. 56 drops and 7 No. 4 type signals)		13 $\frac{1}{8}$ x 1 $\frac{3}{8}$
61	34 type	20	24 $\frac{1}{8}$ x 1 $\frac{3}{8}$	96	34 type	15	21 x 1 $\frac{3}{8}$
62	34 type	12	21 x 1 $\frac{3}{8}$	97	34 type	15	21 $\frac{3}{4}$ x 1 $\frac{3}{8}$
*77	42 type	10	9 $\frac{1}{8}$ x $\frac{7}{8}$	*105	42 type	20	9 $\frac{1}{8}$ x 1 $\frac{1}{8}$
*78	42 type	10	7 $\frac{3}{8}$ x $\frac{7}{8}$				
*79	42 type	20	9 $\frac{1}{8}$ x $\frac{7}{8}$				

*Note. Upper part of face equipped with designation strip.

SIGNAL MOUNTINGS AND PLUGS

Signal Mountings (Continued)

Code No.	For Signals	No. of Signals per Strip	Size of Plate, Inches	Code No.	For Signals	No. of Signals per Strip	Size of Plate, Inches
FOR COMBINED JACKS AND SIGNALS							
80B	2, 3, 6, 7, 8, 9, 12	1	1 $\frac{1}{8}$ x 2 $\frac{1}{4}$	89C	24, 31	5	6 $\frac{3}{4}$ x 1 $\frac{3}{4}$
80C	4, 5, 11	1	1 $\frac{1}{8}$ x 2 $\frac{1}{4}$	89D	23, 52, 55	5	6 $\frac{3}{4}$ x 1 $\frac{3}{4}$
81E	2, 3, 6, 7, 8, 9, 12	5	6 $\frac{3}{4}$ x 1 $\frac{3}{4}$	92B	22, 23, 26, 27	1	1 $\frac{1}{8}$ x 2 $\frac{1}{4}$
81F	4, 5, 11	5	6 $\frac{3}{4}$ x 1 $\frac{3}{4}$	92C	24, 31	1	1 $\frac{1}{8}$ x 2 $\frac{1}{4}$
89B	22, 23, 26, 27	5	6 $\frac{3}{4}$ x 1 $\frac{3}{4}$				
FOR SUPERVISORY SIGNALS							
80D	10, 13	1	1 $\frac{1}{8}$ x 2 $\frac{1}{4}$	90C	34C	5	6 $\frac{3}{4}$ x 1 $\frac{3}{4}$
81D	10, 13	5	6 $\frac{3}{4}$ x 1 $\frac{3}{4}$	93A	34C	1	1 $\frac{1}{8}$ x 2 $\frac{1}{4}$
				99A	34C	10	11 $\frac{1}{4}$ x 1 $\frac{3}{4}$

Nos. 1, 2, 3 and 4
Type Signal PlugNos. 5 and 6 Type
Signal Plug

Signal Plugs

The Nos. 1, 2, 3 and 4 types are metal plugs which are inserted in a jack to designate a change of number, line temporarily disconnected, line arranged for calling only, or similar purposes. Heads are covered with opaque celluloid paint.

The white heads of the Nos. 1A and 3A may be written upon.

Code No.	Color of Head	—Dimensions, Inches—		Code No.	Color of Head	—Dimensions, Inches—	
		Diameter of Head	Overall Length			Diameter of Head	Overall Length
FOR NO. 49 AND NO. 193 JACKS							
1A	White	$\frac{27}{64}$	} $\frac{11}{16}$	2E	Yellow	} $\frac{27}{64}$	} $\frac{11}{16}$
2B	Red	$\frac{27}{64}$		2F	Blue		
2C	Slate	$\frac{27}{64}$		2G	Dark Green		
2D	Black	$\frac{27}{64}$		2H	Light Green		
FOR NO. 92 JACKS							
3A	White	$\frac{23}{64}$	} $\frac{11}{16}$	4E	Yellow	} $\frac{15}{64}$	} $\frac{11}{16}$
4B	Red	$\frac{17}{64}$		4H	Light Green		
4D	Black	$\frac{17}{64}$					

The Nos. 5 and 6 type signal plugs are used as line markers for indicating lines in trouble, spare jacks, etc. The metal shank is slotted in two directions and the head has a white celluloid face which may be written upon. The sides of the plug head are colored as indicated in the table.

The No. 7A signal plug has black finish face and is engraved with one or two letters, $\frac{3}{32}$ in. high, or three letters, $\frac{1}{8}$ in. high as per order. Engraving is filled white.

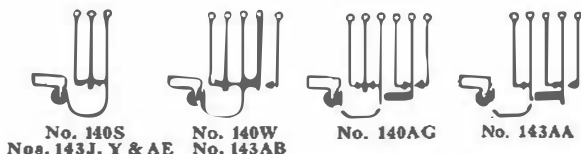
The No. 8A is similar to the No. 7A except it is engraved with one or two letters $\frac{1}{8}$ in. high or three letters $\frac{3}{32}$ in. high as per order.

Code No.	Color of Face	Color of Side Head	Length of Side Head	Overall Length	Diameter Inches
FOR NO. 49 AND NO. 193 JACKS					
5A	White	Red	$\frac{1}{2}$	1 $\frac{3}{32}$	$\frac{11}{32}$
5B	White	White	$\frac{1}{2}$	1 $\frac{3}{32}$	$\frac{11}{32}$
5C	White	Blue	$\frac{1}{2}$	1 $\frac{3}{32}$	$\frac{11}{32}$
7A	Black	.....	..	1 $\frac{3}{32}$	$\frac{11}{32}$
FOR NO. 92 JACKS					
6A	White	Red	$\frac{1}{2}$	1 $\frac{3}{32}$	$\frac{11}{32}$
6B	White	White	$\frac{1}{2}$	1 $\frac{3}{32}$	$\frac{11}{32}$
6C	White	Blue	$\frac{1}{2}$	1 $\frac{3}{32}$	$\frac{11}{32}$
8A	Black	.....	..	1 $\frac{3}{32}$	$\frac{11}{32}$

SWITCH HOOKS



No. 143Y



No. 140S

Nos. 143J, Y & AE

No. 140W

No. 143AB

No. 140AG

No. 143AA

No. 140 and 143 Types

The Nos. 140 and 143 type switch hooks are simple, compact and self-contained. The switch hook lever is made of brass with black finish and is designed to withstand rough usage. The bracket is made of steel and is extremely rigid. The springs are of nickel silver and are backed up with brass stop springs. The movement of the lever is limited by stops, making it impossible for the springs to be damaged. The switch lever pivots on a fulcrum pin which is normally locked in position by means of a retaining spring. This pin may be readily removed with the fingers, when desired.

All iron and steel parts have an electro-galvanized finish to thoroughly protect them against rusting.

Mechanical contact is made between the lever and the tension spring through a hard rubber roller to minimize friction. All current carrying parts are insulated from the bracket.

Except for the No. 143AE these switch hooks are designed for use with standard hand receivers (Nos. 143AW and 144AW).

The No. 140 type switch hooks are intended for use in metal telephones (Nos. 1533 and 1553 types and, therefore, no escutcheons are provided.

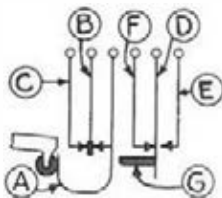
The No. 143 type switch hooks mount by means of four machine screws which pass through clearance holes in the escutcheon and thread into tapped holes in the switch hook bracket. Screws of suitable length for mounting in $\frac{1}{2}$ inch woodwork are furnished unless otherwise specified.

****Code Nos.** 140S 140W 140AG 143J* 143Y 143AA 143AB 143AE†

*No. 143J is treated to resist action of moisture and fumes.

†No. 143AE is equipped with special lever for use with head band receiver only.

**Refer to spring contact arrangements above.



Symbols

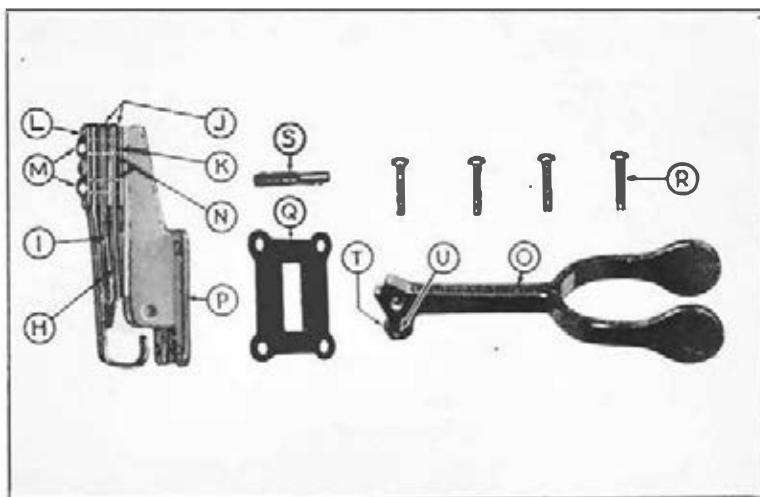
Switch Hook Replacement Parts

CONTACT SPRING PARTS

Switch Hook Code Numbers

Symbol	140S	140W	140AG	143J	143Y	143AA	143AB	143AE
A	P-121484	P-121484	P-121484	P-121484	P-145644	P-145644	P-145644	P-162207
B	P-145633	P-145633	P-145633	P-145633	P-145633	P-114095	P-145633	P-145633
C	P-114097	P-114097	P-114097	P-114097	P-114097	.....	P-114097	P-114097
D	.....	P-114098	P-145831	.....	.....	P-145827	P-145825	.....
E	.....	P-114097	P-114095	.....	.....	P-114095	P-114097	.....
F	.....	.....	P-114095	.....	.....	P-114095	.....	.....

SWITCH-HOOKS AND FOOT SWITCHES



Switch-Hook Replacement Parts (continued)

Symbol		Switch-Hook Code Numbers							
		140S	140W	140AG	142Y	143J	143AA	143AB	43AE
G	Spring Separator	P-112938	P-44454	P-106209	P-112938	P-112937	P-106209	P-44454	P-112937
H	Stop Spring	P-112693	P-112938	P-112938	P-112693	P-112692	P-112692	P-112937	P-112692
I	Insulators	P-44448 (4)	P-44448 (5)	P-44448 (7)	P-44448 (4)	P-44448 (4)	P-44448 (6)	P-44448 (5)	P-44448 (4)
J	Steel Spacers	P-157542 (4)	P-157542 (5)	P-157542 (7)	P-157542 (4)	P-157542 (4)	P-157542 (9)	P-157542 (5)	P-157542 (4)
K	Steel Spacer	P-157541	P-157541	P-157541	P-157541	P-157541	P-157541	P-157541	P-157541
L	R.H.M. Screw	P-147781 (2)	P-157544 (2)	P-114035 (2)	P-147761 (2)	P-147761 (2)	P-114035 (2)	P-157544 (2)	P-147761 (2)
M	Washers	P-139186 (2)	P-129907 (2)	P-111760 (2)	P-139186 (2)	P-139186 (2)	P-157547 (2)	P-129907 (2)	P-139186 (2)
N	Switch-hook	P-123514	P-123514	P-123514	P-123514	P-123514	P-123514	P-123514	P-139256
O	Bracket and Springs, Complete	P-145648	P-145812	P-161134	P-145802	P-145646	P-145806	P-145807	P-158821
Q	Escutcheon	P-38335 (4)	P-38335 (4)	P-38335 (4)	P-139277	P-136748	P-136748	P-136748	P-136748
R	Mtg. Screws	P-158139	P-158139	P-158139	P-107892 (4)	P-40830 (4)	P-40830 (4)	P-40830 (4)	P-40830 (4)
S	Fulcrum Rim	P-128282	P-128282	P-128282	P-158139	P-158139	P-158139	P-158139	P-158139
T	Roller and Rivet and sleeve	P-128283	P-128283	P-128283	P-128282	P-128282	P-128282	P-128282	P-128282
U-1		P-111165	P-111165	P-111165	P-128283	P-128283	P-128283	P-128283	P-128283
U-2					P-111165	P-111165	P-111165	P-111165	P-111165

Note. Numbers in parentheses indicate total numbers of parts required.

Foot Switches



No. 1B Foot Switch

Code No.	Springs	Used
1B	Makes one contact.	In dispatcher's telephone set.
3B	Makes two and breaks one contact.	In way station telephone sets.
3C	Makes three and breaks two contacts.	In way station telephone sets with No. 501B desk set boxes.

FOOT SWITCH ATTACHMENTS

Code No.	Length, Ins.	Use and Description
1A	12	With all types foot switches.
1B	24	With all types foot switches.
2A	23	A $\frac{3}{4}$ inch black enamelled conduit equipped with a $\frac{3}{4}$ inch T. & B. bushing (List No. 97760) at one end also includes pipe strap No. 97295 and two wooden screws for mounting. Used to protect wires entering foot switches.



No. 1A Foot Switch Attachment

SWITCH HOOKS AND SWITCHBOARD WIRE



No. 141A Switch Hook

Switch Hook

Code No.	Use and Description
141A	A nickel plated brass hook having a wood screw thread at one end and provided with a stop escutcheon. Overall length, 2 $\frac{1}{8}$ inches. Intended for use with No. 1002 and No. 1003 type hand sets.
145A	A cast brass nickel plated auxiliary hook designed so that it may readily be secured to the No. 1048 type transmitter arms.

Switchboard Wire

Single conductors are furnished in 14, 16, 18, 19, 20, 22 and 24 B. & S. gauge sizes.

Twisted pairs are furnished in 16, 18, 19, 20, 22, and 24 B. & S. gauge sizes.

Triple conductors are furnished in 19, 22 and 24 B. & S. gauge sizes.

Quadruple conductors are furnished in 19, 22 and 24 B. & S. gauge sizes.

Cross-Connecting or Distributing Frame Wire

Jumper Wire

This wire, usually known as jumper wire, is made in single, twisted pair, triple and quadruple conductors.

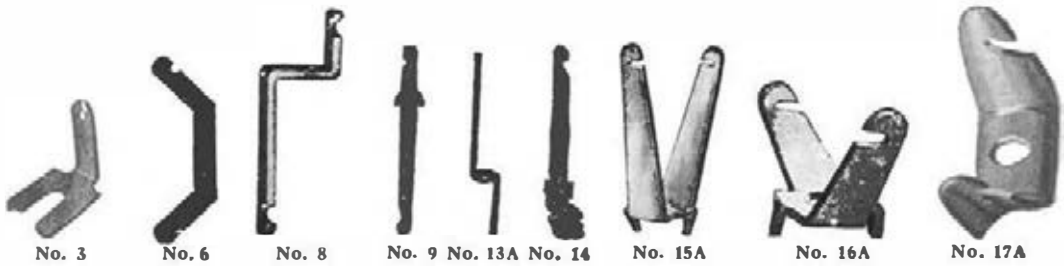
This cross-connecting wire is made in No. 20 and No. 22 B. & S. gauge tinned copper wire, rubber covered and having a flame-proof cotton braid.

Furnished in 200-foot and to 100-foot coils.

Code No.	Size (B. & S. Gauge)	Number of Conductors	Color
R-20S	20	1	Brown
R-20P	20	*2	Brown, Black
R-20T	20	*3	Brown, Black, Red
R-20F	20	*4	Brown, Black, Red, Green
R-22S	22	1	White
R-22P	22	*2	White, Black
R-22T	22	*3	White, Black, Red
R-22F	22	*4	White, Black, Red, Green

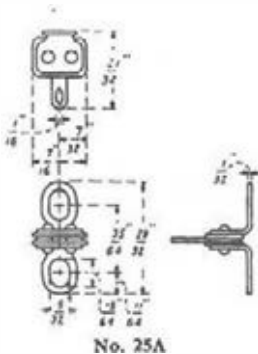
*Conductors are twisted together.

TERMINAL PUNCHINGS



TERMINAL PUNCHINGS

Code No.	Material	Use
3	Nickel Silver.	On fuse posts and fuse blocks.
6	Brass, tinned ends.	For the ground side of ringing leads.
8	Brass, tinned ends.	On double sided connecting racks.
9	Brass, tinned ends.	On No. 10 switchboards.
13A	Brass, dip tin finish.	On double sided connecting racks.
13B	Brass, dip tin finish.	Similar to No. 13A, except $\frac{1}{2}$ in. shorter.
14	Brass, one end tinned.	For screw connection on one end.
15A	Brass, tinned ends.	On one sided connecting racks.
16A	Brass, tinned ends.	On repeating coils and retardation coils.
17A	Brass, tinned ends.	On induction coils and telephone coils.
21A	Brass, dip tin finish.	On repeating coils, induction coils and retardation coils.



SWITCH BOARDS

Telephone Switchboards and Systems

Western Electric telephone switchboards represent the result of over fifty years experience in the manufacture and design of telephone central office equipment. By virtue of its position as the largest as well as the oldest manufacturer of telephone equipment, the Western Electric Company has been a big factor in the development of the telephone art to its present degree of perfection. As a result their switchboard equipment incorporates material, apparatus, circuits and design features which have been found essential for the successful operation of modern telephone systems.

These switchboards are the result of continuous efforts by this great organization to build equipment which is simple in operation, durable in construction, economical in maintenance, and highest in efficiency, incorporating such new features as experience suggests and modern telephone practice demands.

The smaller switchboards are fully described and will be found adequate to meet the requirement of every non-multiple central office. The larger central offices must of necessity be designed to care for the individual requirements of each exchange area. Western Electric engineers are equipped to make studies and recommend correct central office equipments for any part of the world.

AUDIBLE CODE SIGNALING

To enable the switchboard operator to distinguish various code rings on bridging lines an "audible code signaling" feature can be provided. This is accomplished by using No. 6 or No. 26 type combined jacks and signals, having a local contact which is closed during the ringing interval. This contact operates a local alarm bell circuit, which repeats the codes sounded.

CENTRAL OFFICE SELECTIVE SIGNALING

This signifies that the subscriber can signal the central office without ringing the other bells on a rural line, or signal the other parties on the line without operating the switchboard signal. For this service the No. 7 or No. 27 type combined jacks and signals are used, permitting one side of the signal winding to be connected to ground. Push button type telephones are used on these lines.

For diagram and information on telephones, see descriptive matter under "Magneto Telephone" sets.

COMBINED JACK AND SIGNAL

This is the term given to the Western Electric line signal where the jack is mounted immediately under its associated signal. These signals are automatically restored when the answering plug is inserted.

CORD CIRCUIT, COMBINATION

This type of cord circuit is so designed that one cord of the pair may be used on either central battery or magneto lines, the other cord being used for one class of service only. The latter may be either central battery or magneto, depending upon the class of service involved.

CORD CIRCUIT, UNIVERSAL

This type of cord circuit is so designed that each of the two connecting cords is adapted for making connections with either magneto or central battery lines. The circuit automatically adapts itself to either class of service by the operation of relays which form a part of the circuit. The circuit may be used for connecting two magneto lines and two central battery lines or one magneto line and one central battery line.

CORD CIRCUIT, JACK LISTENING TYPE

In this type of cord circuit the operator can listen in on a line by inserting the plug of the listening cord into a listening jack. One of these listening jacks is associated with each pair of connecting cords. Plugging in the listening cord bridges the operator's telephone set across the line.

SWITCH BOARDS**Telephone Switchboards and Systems**

(Continued)

CORD CIRCUIT, KEY LISTENING TYPE

In this type of cord circuit the operator can listen in on a line by merely operating the listening key handle of a cord circuit key. One of the keys is associated with each pair of cords and the corresponding supervisory drop.

CORD CIRCUIT, NON-HANG-UP TYPE

In this type of cord circuit it is possible under all conditions for both subscribers, at the completion of a conversation, to operate the clearing-out signal on the operator's cord circuits.

CORD CIRCUIT, NON-RING-THROUGH TYPE

This type of cord circuit is so equipped that it is impossible for any subscriber in "ringing-off" to ring any of the bells on the connected line.

CORD CIRCUIT, NON-HANG-UP NON-RING-THROUGH TYPE

This type of cord circuit includes the features of the non-hang-up and the non-ring-through circuits.

LINES WITH LINE RELAYS

In central battery private exchanges and private branch exchange switchboards, it is necessary to use line relays in order to operate lines that have over 30 ohms resistance. This corresponds approximately to an 800 foot line of No. 22 or a 1600 foot line of No. 19 B.&S. gauge copper wire.

REPEATING COILS IN MAGNETO SWITCHBOARDS

These are sometimes used at the switchboard end of a grounded circuit to eliminate noise when connecting metallic circuits. They are also used in cord circuits to provide the "non-hang-up, non-ring-through" feature. Repeating coils are also used in connection with cord circuits to connect noisy or unbalanced lines

RINGERS USED AS SWITCHBOARD LINE SIGNALS

Ringers are slightly more sensitive than drops or signals, and are sometimes used on extremely long lines. They are also used sometimes where audible code signaling is desired. The Western Electric audible code signaling drop provides this feature without the sacrifice of the additional space required in which to mount ringers.

RINGER INDICATORS

These are provided on the ringers used in place of signals or drops where the operator is not constantly at the switchboard. They indicate which line has been calling by means of a sliding shutter actuated by the motion of the clapper.

RINGING, ONE WAY

This provides for ringing on the calling (front or nearest the operator) cords only.

RINGING, TWO WAY

This provides for ringing on the calling (front or nearest the operator) and also upon the answering (back or farthest from the operator) cords.

RINGING KEYS, INDIVIDUAL, FOR PARTY LINES

In this case the various parties on the party line can be signaled selectively by means of the cord circuit key associated with each cord circuit.

RINGING KEYS, MASTER, FOR PARTY LINES

In this case, the various parties on the party line can be signaled selectively, only when a master ringing key operated in conjunction with a cord circuit key. There is one master key for each operator's position.

SWITCH BOARDS

Telephone Switchboards and Systems

(Continued)

RINGING COMBINATIONS

For further information on classes of ringing service see preceding pages of telephone terms.

Single party, one-way or two-way ringing provides for ringing one telephone only over the calling cord or over the calling or answering cord, respectively.

Two-party, one-way, selective individual or selective master key (divided circuit) provides for ringing one of two parties on the same line selectively over the calling cord only.

Two-party, two-way, selective individual or selective master key (divided circuit) provides for ringing one of two parties on the same line selectively over either calling or answering cord.

Four-party, one-way, pulsating individual or pulsating master key provides for signaling one of four parties on the same line selectively, over the calling cord only, by means of positive or negative pulsating current over either side of the line to ground.

Four-party, two-way, pulsating individual or pulsating master key provides the same service as the preceding combination except that ringing current can be sent out over either calling or answering cord.

Four-party, one-way, harmonic individual or harmonic master key provides for signalling one of four parties on the same line selectively, over the calling cord only, by means of harmonic current. In this case, the telephone ringers ring only when alternating current of a given frequency is sent over the line.

Four-party, two-way, harmonic individual or harmonic master key provides for the same service as the preceding combination except that ringing current can be sent out over either calling or answering cord.

Eight-party, one-way, harmonic individual or harmonic master key provides for the same service as the corresponding **four-party** combination except that any one of the eight parties on the same line can be signaled selectively over the calling cord only.

Eight-party, two-way, harmonic master key provides for the same service as the corresponding eight-party combination except that any one of the eight parties on the same line can be signaled selectively over either calling or answering cord.

SUPERVISORY SIGNAL, MAGNETO

This signal, also known as a clearing-out drop, consists of a drop bridged across each cord circuit to indicate when a conversation has been completed. The current for operating this drop is furnished by the ring-off signal from the subscriber's telephone set generator.

SUPERVISORY SIGNAL, CENTRAL BATTERY

This consists of a lamp associated with each cord of the cord circuit. This lamp lights when a conversation is completed and the subscriber hangs up his receiver. It remains lighted until the connection is taken down. When making a connection, the lamp on the calling cord remains lighted until the called-for subscriber answers.

SUPERVISION, SINGLE

This term is used to describe a telephone switchboard cord circuit having only one "clearing-out" or "ring-off" drop. (For diagrams see description of No. 1200 type switchboards.)

SUPERVISION, DOUBLE

This term is used to describe a cord circuit having two "clearing-out" or "ring-off" drops or two supervisory lamps, one per cord. (For diagrams see description of No. 1200 type switchboards.)

THROUGH TOLL LINES

These toll lines are those that loop through an intermediate office. For example, when a toll line connects A and C, and passes through an intermediate office B, code signaling is employed. A and C are called with one ring, and B with two rings.

By means of "cutoff" jacks at B, the one line is made to act as three. That is, either as a through circuit between A and C, or as two local circuits; one between A and B and the second between C and B.

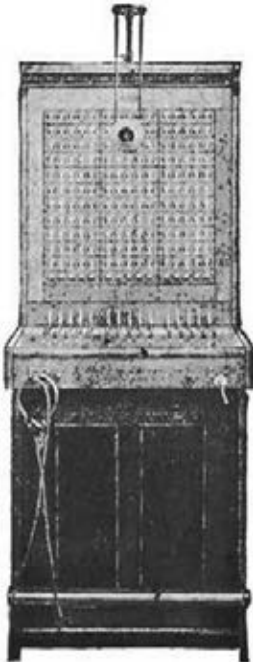
TRANSFER CIRCUITS

These are used where a switchboard consists of two or more positions and a number of the subscriber line jacks are out of the reach of any one operator. The transfer circuits provide a means of extending the cord circuits to the positions in which the jacks appear.

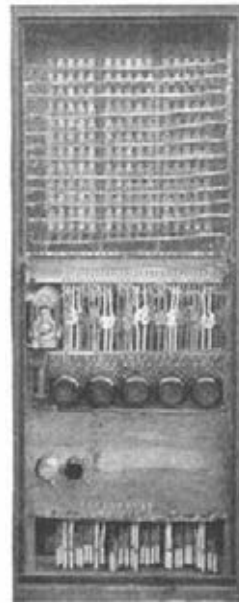
TRUNK, RECORDING TOLL

This is a trunk circuit between the local switchboard and the toll switchboard that makes it possible for subscribers desiring toll connections to get in direct communication with the recording toll operator. When it is known that it will take some time to complete the toll call, the operator tells the subscriber to hang up and can then call him back to the line over the trunk.

SWITCHBOARDS—MAGNETO NON-MULTIPLE



Front View
No. 1240D Switchboard



Rear View
No. 1240D Switchboard

No. 1240D Switchboard

Capacity 165 Lines 15 Cord Circuits

This standard efficient magneto switchboard has been giving universal satisfaction in all parts of the United States and foreign countries. Designed by the largest corps of telephone engineers in the world and equipped with reliable, efficient apparatus, it has met with the approval of operating companies requiring magneto switchboards that insure a long life of service, coupled with economical operating and maintenance.

Where more than 165 lines are required several sections may be lined up with good results. This has been done in numerous cases and the desired capacity obtained without any complications. All of the apparatus used in this switchboard has been proven reliable and efficient in operation, by many years of service, it being economical to maintain and exempt from repairs to an exceptional degree.

The operation of the No. 1240-D switchboard is simple and easily performed for the line jacks are so grouped as to be within easy reach of the operator, reducing that work to a minimum.

The Framework

The lumber used in the construction of the cabinet is red oak, thoroughly seasoned and kiln dried to prevent warping or cracking. All joints in the woodwork are tongued and grooved and securely fastened with the best quality of glue, no butt joints being used. Steel angles are installed inside of the cabinet at the corners giving additional strength to the cabinet.

The exterior of the cabinet is given a dull golden oak finish which is very serviceable. As an added precaution against warping, cracking or decay the interior surfaces are coated with shellac.

The steel framework which supports the face equipment is copper plated as a protection against corrosion or rust, also insuring a positive ground connection for the apparatus. This framework is fastened to the cabinet in a secure manner which insures a permanent, rigid support for the drops and jacks in the face of the board. The front panel, and the rear door are removable which permits easy access to all of the equipment.

The keyshelf is twenty-four (24) inches wide allowing ample space for the operator. The keys are mounted upon cold drawn galvanized steel bars which are supported at either end by steel reinforcing details and fastened to these bars with machine screws. Thus a perfect, rigid alignment is obtained for the keyboard equipment as the machine screws do not loosen by the operation of the keys.

SWITCHBOARDS—MAGNETO NON-MULTIPLE

• No. 1240D Switchboard

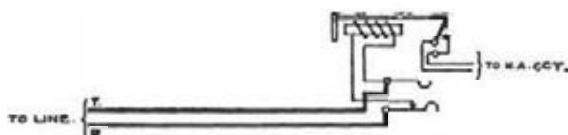
(Continued)

The cordshelf, upon which the cord terminals are mounted, is located where inspection or repairs can be made conveniently. All terminals are plainly marked.

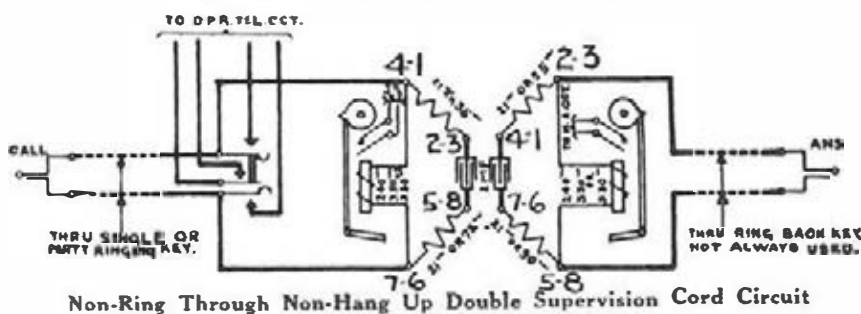
An apparatus and terminal board is mounted in the rear of the switchboard on which are mounted the repeating coils, night alarm bell, and large screw terminals where all power wiring such as power ringing, transmitter battery, night alarm battery, monitor tops, etc., are terminated.

The Line Circuits

The line circuits are equipped with the efficient No. 22C combined jack and signal mounted five per strip consisting of the well known shutter type drop and cut-off jack which have been standard equipment on Western Electric magneto switchboards for many years. The drops are self restoring upon insertion of the plug in the jack, positive in action and will not stick. Removable number plates with large characters are mounted on the shutters of the drops. The night alarm springs are insulated from the jack springs and the design insures reliable operation of the night alarm circuit.



Line Circuit No. 1240-D Switchboard

Non-Ring Through Non-Hang Up Double Supervision Cord Circuit
No. 1240 Switchboard

The Cord Circuits

The local cable in this switchboard is so arranged that any of the various standard type of cord circuits may be equipped as follows:

Single supervision, without repeating coil.

Single supervision, with repeating coil and cutout key (cords No. 1 to 5).

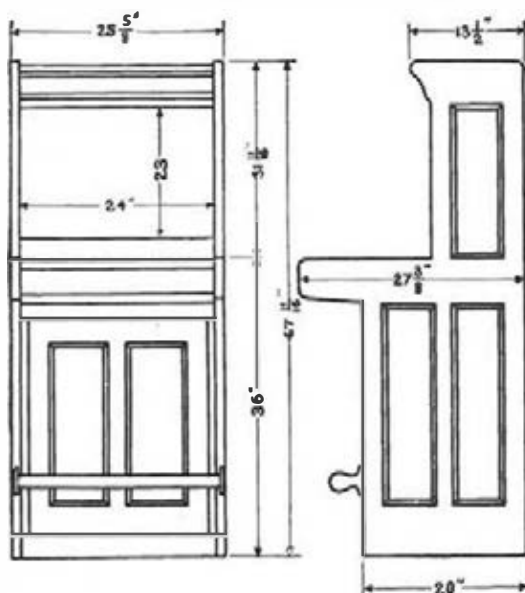
Double supervision, "non-ring through," "non-hang-up" with repeating coil.

Double supervision, practically "non-ring through," "non-hang-up" without repeating coil.

The supervisory (ring off) signals are of the manually restored shutter type drops equipped with number plates having large characters easily distinguishable by the operator. The cords are installed in accordance with the standard distinctive color scheme, each pair alternating red, white and green in the order named. This is a great help to the operator in locating cord pairs to take down connections corresponding to the "ring off" drop which has been operated, also reducing the possibility of error to a minimum.

The keys are of the type and design that have been giving service for years in the largest switchboards. They are so arranged that the springs are easily accessible for inspection when the keyshelf is open. These springs are constructed of metal having the proper resiliency which will insure good contact both in the normal and operated positions. They are positive in action and designed for long life service.

SWITCHBOARDS—MAGNETO NON-MULTIPLE



Dimensions No. 1240-D Switchboard

No. 1240-D Switchboard (Continued)

OTHER CIRCUITS

The ringing circuit is equipped with a powerful five bar hand generator. The local wiring is universal in that any of the following ringing combinations may be equipped as required:

Single party, two way	Four party, two way, pulsating master key
Two party, one way selective, individual key	Four party, one way, harmonic, individual key
Two party, two way, master key	Four party, two way, harmonic, master key
Four party, one way, pulsating, individual key	Eight party, two way, harmonic, master key.

The operator's telephone circuit is furnished with the standard receiver and transmitter known the world over for their high transmission efficiency. Ordinarily the suspended type transmitter is used although the chest type instrument can be used if desired as the wiring is in place for either type.

The night alarm circuit is equipped with a reliable loud ringing vibrating bell operated with dry batteries and a night alarm key for cutting the bell off or on as required. This key, together with the operators telephone jacks and ringing generator crank are located conveniently in the front of the keyshelf rail.

All of the following features are provided for and may be included without difficulty either before or after the switchboard is placed in service:

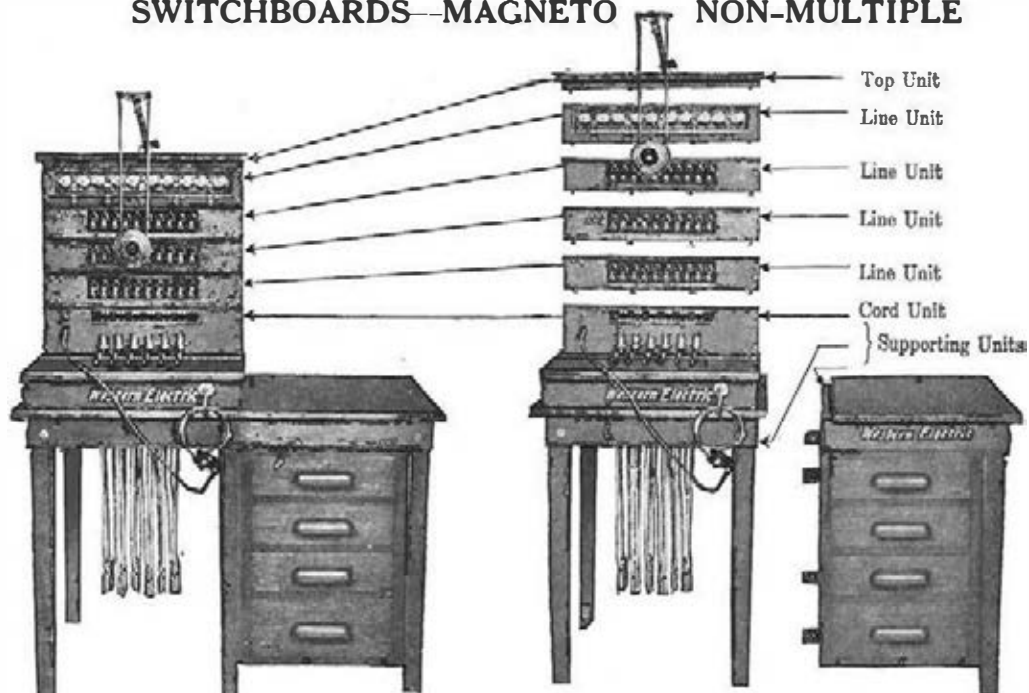
- Audible code ringing on subscribers
- Through toll lines
- Monitoring or transmitter cut-out
- Call wire circuits
- Duplicate set of operator telephone jacks for student operator
- Jack ended interposition trunks with lamp signal
- Buzzer equipment in positional ringing circuit (single or two party)
- Telephone switching key for connecting two positions together
- Plug ended switching trunks from toll switchboard

Battery current for the operator's telephone circuit is supplied from three dry cells or five Edison primary batteries and for the night alarm circuit from five dry cells or eight Edison primary batteries.

CABLE

The standard method of running the line cables is through the top of the switchboard which is the best method since the cables are kept off of the floor away from moisture or mechanical injury. However, if local conditions are such that it is advisable to bring the line cables in at the bottom of the section they will be furnished accordingly.

SWITCHBOARDS—MAGNETO NON-MULTIPLE



Method of assembling No. 1800 Switchboard to 35 line capacity

No. 1800 Sectional Unit Type Switchboard

The unit or sectional type construction for the small switchboard was introduced by the Western Electric Company a number of years ago, and since that time has been supplying the demand of discriminating buyers for a small switchboard that would meet their traffic requirements and eliminate the necessity of buying an "oversize switchboard."

The capacity of the No. 1800 Unit Type Switchboard is from 10 to 50 lines. While 50 lines has been set as an arbitrary maximum it is safe to assume that with a normally low calling rate as many as 70 or 80 lines can be handled conveniently. While the No. 1800—Unit Type switchboard is small in size (Floor space required only 2 feet x 2½ feet), this does not mean that this board receives less consideration or care in manufacture than a larger switchboard, for the same quality of material, skilled workmanship and rigid inspection are applied to all of the Western Electric products regardless of size. Red oak lumber, which has been kiln-dried, thoroughly seasoned and given a dark rubbed finish, is used in the construction of the units. The inside of the units have been specially treated to preserve wood and prevent warping or cracking.

To meet various requirements, there are different types of base or supporting units, cord units, line units and top units. To assemble a switchboard of 10 lines capacity for example it is only necessary to select units as follows:

1 Supporting Unit
1 Cord Unit

1 Line Unit
1 Top Unit

These units are easily assembled into a complete switchboard which presents a neat, compact and serviceable appearance and can be arranged to meet any service condition. Line units can be added at any time.

All of the apparatus and terminals associated with the operator's cord and telephone circuits are mounted in the cord unit.

The circuits used are very simple. A diagram of each circuit is pasted to the inside of the rear doors for convenient reference. The back of each unit is hinged and when open, all of the wiring and equipment are easily accessible.

This switchboard is especially recommended for small, rapidly growing telephone exchanges where the ultimate capacity cannot be definitely determined.

SWITCHBOARDS—MAGNETO NON-MULTIPLE



No. D-3 Supporting Unit



No. D-4 Supporting Unit

No. 1800 Sectional Unit Type (Continued)

Supporting Units

The Nos. D-1 and D-2 supporting units are special heavy brackets for use in mounting the No. 1800 type switchboard in a convenient location on the wall. These brackets mount on a one inch polished red oak board which is fastened securely to the wall before the brackets are attached. One bracket in each of the Nos. D-1 and D-2 types is hinged to permit the swinging of the switchboard to a position at a right angle with the wall upon which it is mounted which makes the apparatus easily accessible. The No. D-1 unit has the hinged bracket at the right and the No. D-2 unit at the left.

The No. D-3 Supporting Unit. Consists of a rigid skeleton table upon which the cord line units can be mounted.

The No. D-4 Supporting Unit. Consists of a tier of drawers designed for mounting next to the skeleton table unit No. D-3. The combination of the two units (No. D-3 & D-4) makes a very neat, compact, complete and sanitary switchboard support.

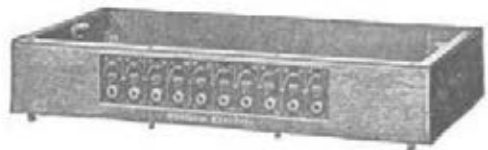
The No. D-5 Supporting Unit. Is an extension writing panel which is always required in connection with cord units Nos. CA-1, CB-1, and CA-5 when mounted on supporting unit No. D-3. This is necessary since the cord circuits in the Nos. CA-1, CB-1 and CA-5 units are not equipped with keys and the keyshelf is not as wide as the units in which keys are used in the cord circuits.

The Line Units

The line units are made in different types arranged to meet any possible line condition. Copper bars are used for mounting the combined drops and jacks in the face of the unit, and special drilled steel mounting plates for the ringer indicators, which insures perfect rigid alignment for the face equipment. The corners of the unit are neatly mortised together and reinforced on the inside with substantial steel brackets. The finished unit presents a very neat, compact and serviceable appearance.



No. BA-7, BB-7 or BC-7 Line Unit



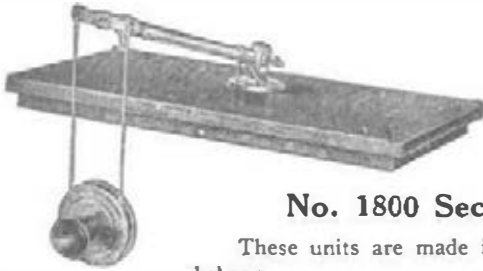
No. BA-12 or BA-13 Line Unit

The following units are equipped with ringers (bells) and jacks. The bells are equipped with an indicator which shows which bell has rung. A very convenient arrangement where the operator is not always at the switchboard.

Code No. of Unit	Code No. of Ringer	Res. of Ringer in Ohms	Code No. of Jacks	Code No. of Unit	Code No. of Ringer	Res. of Ringer in Ohms	Code No. of Jacks
BA-7	40BG	2500	168	BC-7	40AG	1000	168
BB-7	40FG	1600	168				

The following units are equipped with self-restoring shutter type combined jacks and signals.

Code No. of Unit	Code No. Combined Jack and Signal	Resistance in Ohms	Code No. of Unit	Code No. Combined Jack and Signal	Resistance in Ohms
BA-12	22C	330	BA-13	26C	330

SWITCHBOARDS—MAGNETO NON-MULTIPLE**No. AA-2 Top Unit****No. AA-1 Top Unit****No. 1800 Sectional Unit Type (Continued)**

These units are made in two types to meet the various conditions described below:

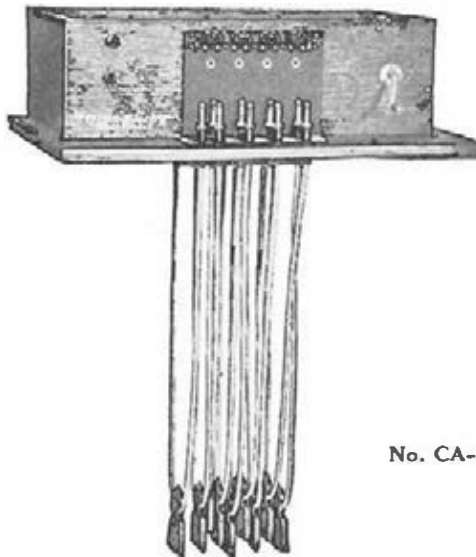
The No. AA-1 unit is merely a "cover" for the line units and is intended for use when the cord circuits are arranged for a hand set or desk set.

The No. AA-2 unit is similar to the No. AA-1 except that it is arranged for use with a suspended type transmitter. A No. 232-W transmitter and No. 19-D transmitter arm are furnished with this unit.

The Cord Units

These units are made up in different types to meet the operating requirements of any small magneto exchange.

The cord and operator's telephone circuit apparatus is all mounted in the cord unit. All connections to the line units are made under screw terminals and the only tool required for this work is a screw driver. The keyshelf is hinged and all terminals are accessible. The rear doors of the cord and line units are hinged and when opened, all of the wiring and apparatus is easily accessible. The circuits used are simple and a diagram of the circuit is pasted on the inside of the rear door of each unit.

**No. CA-1 Cord Unit**

No. CA-1 Cord Unit. This unit is equipped with 4 cord circuits arranged with ring off drops and listening jacks, the two left-hand circuits being wired for repeating coils which may be easily added if desired.

The operation of this unit is as nearly "fool-proof" as it is possible to make a switchboard. The 4 cord circuits can each be considered as being the same as a single length of cord with a plug on

SWITCHBOARDS—MAGNETO NON-MULTIPLE

No. 1800 Sectional Unit Type (Continued)

CORD UNITS

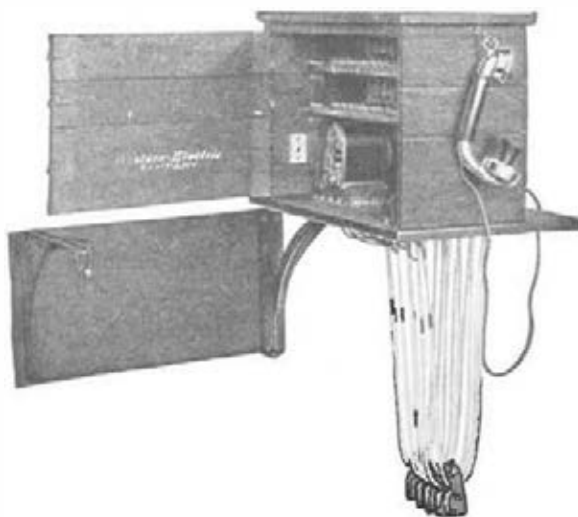
both ends and no other connection with the switchboard except the "ring off drop" and the "listening in jack" which are "bridged" across the line. The ring off drop operates when the subscribers have completed their conversation and "ring off." The "listening in jack" provides means for the operator to supervise the connections.

The operator's telephone set consists of a hand telephone set having the transmitter and receiver connected together as one unit.

The additional single cord at the left is the operators talking, ringing and listening cord. With this cord the operator answers the calling party, finds out who is to be called and rings them. The connection is then established with any one of the other cord circuits and left up until the ring off drop operates. Interference with a connection, after it is once established is reduced to a minimum.

No. CB-1 Cord Unit. This unit is the same as the CA-1 unit except that the operators' telephone circuit is arranged for a suspended type transmitter.

The No. CA-2 unit is equipped with four cord circuits, the two left hand cords of which are wired for repeating coils (repeating coils are not furnished unless specified) and is the same as the CA-1 unit except that No. 156-A two lever key is used in the cord circuit for ringing, listening and talking and is wired for ringing on both the front and rear cords. This unit is equipped with a suspended transmitter



Rear View of 20-line Wall Type No. 1800 Switchboard

The No. CB-2 unit is the same as the No. CA-2 except that it is arranged for the use of a hand set or a desk telephone in operator's telephone circuit.

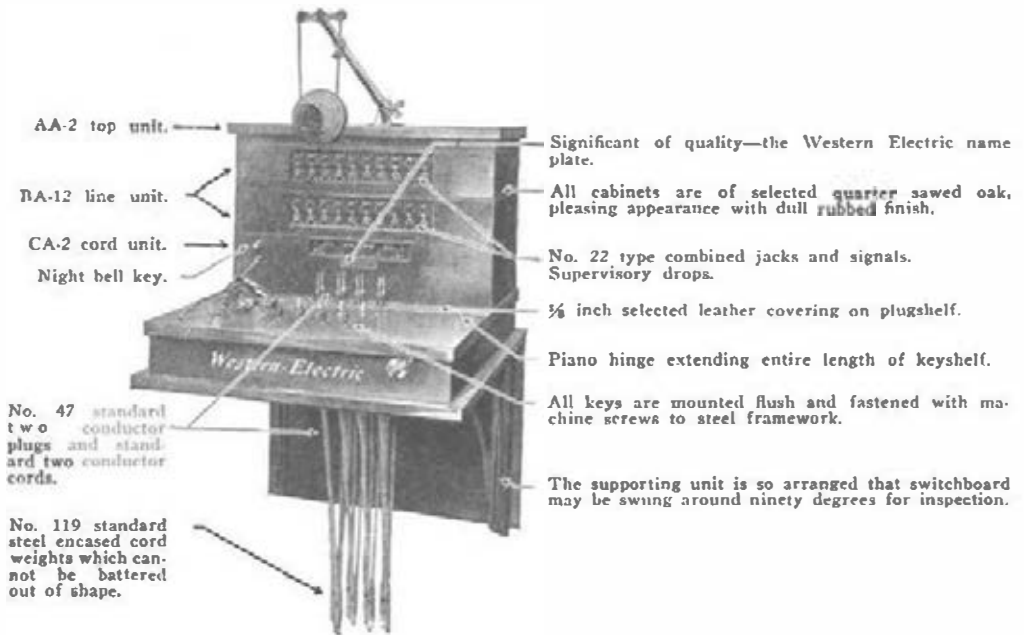
The No. CA-6 unit is the same as the No. CA-2 unit except that it is arranged for six cord circuits instead of four, and is provided with a suspended transmitter.

The CB-6 unit is the same as the CA-6 except the telephone circuit is arranged for use with hand set or desk telephone.

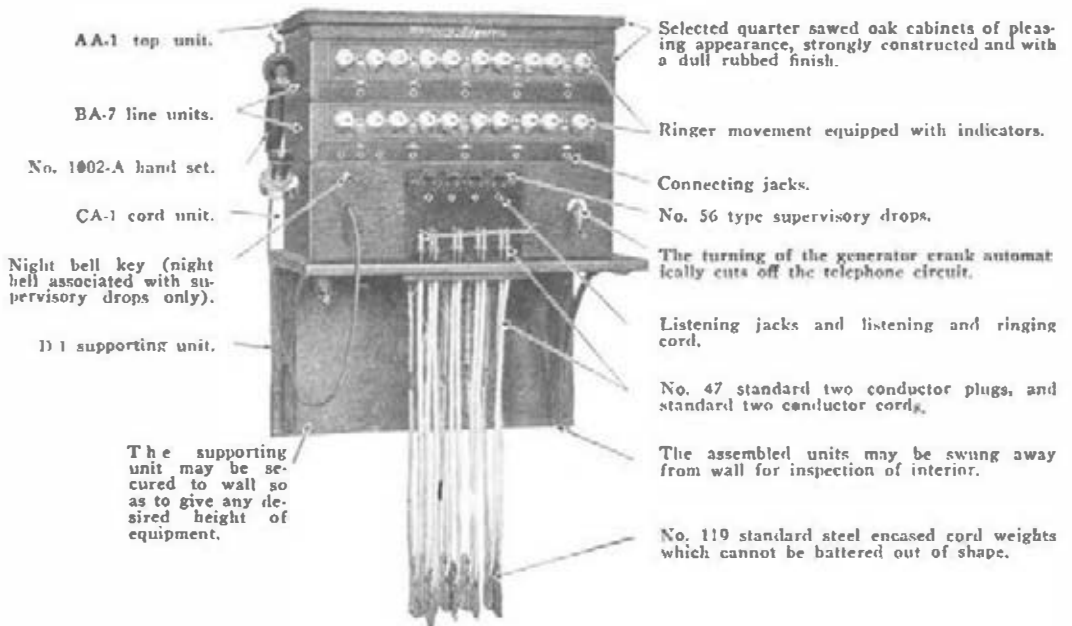
The units assembled into a wall type switchboard present a very neat and compact appearance. All of the wiring, terminals and apparatus are easily accessible when the switchboard is swung out and the rear doors opened for inspection. A convenient switchboard for use when the central office is located in a residence.

SWITCHBOARDS—MAGNETO NON-MULTIPLE

No. 1800 Sectional Unit Type (Continued)

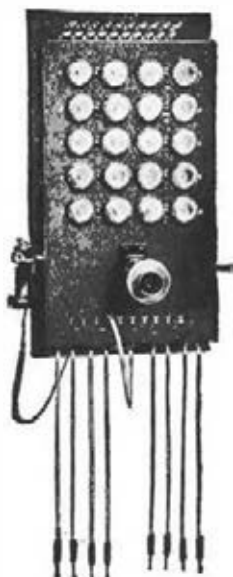


No. 1800 Sectional Switchboard



No. 1800 Sectional Switchboard

SWITCHBOARDS—MAGNETO WALL



No. 1012 Switchboard

No. 1012 "Ringer Type"

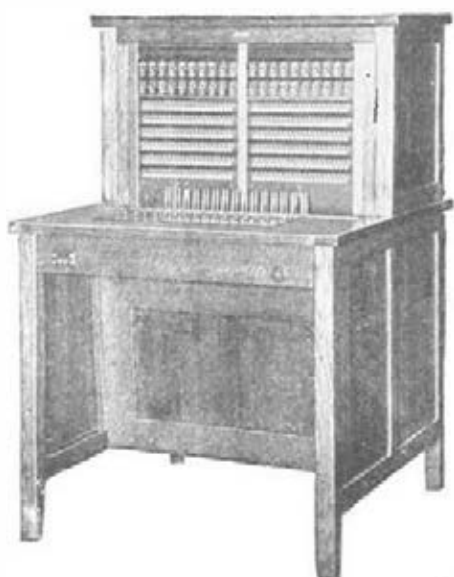
This switchboard is intended for use on exchanges having 10 lines or less, and where the number of calls does not warrant having a regular telephone operator in attendance. It has been installed by numerous rural companies who desire a switching station established in the country in which cases it is installed in a farmer's home and the calls are answered by members of the family. Being equipped with ringers, constant attendance at the switchboard is not necessary as the bells can be heard at some distance from the board. In addition to this ringer indicators are supplied with each ringer which gives a visible signal showing which bell has been ringing.

The cabinet is well constructed of thoroughly seasoned, quarter sawed oak, which is given a durable light finish. The front is hinged and the apparatus and wiring is within easy reach for inspection or maintenance.

Equipment. Each line is provided with a jack and a 1000 ohm ringer, although 1600 or 2500 ohm ringers can be furnished if required. Four-cord circuits, with a listening in jack bridged across the tip and ring, and a listening cord are provided for handling the calls, no supervisory or ring off signals being provided. A powerful five-bar hand generator is furnished for ringing purposes. The operator's telephone set consists of the regular long distance transmitter and receiver.

Operation. Subscribers are called by ringing with the hand generator over the listening cord with which the operator answers calls and listens in for supervisory purposes. Connections are made with the other cords, without the use of keys.

SWITCHBOARDS—CENTRAL OFFICE



No. 1948 "Sanitary Type" Switchboard

Capacity

240 Central Battery Lines

40 Toll or Rural Lines

20 Transfer Trunks

No. 1948 "Sanitary Type"

The No. 1948 switchboard is designed to provide the small telephone companies who desire central battery service with modern efficient and reliable equipment. It is built along the lines of the modern office desk, having square lines generally, square legs (metal capped at bottom) and a clearance underneath for cleaning purposes, hence the term "Sanitary Type" and is the Western Electric Company's latest departure from old methods of small switchboard manufacture. Meeting the demands of exacting buyers as it does is evidence of the confidence enjoyed by this company in the development of a much needed small central battery switchboard which is easy to operate, economical to maintain and constructed of the same materials which enter into the construction of the larger boards upon which the Western Electric Company's reputation for quality products is built and maintained.

The Framework. The cabinet is constructed of durable red oak lumber, which has been kiln dried and thoroughly seasoned to prevent warping and cracking and provided with a dull rubbed dark finish. Each section is a unit by itself, although several sections can be lined up together as the end panels are removable. The keyshelf is a convenient height (30 inches) allowing the use of an ordinary chair for the operator.

The equipment, relays, resistances, retard coils, etc., associated with the various circuits are mounted on a swinging relay gate presenting a neat, compact appearance when closed and bringing the apparatus and wiring within easy reach when open.

SWITCHBOARDS—CENTRAL OFFICE

No. 1948 Sanitary Type (Continued)

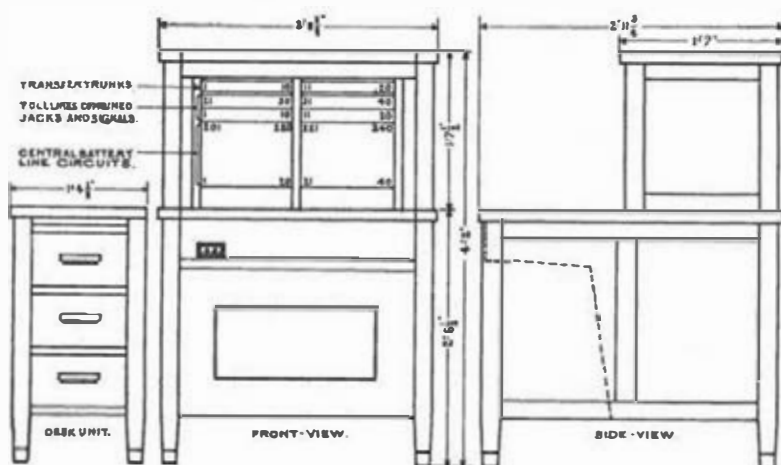
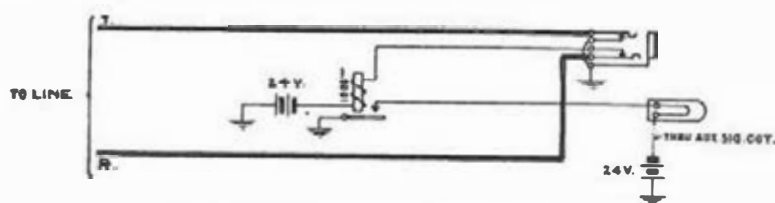


DIAGRAM SHOWING DIMENSIONS OF NO. 1948 SWITCHBOARD.

The Line Circuits. The line circuits are as simple as is consistent with modern practice. They are equipped with flat type relays which require a small mounting space and are especially adapted for use in a self contained switchboard of this type. These relays consume a comparatively small amount of current resulting in economy in storage battery equipment.



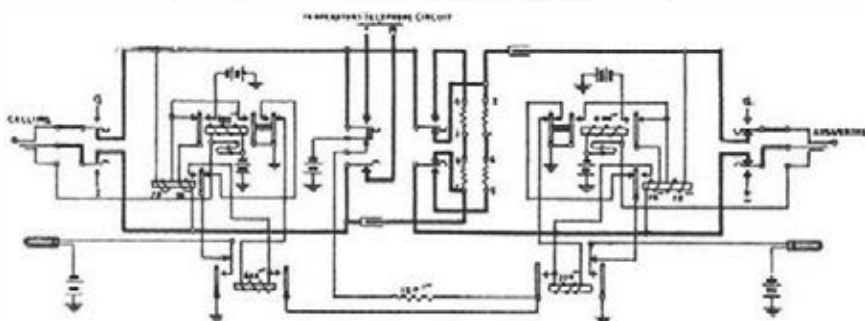
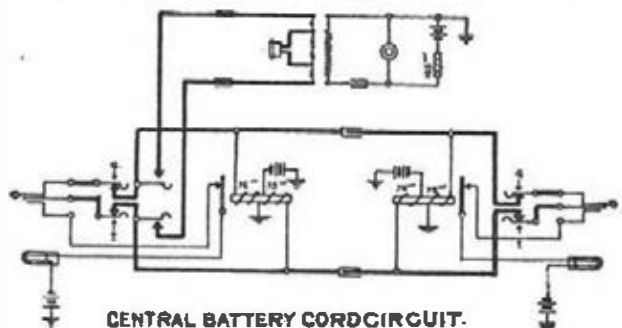
LINE CIRCUIT 1948 SWITCHBOARD.

The Cord Circuits. The local cables which contain all of the wiring inside of the switchboard, are universally wired and can be equipped to include any of the features listed below:—

- (a) Subscribers central battery cord circuits.
 - (b) Rural universal, with or without repeating coils and cutout keys. Repeating coils and cutout keys not equipped unless specified. Cutout keys are used for cutting the repeating coil in or out of the cord circuit as required.
 - (c) Ringing combination for either central battery or universal cord circuit.
- Single party, two-way.
- Two party, two-way, master key.
- Four party, two-way, master key (pulsating).
- Four party, two-way, master key (harmonic).
- Eight party, two-way, master key (harmonic).

SWITCHBOARDS—CENTRAL OFFICE

No. 1948 Sanitary Type (Continued)



Power Plant. The proper battery supply for this switchboard is obtained from storage batteries. Since the storage battery is a very important part of the telephone system and the satisfactory operation depends upon a reliable battery supply, it is imperative that great care be exercised in the selection of this unit. In figuring the size of the charging machine and storage battery consideration should be given to the source of power supply with regards to its reliability. In ordinary cases provide not less than 36 hours reserve and up to 72 hours in cases of questionable power.

The size of batteries may be determined on the basis of the following example of calculation:

1000 total local and rural connections per 24-hour day.
 .015 current in ampere hours per call (based on call of ordinary duration).

5000
 1000

15,000 current in ampere hours for calls in 24 hours.

Since the rating of the storage battery is computed on an 8-hour capacity it is necessary to divide the ampere hour rating for 24 hours by 8 hours in order to determine the ampere rating of the battery required.

Thus 15,000 current in ampere hours for calls in 24 hours divided by 8-hour capacity
 Equals 1.875 ampere = ampere rating for battery 24 hours
 Plus .1875 10% safety factor

Equals 2.0625 battery rating (basis 8-hour discharge rate)

4.1250 Ampere rating for battery 48-hour supply (nearest battery E. S. B. Co.'s type ET couple (4½ amp.).

The charging medium required would be a 5 ampere D.C. motor-generator or a rectifier delivering this current at 30 volts. If it is desired to operate an interrupter ringing outfit from the storage battery the size of the latter should be increased from 1½ to 3 amperes depending on the amount of ringing to be done.

SWITCHBOARDS—PRIVATE BRANCH EXCHANGE



Front View No. 1962 Board—Showing Desk Unit

No. 1962 "Sanitary Type"

This switchboard is a result of the continuous efforts which the Western Electric Company is exerting in order to produce modern switchboards readily adapted to any operating conditions and at the same time maintaining the simplicity of operation, quality of material, skilled workmanship and maintenance economy which are characteristic of Western Electric products.

The No. 1962 switchboard being universally wired is adaptable to the varied requirements of private branch exchange service. It is designed to handle all practical service conditions which have arisen since the advent of the private branch exchange idea.

In addition to including all of the popular features adapted to private branch exchange service the No. 1962 switchboard is of the "Sanitary Desk Type" of construction which represents the Western Electric Company's most recent development and departure from old manufacturing methods. This cabinet has square lines generally, square legs (metal capped at bottom), plain panels and a clearance underneath the cabinet to provide for cleaning, hence the name "Sanitary." This switchboard is evidence of the continuous efforts being exerted by the Western Electric engineers toward the development of modern switchboards which will meet the exacting demands of discriminating buyers, and still retain the simplicity of operation, quality of material, skilled workmanship and low maintenance cost, which have been characteristic of Western Electric products in the past and upon which the company's reputation for service and quality has been built and maintained.

Built along the lines of modern office furniture it will harmonize with the surroundings in any modern office.

Capacity

Central Battery Local Lines.....	200
Trunk Lines	8
Cord Circuits	12

Framework. The framework is constructed of clear grained, red oak lumber, kiln dried and thoroughly seasoned to prevent warping and cracking and provided with a dull rubbed dark finish.

The stile strips, which hold the jacks and lamps in the face of the switchboard, and the key strips in the keyshelf by means of which the keys are held in place are made of cold drawn steel with a galvanized finish as a protection against moisture, also insuring perfect, rigid alignment of the face and keyboard equipment.

All relays are mounted on a swinging relay gate consisting of one piece of cold drawn galvanized steel equipped with mounting clips of the same material and brass machine screws. The mounting clips hold the relay mounting plates in place and eliminate the necessity of drilling holes in the relay gate. This is a typical Western Electric development which excludes the possibility of broken relay gates. The relay gate is mounted on a heavy steel bracket and presents a very compact appearance when closed as well as bringing the wiring within easy reach when open.

The Line Circuits. The line circuits terminate in jacks and lamps. This circuit is very simple reducing trouble to a minimum. Lines 1 to 20 are arranged for the use of a relay to light the line lamp where the telephone is located a considerable distance from the switchboard. In the remaining lines the relay is not provided for since these lines will be used for the telephones located nearer the switchboard. Ordinarily any stations located over 800 feet from the board require a line relay for lighting the line lamp.

SWITCHBOARDS—PRIVATE BRANCH EXCHANGE

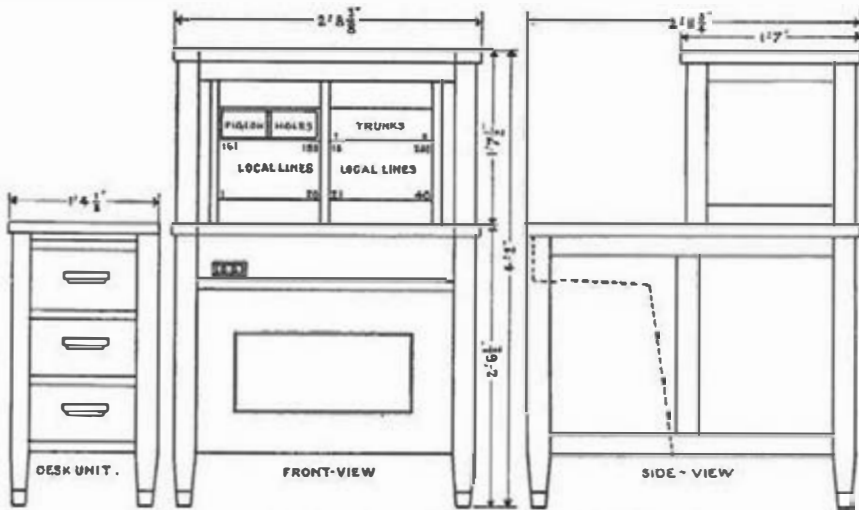
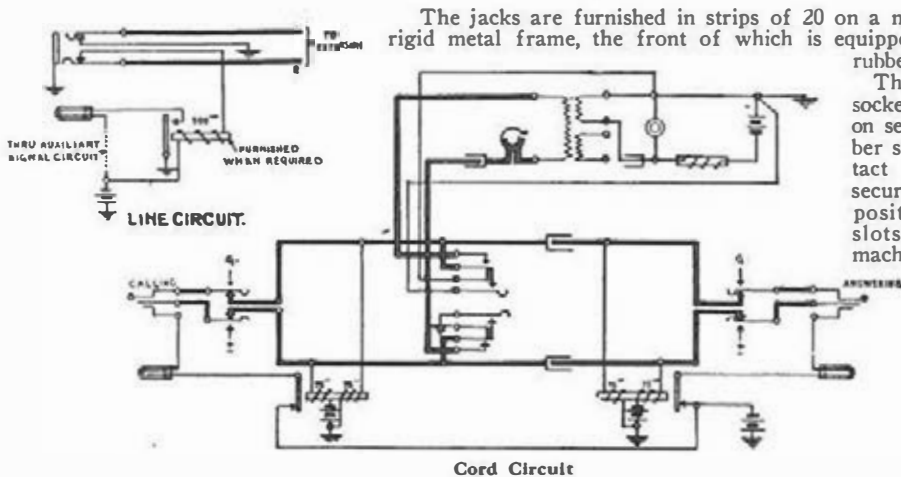


Diagram Showing Dimensions of No. 1962 Switchboard

No. 1962 "Sanitary Type"



Cord Circuit

The jacks are furnished in strips of 20 on a mounting with a rigid metal frame, the front of which is equipped with a hard rubber face strip.

The line-lamp sockets are mounted on selected hard rubber strips. The contact springs being securely fastened in position in milled slots by means of machine screws.

The Cord Circuits. The cord circuits are of the bridged impedance type which have the talking battery connected in series with two windings of the cord supervisory relay and fed through these windings to the tip and ring of either cord. Each cord has its own supervisory relay and lamp which is controlled by the switchhook in either the called or calling party's telephone, thus having what is technically termed "double supervision."

These are arranged for two-way ringing (ring on either cord) and with or without flashing recall on either cord. The flashing recall is a very desirable feature which speeds up the operator on answering recalls by flashing the supervisory lamp in the keyshelf. Some telephone men and the average layman have visions of a complicated mechanical device in connection with the flashing recall feature. Such is not the case, however, for this feature is accomplished by merely adding two relays in the cord circuit and three flashing recall relays which are common to all cord and plug ended trunk circuits in the switchboard. Their function is to interrupt the battery or ground supply to the supervisory lamps thus flashing them.

Flat type relays requiring little mounting space and having spring contacts are used exclusively.

Universal type keys are used having key springs and spring combinations fastened to the key mounting by means of machine screws. The springs are resilient and of suitable length to give the proper contact pressures in the normal as well as operated positions. The action of the levers is smooth and positive, and the design throughout is such as to provide for maximum life. The entire key is easily removed for inspection or repairs.

SWITCHBOARDS—PRIVATE BRANCH EXCHANGE

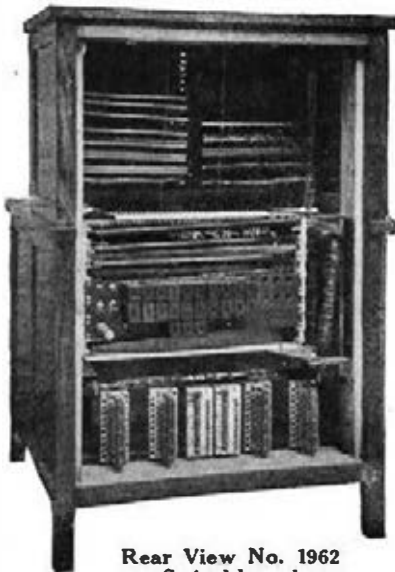
No. 1962 "Sanitary Type" (Continued)

The Trunk Circuits. The trunk circuits are universally wired and can be equipped to meet the most exacting service requirements. Plug or Jack ended trunks can be selected from the following data to meet any local condition which may arise. The advantage, to the telephone company or the individual owner, of universally wired trunk circuits can be readily recognized if the possibility of a change in type of equipment for the main central office is taken into consideration.

In cases where the telephone company's present equipment is of the magneto type and a cut-over to central battery equipment, which is right in line with the trend of modern telephony, is contemplated, it is a distinct advantage to have the trunks arranged so that the conversion to central battery trunks involves very little labor.

With the individual owner, who is not informed regarding the plans of the telephone company with whose switchboard a connection is desired, the advantages of universally wired trunks are manifold, in that facilities are provided to take care of any future change.

Type of trunk circuits for which the No. 1962 board is wired:



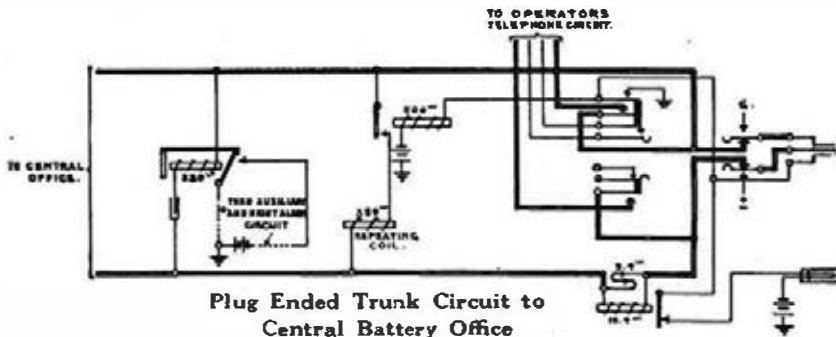
Rear View No. 1962 Switchboard

Plug Ended Trunks

- To central battery office
- To central battery office with night service
- To central battery office arranged to trip machine ringing
- To central battery office arranged to trip machine ringing and with night service
- To magneto office
- To magneto office with night service
- With flash recall to central battery office
- With flash recall to central battery office and night service
- With flash recall to central battery office arranged to trip machine ringing
- With flash recall to central battery office arranged to trip machine ringing and with night service
- With flash recall to magneto office
- With flash recall to magneto office with night service.

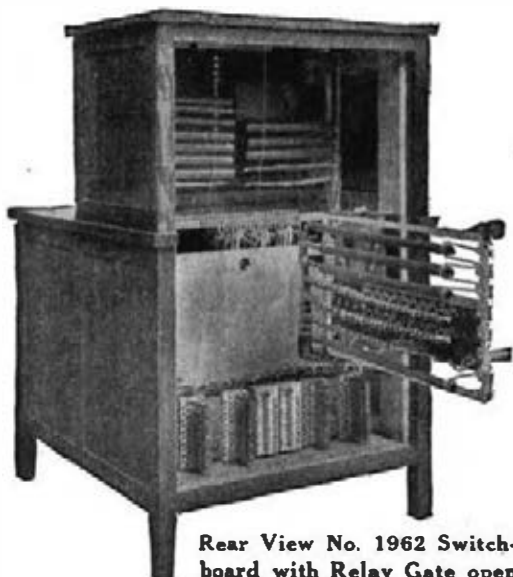
Jack Ended Trunks

- To central battery office
- To central battery office with night jacks
- To magneto office
- To magneto office with night jacks
- To automatic office
- To automatic office with night jacks



SWITCHBOARDS—PRIVATE BRANCH EXCHANGE

No. 1962 "Sanitary Type" (Continued)



Rear View No. 1962 Switchboard with Relay Gate open

The Local Cable. The local cable is carefully constructed, well taped in exposed places as a protection against mechanical injury, and held securely in place by means of leather straps. Coatings of shellac are applied to preserve the insulation.

The Desk Units. This type switchboard is supplied with or without the tier of drawers depending upon the requirements of the purchaser. When furnished the drawer unit may be located at either side of the switchboard as desired. While the drawers are not an essential factor in the operation of the private branch exchange switchboard they are very convenient for keeping records or stationery where the private branch exchange operator has other duties than operating the switchboard. The finish of the woodwork is the same as the switchboard and when assembled as part of the switchboard compares with the usual office furniture.

The Power Plant. Storage batteries provide the best current for operating this switchboard. The storage battery has been rightly termed the heart of the telephone system, consequently great care must be used in the selection of the proper size of the storage battery and charging units.

The size of batteries may be determined on the basis of the following example of calculation:

1000	Total trunk and local connections per 24 hour day
.015	Current in ampere hours per call (based on call of ordinary duration)
<hr/>	
5000	
1000	
<hr/>	
15.000	Current in ampere hours for calls in 24 hours.

Since the rating of the storage battery is computed on an 8-hour capacity it is necessary to divide this current at 30 volts. If it is desired to operate an interrupter ringing outfit with the storage battery the size of the latter should be increased from $1\frac{1}{2}$ to 3 amperes depending on the amount of ringing to be done.

Thus	15.000	Current in ampere hours for calls in 24 hours
		Divided by 8
Equals	1.875	ampere—ampere rating for battery 24 hours
Plus	.1875	10 per cent. safety factor
<hr/>		
Equals	2.0625	Battery rating (basis 8-hour discharge rate)
	2	
<hr/>		
4.1250	Ampere rating for battery 48 hour reserve	
	(Nearest battery E.S.B. Co.'s type ET cells $4\frac{1}{2}$ amp.)	

The charging medium required would be a 5 ampere D.C. motor generator or a rectifier delivering this current at 30 volts. If it is desired to operate an interrupter ringing outfit with the storage battery the size of the latter should be increased from $1\frac{1}{2}$ to 3 amperes depending on the amount of ringing to be done.

A satisfactory method of obtaining battery current for the private branch exchange is to have a direct connection to the main central office storage battery over several cable pairs. This is also true about the ringing current since this plan eliminates the necessity of maintaining the storage batteries and ringing equipment at the private branch exchange.

SWITCHBOARDS—PRIVATE BRANCH EXCHANGE

No. 550 Type Switchboard



80 Line No. 550B Switchboard

This switchboard has passed the Test of Service and proven Satisfactory and Reliable

This switchboard has the distinction of being a pioneer in the private branch exchange field since the adoption of the modern flat type relays, it being the first private branch exchange switchboard in which the new relays were used. The No. 550B switchboard in both the 30 and 80 line capacities makes an ideal installation in any city or town where the present equipment of the main central office is of the manual central battery type.

The compact cabinet design presents a neat appearance and compares favorably with the furniture in any modern office.

If there is a possibility of a change from manual to machine switching telephone equipment the purchase of the No. 550C switchboard, which has trunks arranged for connection to machine switching offices, including the necessary dialing features, is recommended.

TYPES AND CAPACITY

	550B(30)	550B(80)	550C(30)	550C(80)
Station lines total	30	80	30	80
†Station lines wired for relays	10	20	10	20
Trunk lines	10	15	10	15
*Cord circuits	10	15	10	15

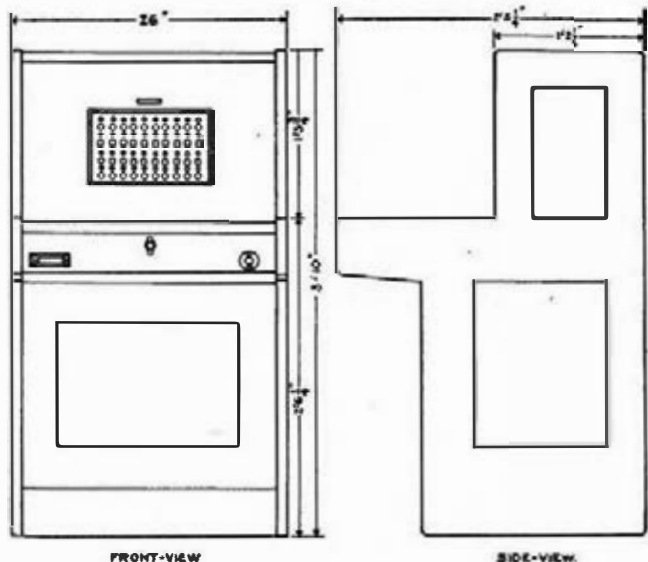
*The cord circuits in the No. 550B board can be equipped for either single or double supervision while those in the No. 550C board are arranged for double supervision only.

†Certain lines are wired for relays to be used on lines where the telephone is located considerable distance (800 ft.) from the switchboard. Relays are not provided unless specified.

The Framework. Red oak lumber with a rich, dark finish or birch with a mahogany finish is used for all exposed woodwork parts. The lumber is kiln dried and thoroughly seasoned to prevent warping and cracking. Iron reinforcing brackets are placed on the inside of the cabinet at the corners giving added strength.

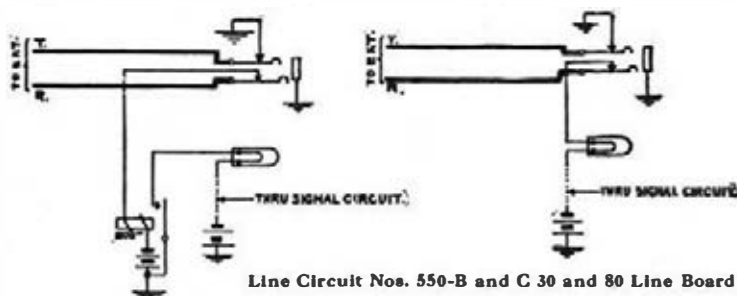
The stile strips which hold the line jacks and lamp sockets in place as well as the key mounting strips in the keyshelf consist of cold drawn galvanized steel. This insures perfect alignment of the face and keyboard equipment also prevents damage from moisture.

The equipment, such as relays, resistances, retard coils, etc., associated with the trunk, line, cord, night alarm, dialing, auxiliary and operator's telephone circuits, is mounted on a swinging relay gate which is constructed of a single piece of cold drawn galvanized steel bent in the proper shape and mounted on a heavy steel bracket securely fastened to the switchboard.



Dimensions of No. 550—80 Line Private Branch Exchange Switchboard

SWITCHBOARDS—PRIVATE BRANCH EXCHANGE



Line Circuit Nos. 550-B and C 30 and 80 Line Boards

No. 550 Type Switchboard (Continued)

The gate is equipped with mounting clips and screws. The mounting clips hold the relay mounting plates on the relay gate and permit the use of the one piece relay gate.

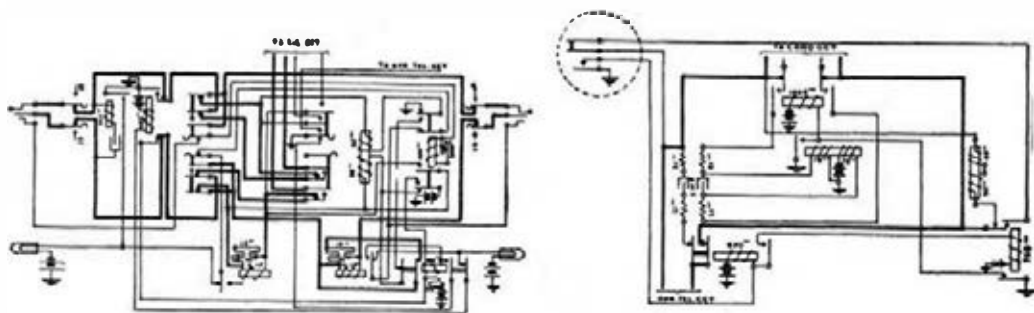
The cabinet is compact and all parts are easily accessible. These switchboards in the 80 line capacity are equipped with removable end panels. This permits the lining up of two boards and makes an ideal installation where several positions are required.

The Line Circuits. The line circuits are simple and terminate on screw terminals located on a hinged connecting rack which can be opened for inspection.

Certain lines are arranged for use with relays and intended to be used for the stations located considerable distance (800 ft.) from the switchboard. The latest standard flat type relays are used throughout which permits placing the maximum amount of equipment in a small space.

Individual line jacks and associated lamp sockets are used in all boards on trunk and line circuits. The number of jacks and lamps required are equipped and the remaining jack and lamp positions plugged with apparatus blanks. The blanks can be removed and jacks and lamps installed at any time. The panels upon which the individual jack and lamp sockets are mounted consists of one piece of dull finished black faced fibre which does not reflect the light. A designation strip is provided below each row of jacks for convenience in numbering. The black faced fibre panel presents a very neat appearance as well as insuring perfect alignment of the face equipment.

The Trunk Circuits. Jack ended trunks are used on all No. 550 type boards. The jacks and lamp sockets are individually mounted as in the line circuits.



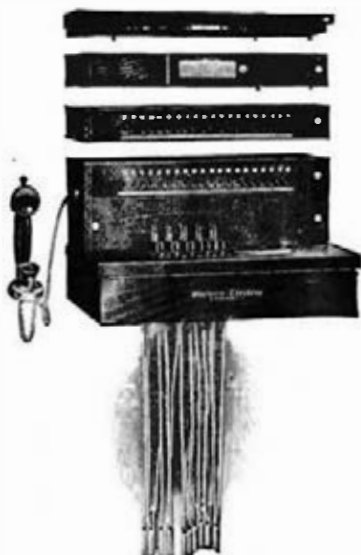
CORD CIRCUIT NO. 550 PRIVATE BRANCH EXCHANGE SWITCHBOARD.

DIALING CIRCUIT NO. 550-C-PRIVATE BRANCH EXCHANGE SWITCHBOARD.

The Cord Circuits. The cord circuits embody all of the features required for the successful operation of the private branch exchange. Connections between stations and from stations to trunks are easily established. On the 550C board each cord circuit is arranged for dialing by the operator from the board and through dialing from any station on the private branch exchange to the machine switching exchange. This through dialing is accomplished by the operator throwing the night key and the through dialing key in the proper position after putting up the night connections. The function of the night key is to cut out all the equipment from the circuit which is not required for night service.

The Dial Circuit No. 550C Board. The dial may or may not be used as desired, it being easily installed when needed. It is connected to the local cable by means of a flexible cord and the dial itself held in place by a spring clip which is screwed to the keyshelf. When the dial is not equipped the hole for the cord is suitably covered with an apparatus blank.

No. 1801 Sectional Unit Type



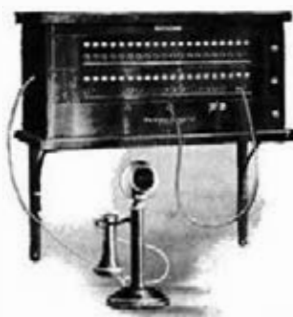
**No. 1801 Switchboard
Showing Method of Enlarging**

Four systems—"A," "B," "C," and "D"—have been devised to handle the various classes of service required in this type of switchboard. Telephones which can be used with the systems are listed under heading: Central Battery Telephones.

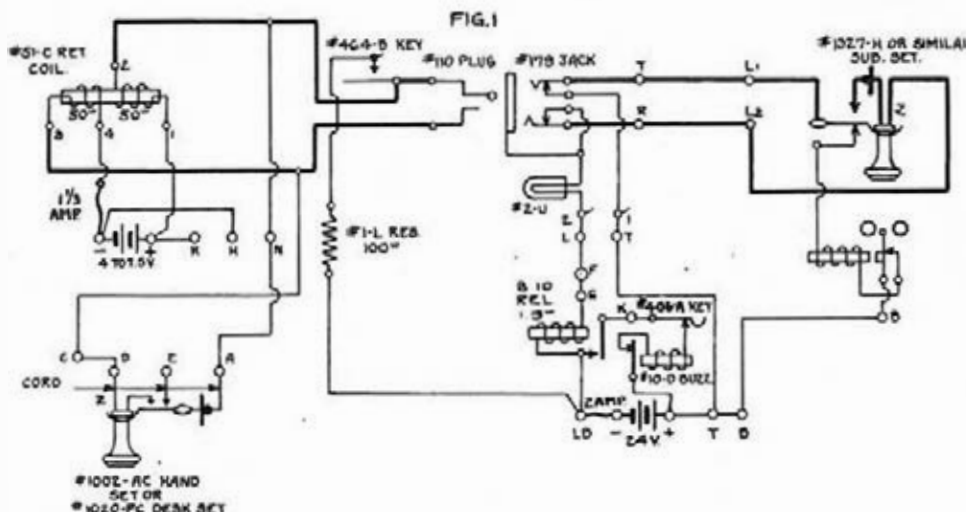
SYSTEM "A"

Direct current is used for ringing the telephone bells, hence a battery is required for ringing as well as for talking current.

This is a three-wire system, a third wire common to all sets being required in addition to the two wires individual to each station. When a station is being rung, ringing current passes out over the tip side of the line through the bell in the telephone and back over the third wire.



**No. 1801 Switchboard
System "A"**
Consisting of:
1—G-1 Top Unit
1—HD-1 Line Unit
1—JD-1 Cord Unit
1—K-1 Supporting Unit



SWITCHBOARDS—PRIVATE EXCHANGE

No. 1801 Sectional Unit Type (Continued)

Since the operator is a party to all conversation, no supervision is required.

The telephones used on the lines of this system are equipped with direct current vibrating bells.

The switchboard can be arranged for simultaneous ringing of and talking to all stations.

SYSTEM "B"

This system embodies all of the features of System "A" and in addition has facilities for intercommunication between stations. Five pairs of connecting cords with ringing and listening keys are provided for this purpose.

The method of wiring to the sets is the same as System "A" and the stations are rung in the same manner.

As soon as a connection is set up, the line lamps of the lines connected become supervisory lamps and remain dark as long as the parties have their receivers off the hook and light when they hang up.

Note the simplicity of the cord and line circuits. Since the circuits are simple in design the possibility of trouble is reduced to a minimum. It is to be noted that there are no relays in the line circuits with the exception of the night alarm relay.

Simultaneous ringing and talking feature can be furnished with this system.

SYSTEM "C"

This system embodies all of the features of System "B," and in addition two plug ended trunks are provided which may be equipped for connections to either magneto or central battery central offices.

These trunk circuits are provided with holding, ringing and listening keys and the operators' telephone circuit is equipped with an induction coil to insure good transmission on trunk connections. The stations are rung, and supervision obtained in the same manner as in System "B."

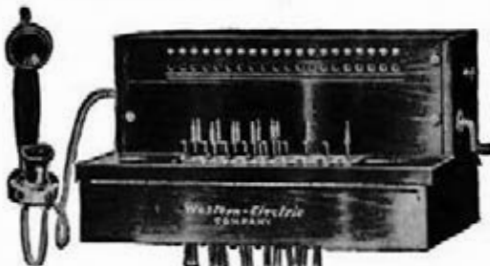
When trunk circuits to central battery central offices are equipped they are connected to a regular subscribers' line circuit at the central office. When the trunk is plugged into a line on which the party has removed the receiver from the hook, the central office operator will receive the signal in the usual manner. The private exchange operator can also signal the central office operator by manipulating the holding key.



No. 1801 Switchboard
System "B"

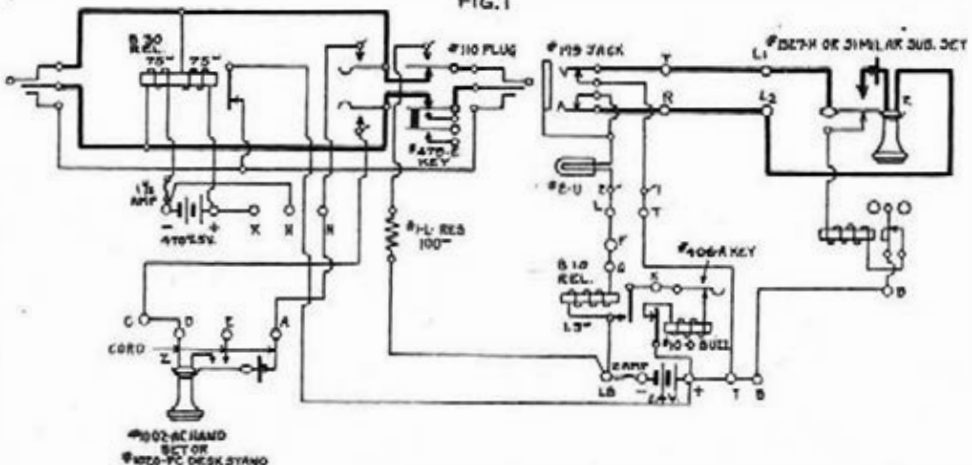
Consisting of:

- 1—G-1 Top Unit
- 1—HA-7 Simultaneous Talking and Ringing Unit
- 1—HD-1 Line Unit
- 1—JC-2 Cord Unit
- 1—K-2 Supporting Unit



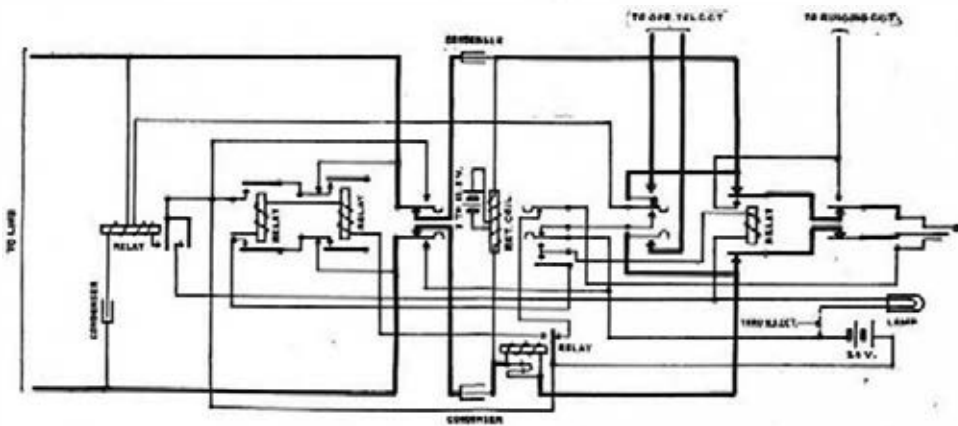
No. JC-5 Cord Unit

FIG. 1

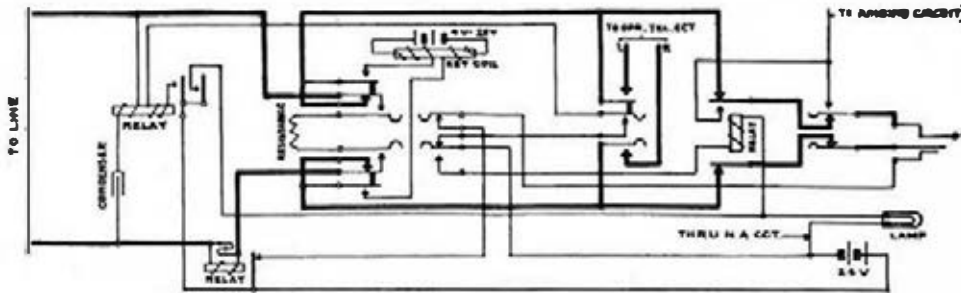


SWITCHBOARDS—PRIVATE EXCHANGE

No. 1801 Sectional Unit Type (Continued)



TRUNK CIRCUIT TO MAGNETO CENTRAL OFFICE.
NO. 1801 SWITCHBOARD.



TRUNK CIRCUIT TO CENTRAL BATTERY CENTRAL OFFICE,
NO. 1801 SWITCHBOARD.

To signal the private exchange operator, the central office operator rings out on the line in the usual manner. This action lights the trunk lamp which remains lighted until the listening key is operated. Talking current is obtained from the central office on trunk connections, except when the holding key is operated.

The holding key enables the operator to hold a trunk connection while she converses with the party desired or until the party desired can be connected.

A night key is provided to prevent battery from flowing when the trunk is set up for night or thru connections.

When the trunks are arranged to handle connections to a magneto central office, the central office operator signals the private exchange by ringing on the line in the usual manner. Talking current for the stations is furnished by the trunk circuit, and supervision is the same as when a connection is made with a cord circuit. A key is provided to ring the stations and a separate key to signal the central office. A night key is provided which has the same function as the night key in the central battery trunks. The trunk circuit is so arranged that on a thru or night connection the action of removing the receiver from the hook will kick down the drop at the central office.

The telephone sets used with this system are similar to those used with systems "A" and "B" except that they are also equipped with an induction coil.

The simultaneous ringing and talking feature can be furnished with this system.

SWITCHBOARDS—PRIVATE EXCHANGE**No. 1801 Sectional Unit Type (Continued)****SYSTEM "D"****No. 1801 Switchboard System "D"**

Consisting of:

- 1—G-1 Top Unit
- 1—HD-1 Line Unit
- 1—JD-7 Cord Unit
- 1—K-3 Supporting Unit

This system has all of the features of system "C" except that it employs the regular two wire line circuit, and alternating current is used for ringing purposes. A ringing interruptor can be supplied for furnishing alternating ringing current. All cord units are equipped with a No. 22 hand generator.

The telephone sets used with this system are the regular central battery sets used with central office systems.

The operation of trunk circuit either to Central Battery or magneto exchanges is the same as for System "C" except that no No. 127A set is required at the stations for night or through connections.

If no trunk circuits are desired, the cord units are furnished with wiring only for those trunks and the apparatus spaces properly blanked.

Description of Units. To make up a complete No. 1801 switchboard one supporting unit, one cord unit and one top unit are required. If line or miscellaneous units are required to handle the service they can be added at any time.

**G-1 Top Unit****HD-1 Line Unit****(Used with all top and cord units)**

Line Units. The line units are all wired for twenty lines, the only difference being in the number that are equipped. All unequipped jack and lamp positions are plugged with apparatus blanks. The jacks and lamp sockets are singly mounted and are easily installed when a few lines are to be added. The following shows the equipment of the various units:

Code No.

- HA-1 wired for 20 lamp signal line circuits, with equipment for 5
- HB-1 wired for 20 lamp signal line circuits, with equipment for 10
- HC-1 wired for 20 lamp signal line circuits, with equipment for 15
- HD-1 wired and equipped for 20 lamp signal line circuits.

SWITCHBOARDS—PRIVATE EXCHANGE

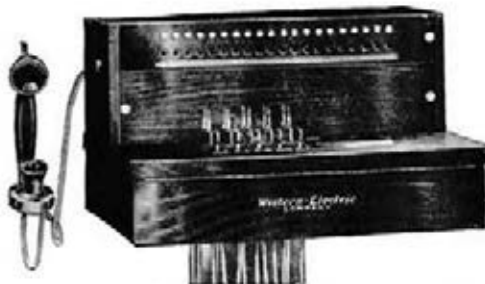
No. 1801 Sectional Unit Type (Cont'd)



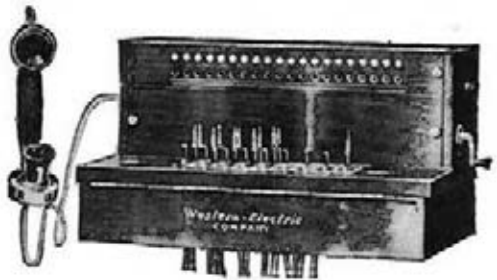
JC-1 Cord Unit



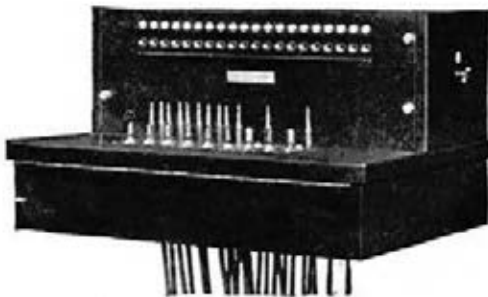
JD-1 Cord Unit



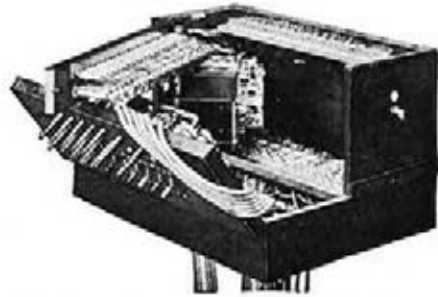
JC-2 Cord Unit



JC-4 Cord Unit



No. JD-3 Cord Unit



No. JD-3 Cord Unit—Showing Gate

Cord Units. Each cord unit is equipped with an operator's telephone circuit (either hand set or desk stand) and night alarm circuits as well as the equipment outlined below. All cord units are adapted for use with all line and line relay units.

On units which are equipped with five cord circuits, five simultaneous connections may be established.

Care is used in the construction of the units to attain the maximum degree of accessibility. The keyshelf is mounted with a piano type hinge, a feature which insures perfect keyshelf alignment. The trunk and cord relays are mounted on a swinging gate which screws rigidly in place by means of brass machine screws.

All battery fuses are located in the cord unit.

Code No.	System	Operator's Ans. and Call Cords	Conn. Cord Ccts. with 1 Way Ring and List Keys	Operator's Set Type	Central Battery Lines	Plug Ended Trks. to C. B. Exchange	Plug Ended Trks. to Mag. Exchange
JC-1	A	1	..	Hand set	20	..	..
JD-1	A	1	..	Desk stand	20	..	..
JC-2	B	..	5	Hand set	20	..	..
JD-2	B	..	5	Desk stand	20	..	..
JC-3	C	..	5	Hand set	20	2	..
JD-3	C	..	5	Desk stand	20	2	..
JC-4	D	..	5	Hand set	20	2	..
JD-4	D	..	5	Desk stand	20	2	..
JC-5	C	..	5	Hand set	20	..	2
JD-5	C	..	5	Desk stand	20	..	2
JC-6	D	..	5	Hand set	20	..	2
JD-6	D	..	5	Desk stand	20	..	2
JC-7	D	..	5	Hand set	20	..	..
JD-7	D	..	5	Desk stand	20	..	..

SWITCHBOARDS—PRIVATE EXCHANGE

No. 1801 Sectional Unit Type (Continued)



No. HA-7 Simultaneous Ringing and Talking Unit, Open

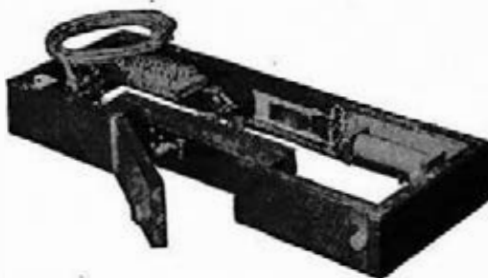


No. HA-7 Simultaneous Ringing and Talking Unit, Closed

SIMULTANEOUS TALKING AND RINGING UNIT FOR USE WITH SYSTEMS A, B and C

It is sometimes desirable to have facilities for ringing and communicating with all stations at once. This unit provides the feature of "simultaneous ringing, listening and talking" which has proven to be of great value at the time of a fire or at any time when it is necessary to send out a "general alarm." This feature has also been used with very good success in schools for ringing the bells at the end of study periods, and in sanitariums and prisons for "spreading an alarm" when one of the inmates has escaped. The only operation necessary to communicate with all stations is the manipulation of the ringing and listening keys. No cords and plugs are used with this feature which reduces the time required for sending an alarm and incidentally reduces the cost of construction. Fire insurance companies consider the simultaneous ringing, listening and talking features very favorably. Since this is a feature which will increase the value and efficiency of the system as a whole, it is advisable that it be included in each installation.

Line Relay Unit. The question of furnishing adequate service, particularly signaling, to stations located a considerable distance (over 800 ft.) from the switchboard frequently arises. The HA-2 line relay unit takes care of this condition. Five relays constitute the equipment in each unit and since the first five lines circuits in each cord unit are wired for conversion to long line equipment it is a simple matter to change to long lines as required. The relays are wired to screw terminals in the rear of the unit.



No. HB-6 Incoming Call Transfer Unit (Open and Closed Views)



No. K-2 Supporting Unit

Incoming Call Transfer Unit. The incoming call and transfer unit is arranged so that all calls can be received at a designated station when an operator is not on duty at the switchboard. This increases the flexibility of the switchboard and makes the system more valuable to the owner. Adapted for use with systems "A," "B," "C" and "D."

Supporting Units. No. K-1. Consists of two jappanned iron brackets for supporting the switchboard against a wall.

No. K-2. A shelf supported by two brackets and a casing for enclosing the cords. Used when the switchboard is mounted against the wall.

No. K-3. A flat-topped desk with one tier of drawers, so arranged that the cores are concealed by a wooden panel.

SWITCHBOARDS—PRIVATE EXCHANGE

No. 1801 Sectional Unit Type

(Continued)

TABLE OF UNITS AND PARTS

	System "A"	System "B"	System "C"	System "D"
Top unit.....	G-1	G-1	G-1	G-1
Line unit.....	HA-1	HA-1	HA-1	HA-1
Line unit.....	HB-1	HB-1	HB-1	HB-1
Line unit.....	HC-1	HC-1	HC-1	HC-1
Line unit.....	HD-1	HD-1	HD-1	HD-1
Line relay unit.....	HA-2	HA-2	HA-2	HA-2
Simultaneous				
Talking and ringing..	HA-7	HA-7	HA-7	—
Incoming call transfer	HB-6	HB-6	HB-6	HB-6
Cord unit.....	JC-1	JC-2	JC-3	JC-4
Cord unit.....	JD-1	JD-2	JD-3	JD-4
Cord unit.....	—	—	JC-5	JC-6
Cord unit.....	—	—	JD-5	JD-6
Cord unit.....	—	—	—	JC-7
Cord unit.....	—	—	—	JD-7
Supporting unit.....	K-1	*K-1	*K-1	*K-1
Supporting unit.....	—	K-2	K-2	K-2
Supporting unit.....	—	K-3	K-3	K-3
Talking battery.....	6 dry cells in series	6 dry cells in series	†6 dry cells in series	†6 dry cells in series
Ringing and Line Lamp battery.....	†20 dry cells in series	†20 dry cells in series	†20 dry cells in series	*†20 dry cells in series
Ringing interrupter...	—	—	—	62A
Telephone sets—Wall.	1527A	1527A	1533M	1533A
Telephone sets—Desk.	6034AU	6034AU	6000AE	6054A

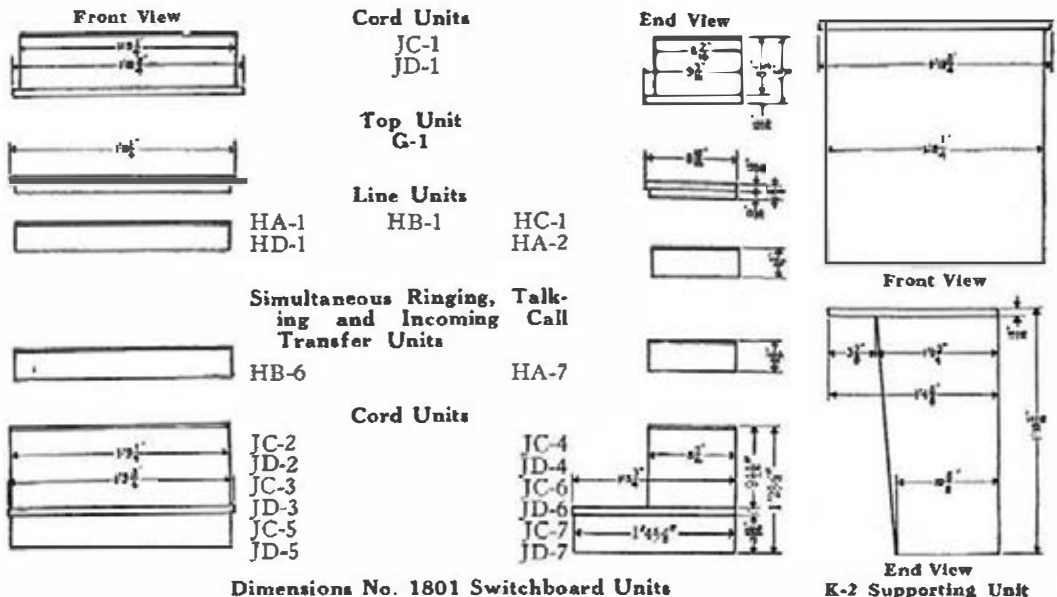
*While the K-1 unit can be used with systems "B," "C" and "D," it does not conceal the cords and one of the other units is recommended.

†If 60 to 100 lines are equipped, furnish 2 strings connected in parallel, each string consisting of 20 cells in series.

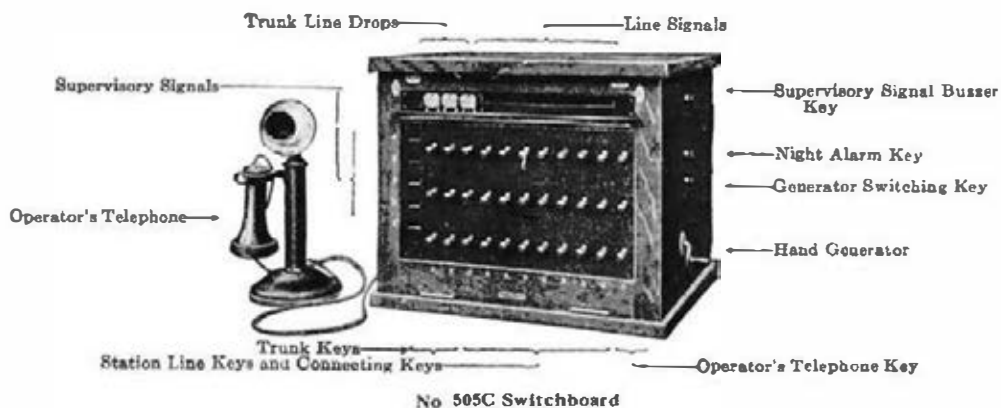
*Line lamp battery only.

†8 cells in series (instead of 6) should be provided if trunks to magneto central office are equipped.

Cord units used with system "D," are equipped with a No. 22 hand generator for ringing.



SWITCHBOARDS—MAGNETO AND CENTRAL BATTERY SERVICE



Cordless Type

These switchboards are designed for both central battery and magneto service and can be used either as private branch exchanges or private exchanges as desired. They are manufactured in three types, the cabinets all being the same size as pictured above. (Height $14\frac{1}{8}$ inch., length $16\frac{3}{4}$ inch., depth $15\frac{3}{8}$ inch.) and equipped to meet service requirements as follows:

No. 505C Private Branch Exchange Switchboard (central battery) equipped with three trunk lines and seven station lines. Commonly called a 3 x 7 cordless switchboard. Trunks can be arranged for connection with either manual central battery offices or for connection to a machine switching office.

Another type is known as the "10 Line Cordless Magneto Switchboard" and is equipped with 10 magneto station lines, any of which may be connected with a line from a magneto office for trunking purposes. This makes an economically operated and convenient private exchange for any isolated factory or institution where inter-department communication is desired.

Compactness in size of cabinet, accessibility of apparatus enclosed and serviceability, have been realized in the design of this switchboard. It has been standardized in light finished quarter sawed oak and birch finished to match mahogany and can be mounted upon an ordinary desk or table making a very desirable equipment where the operator has other duties to perform, such as stenographic or clerical work, etc.

Equipment. Keys operated by cam levers are employed for establishing connections. These permit of rapid operation and a reduction in floor space as no cabinet, desk or special stand must be provided to accommodate cords and weights. The keys provide for five simultaneous connections.

Three push button type keys mounted on the side of the board control the operation of the night alarm buzzer in connection with the line signals, the supervisory signal buzzer, and ringing current from either the central office or hand generator in the board.

The trunks from the central office terminate on drops. This enables central to recall the P.B.X. operator at any time.

Supervision of connections in the central battery type boards is maintained by means of signal targets that are displayed when the parties have finished talking; drops are used for supervision in the magneto type board.

The operator's telephone set includes a desk set with black finish complete with receiver, transmitter and cord and is operated by the key at the extreme right.

Standard central battery telephones are used for the 505 type board and standard magneto telephones for the magneto type boards.

SWITCHBOARDS—NON-MULTIPLE TOLL

"Sanitary Type"

Toll service is a very important factor to consider in the layout of any telephone system regardless of the size, it being the class of service to the public which is recognized as absolutely indispensable and exemplifies the character of the telephone service in the community. It is reasonable therefore that particular care be used in the selection of switchboards to handle this service. The development of the "Sanitary Type" Toll board is the Western Electric Co.'s latest departure from old methods in small switchboard manufacture and is evidence of the efforts being exerted toward the production of modern switchboards that retain the qualities which are characteristic of Western Electric Products upon which the Company's reputation for reliability is built and maintained.

The Framework

The Sanitary Type cabinet is built along the lines of the modern office desk having square lines generally, square legs (metal capped at bottom), plain panels and a clearance underneath for cleaning purposes, hence the term "Sanitary." Red oak lumber, thoroughly seasoned, kiln dried and given a dark durable finish is used in the cabinet construction. Thoroughly glued tongue and groove joints fit the cabinet neatly and securely together. Steel brackets are placed inside of the cabinet at the corners giving additional strength. Cold-drawn galvanized steel is used for stile strips to support the face equipment as well as the keyshelf bars upon which the keys are mounted. This insures permanent, rigid alignment of the face and keyboard equipment.

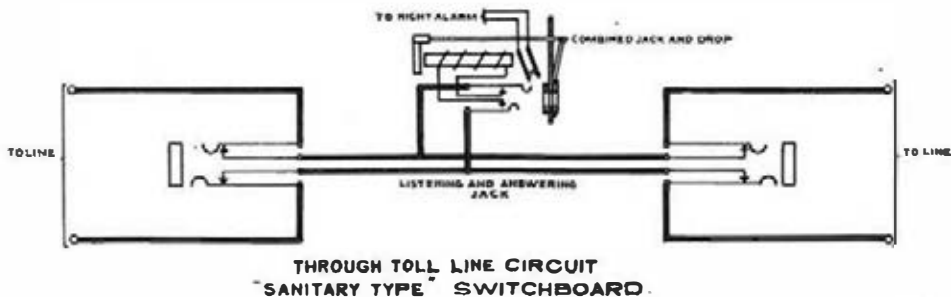
The relays, resistances, retardation coils, etc., associated with the various circuits are mounted on a swinging relay gate consisting of a single piece of undrilled cold-drawn galvanized steel bent into the proper shape and mounted on a substantial steel bracket permitting easy access to apparatus and wiring when open and presenting a neat compact appearance when closed. Plugshelf and piling rail are covered with dull finished non-reflecting durable semi-hard rubber.



Sanitary Type Toll Board

The Apparatus

The well-known No. 23C type combined jack and signal is used in the line circuit. The drop is self-restoring upon insertion of the plug into the jack. The jack springs are well insulated from the drop and night alarm contacts and constructed of metal of the proper resiliency, to insure perfect contact, without unnecessary wear, when the plug is inserted. Universal type keys, which are adaptable to nearly any condition, positive in action, insuring good contact in the normal as well as the operated position, are used in the cord circuits.

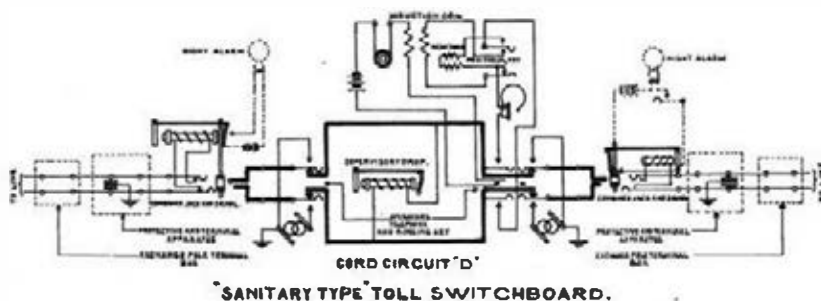


The Line Circuit

Two types of toll line circuits are used, namely, the through toll line and the terminating toll line. The through toll line loops through the office and appears in the face of the board in three double cutoff jacks and a signal.

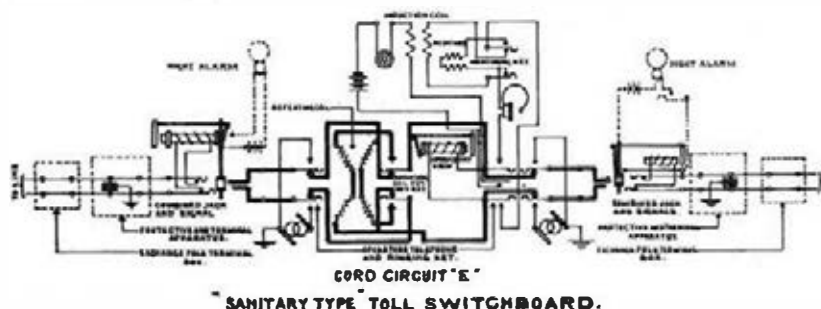
The terminating toll line ends in a combined jack and signal which is of the double cutoff type.

SWITCHBOARDS—NON-MULTIPLE TOLL

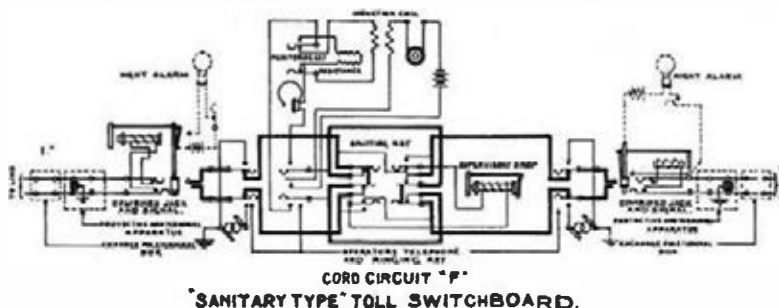


The Cord Circuits

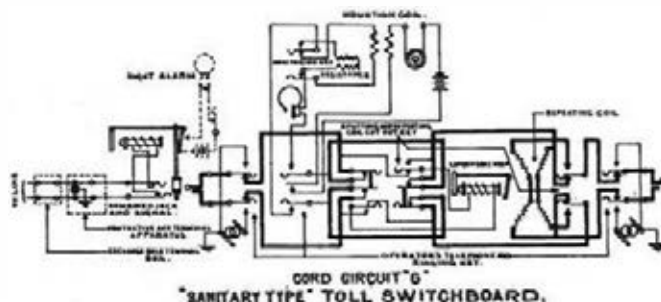
To meet the various requirements four standard cord circuits designated "D," "E," "F" and "G" have been developed. Cord circuit "D" is a simple toll cord circuit arranged for single supervision, two-way ringing and monitoring. Monitoring is an essential feature in all toll cord circuits since it is necessary to listen in for supervisory purposes without interfering with the established connection.



Cord circuit "E" is the same as cord circuit "D" except that a repeating coil wired to a cut-out key has been added. The repeating coil is required in the cord circuit when used to connect a toll line to a grounded, common return or rural line to eliminate noise and is not needed for connections between toll lines, hence the cut-out key.



Cord circuit "F" is arranged for single supervision, two-way ringing, monitoring and splitting, without repeating coil. The splitting key enables the operator to talk to either party on a connection without being heard by the other. This is an advantage in that confusion is avoided in handling connections.



Cord circuit "G" is the same as cord circuit "F" except the repeating coil and cut-out key have been added.

SWITCHBOARDS—NON-MULTIPLE TOLL AND TOLL TEST

Non-Multiple Toll Switchboards—Continued

Other Circuits

Automatic recording trunks from central battery board are jack ended with a lamp signal and provide means of connecting local subscribers through the central battery board to the toll board. These circuits are automatic in operation, the signal in the toll board lighting when the plug is inserted in the trunk jack at the local board.

Outgoing trunk circuits are jack ended in the toll board and plug ended in the local board. The operation is simple as the toll operator requests the local operator, over a call wire, for an outgoing trunk to be assigned for use with each call. The local operator assigns the trunk and plugs the trunk plug into the line desired while the toll operator plugs in to the assigned trunk jack with one of the cord circuit plugs.

Call wire circuits are used in conjunction with the outgoing trunks in establishing connections between the local and toll boards. By pressing a call wire key the toll operator is connected directly with the local operator's telephone set.

The operator's telephone circuit is wired so that the circuit through the transmitter, induction coil and battery is closed only when the operator has a listening key open. A standard long distance transmitter and receiver is used.

Each switchboard is wired for an operator's telephone switching key circuit which is used for switching the operator's telephone from one position to another when several positions are lined up together.

Toll Test Boards

21 and 41 Wire 2 and 4 Jack

The toll line is commercially and physically one of the most important factors in the telephone communication system. It receives first attention when in need of repairs in order that the revenue from it will not be stopped and that towns or cities to which it extends will not be isolated from the rest of the world.

It is reasonable, therefore, that ability to provide efficient, accurate tests is a prime requisite.

The 21 or 41 wire, 2 or 4 jack toll test boards provide sufficient testing equipment and circuit flexibility to insure prompt location of toll line trouble. Reference to 2 or 4 jack circuits, means the number of jacks in the test board through which the toll line conductors are looped for testing purposes. The lines are wired at the jacks in such a manner that they can be opened, closed, grounded or patched through. Each board is equipped with a cord circuit having twin plugs arranged for ringing, listening, talking or patching circuits through.

These boards are adapted for use by either large or small operating companies.

They are suited to the small companies' needs in that they work in conjunction with the No. 1407C testing cabinet and the No. 1407A bridge unit as simple, efficient and reliable wire chief's equipment, where the necessary ground, short circuit, Varley loop or Murray loop tests can be applied as desired.

For the large companies these boards make an ideal test station to be located at a strategic point in the toll line system, from a circuit as well as transportation standpoint, for instance at a toll line junction, where the lines can be opened, grounded or short circuited for testing or patched through for temporary service.



View of 41 Wire 4 Jack
Toll Test Board

SWITCHBOARDS—TOLL TEST

21 and 41 Wire 2 and 4 Jack (Continued)

Capacity

21 wire 2 jack—Equivalent of 10 physical toll lines (2 jacks per wire, 1 ground jack)

21 wire 4 jack—Equivalent of 10 physical toll lines (4 jacks per wire, 1 ground jack)

41 wire 2 jack—Equivalent of 20 physical toll lines (2 jacks per wire, 1 ground jack)

41 wire 4 jack—Equivalent of 20 physical toll lines (4 jacks per wire, 1 ground jack)

The odd jack at the bottom, that is the 21st or the 41st jack, is intended for use as a ground jack and should be connected direct to ground which will prove convenient for use while making tests.

While the capacity of these boards is limited to 20 physical toll lines additional line capacity may be obtained by installing extension test board units which are panels of the same line jack capacity but have no cord circuits or operators telephone circuit.

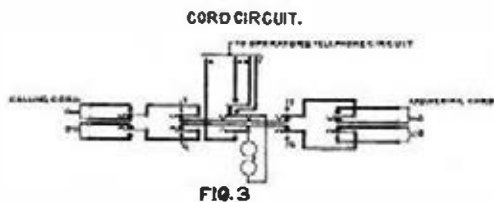
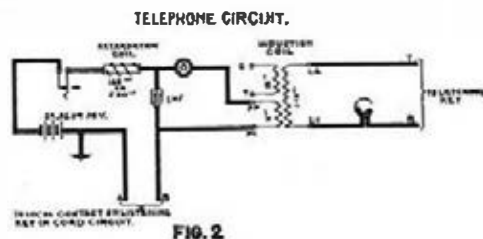
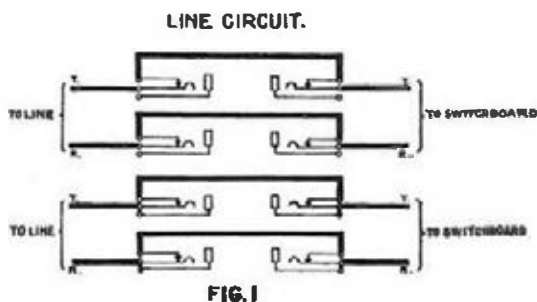
In large toll centers where it is necessary to handle and test more complicated circuits such as simplex, phantom, composite, duplex, telegraph, polar duplex, telephone and telegraph repeater circuits we recommend the installation of our No. 4 toll test board.

The Framework

The cabinets are substantially constructed of thoroughly seasoned, kiln dried mahogany lumber which is given a rich, durable finish. Hard rubber panels of highest insulating qualities are used, on which are mounted the toll line jacks. The rubber panels are securely supported by iron details insuring permanent, rigid alignment of the face equipment. A standard long distance transmitter mounted on a transmitter arm, which is fastened to the top of the cabinet, and a standard head receiver are required with each test board. Designation strips are provided by which each toll line looping through the test board can be properly designated.

The Toll Line Circuits

Toll line circuits on toll test boards are generally referred to and designated by the number of jacks each wire in the circuit is looped through. That is 2 and 4 jack circuits would have each wire of the circuit looped through 2 or 4 jacks respectively. The line circuit is very simple, merely providing means of opening, short circuiting or grounding the lines for testing in either direction and is the standard toll line circuit used in toll test boards. Ordinarily the line jacks are cabled to terminal strips located conveniently on the wall near the board, or to the Distributing Frame where they can be cross connected to any line desired or to phantom or simplex coils if such are installed.



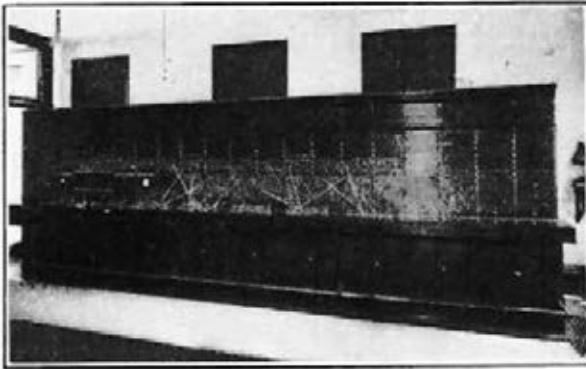
Other Circuits

A cord circuit equipped with twin plugs and arranged for ringing listening, patching and talking on any of the lines for testing purposes is provided. Single plugs are also provided to be used in testing.

Patching cords equipped with either twin or single plugs may be obtained as extra equipment.

The operator's telephone circuit is equipped with the standard long distance transmitter and receiver.

SWITCHBOARDS—CENTRAL BATTERY MULTIPLE



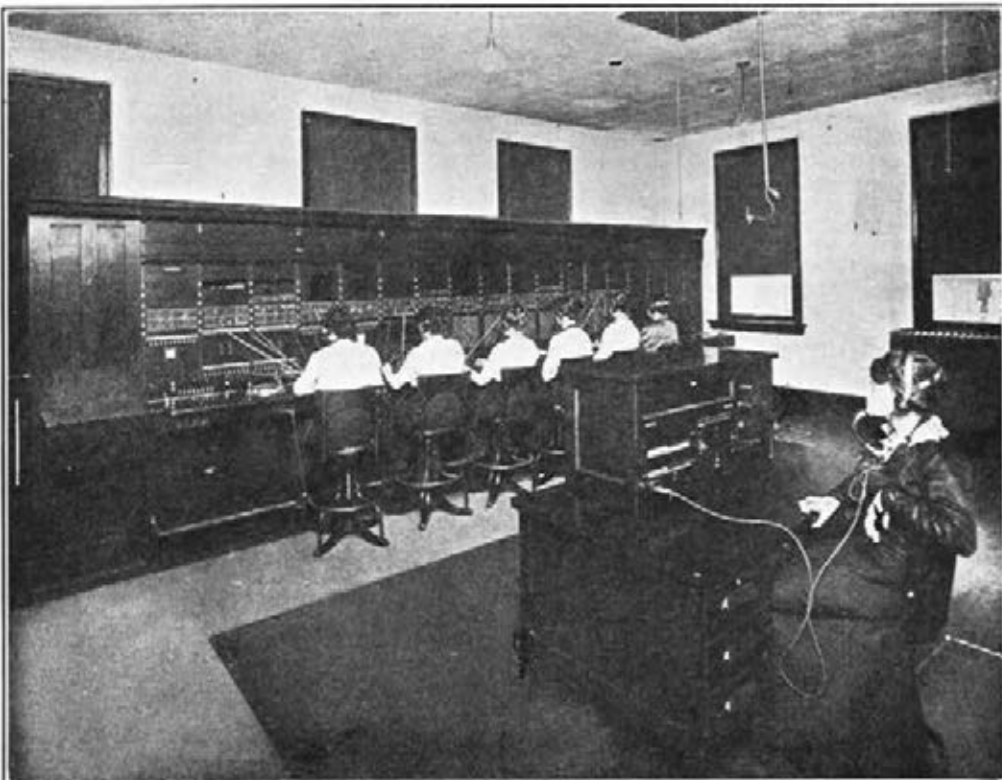
Main Switchboard
Three Sections of 6 Panel No. 1 Type

GENERAL

The idea of using a multiple of the subscriber's switchboard lines to speed up telephone service, by eliminating the transfer trunk system was originated by the Western Electric Company and has been applied to the manufacture of large switchboards for a number of years. Flexibility is provided since a complete multiple of every line in the exchange appears before each operator permitting any line to be called from any position of the switchboard.

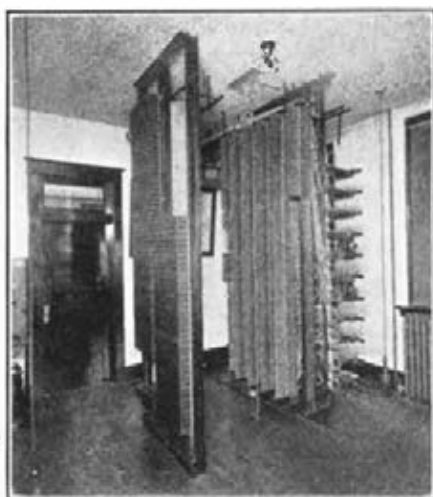
These boards are built to handle efficiently the traffic on exchanges having from 300 to 10500 lines. Since the service features required in a multiple switchboard vary with the conditions peculiar to different localities in which installation takes place, they are built to meet the individual requirements of each exchange. This permits the incorporation of features found desirable after a careful study has been made of the traffic and other conditions.

The layout of a multiple switchboard exchange warrants careful study as consideration must be given to the requirements of future growth, the installation of additional equipment, and other important details.



Operating Room, Showing Main Switchboard and Chief Operator's Desk

SWITCHBOARDS—CENTRAL BATTERY MULTIPLE



Terminal Room

Switchboard Framework

Each section is a unit and consists of 3 operators' positions. A rigid steel skeleton, constructed of steel angles and channels securely riveted and bolted together, constitutes the structure of the framework. This framework is coated with black rustproof paint. Selected mahogany thoroughly seasoned and kiln dried to prevent warping or cracking is used for the cabinet enclosing the steel framework.

All woodwork joints are of the tongue and groove type, thoroughly glued. All exposed outer surfaces are given a rich, durable finish and the inner surfaces coated with shellac as protection against the effects of moisture.

Cold-drawn galvanized steel is used for the stile strips, which support the face equipment, the key mounting bars that hold the keys in place in the keyshelf and the relay mounting supports to which the relay mounting plates are attached. Piano type hinges extending the full length of the keyshelves are used on all boards.

The end panels are removable as well as the front panels that conceal the cords. Rear roller curtains which operate easily allow free access to the back of the section.

Each lineup of switchboard requires a cable turning section at one end to enclose the cables entering the switchboard. Lineups can be straight or with angles as required.

The relays, resistances, retardation coils, condensers, etc., associated with the cord, operator's telephone, supervisor, night alarm and auxiliary signal circuits are mounted in the rear of the board, the line relays being mounted on a separate relay rack.

The plugshelf and piling rail are covered with durable, non-reflecting, semi-hard rubber.

Distributing Frames

A main distributing frame is essential with any switchboard, but in a multiple central office the importance of a properly designed main frame is manifold. Consideration must be given the proper protection of all lines, accessibility of all terminals for the purpose of making cross connections, provision for future growth and strength and durability.

The Western Electric design of main frames takes all of these factors into consideration. The framework proper is of steel bars and angles carefully riveted and bolted together and finished with a rust resisting paint. The protectors afford uniform protection to all lines while all terminals of both protectors and terminal strips are strong and accessible.

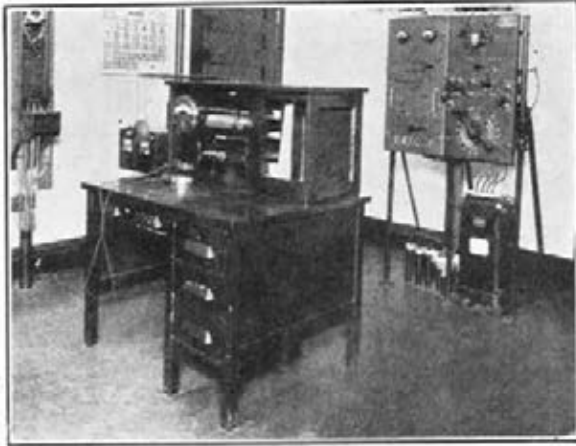
Intermediate distributing frames are not always required or considered essential, but when furnished possess all the good points of main frames.

Relay Rack

The relays for the line circuits are mounted on a separate relay rack associated with the main distributing frame or the intermediate frame when the latter is furnished.

Western Electric relay racks are constructed of steel bars, I-beams and angles, carefully designed to provide ample strength and preserve alignment. All metal work is given a rust resisting finish.

SWITCHBOARDS—CENTRAL BATTERY MULTIPLE



Wire Chief's Desk, No. 1309D, and Power Plant

Power Plant

A power plant for a multiple switchboard comprises—motor generator or rectifier charging equipment—power board—storage battery—ringing equipment—conduit and wiring, representing the heart of the entire exchange. Careful attention is given to ample capacity of all units as providing for the ultimate needs of the switch board as well as the immediate needs.

All units for the Power Plant of a Western Electric switchboard are selected for efficiency and ability to perform satisfactorily for the entire period of expected life.

Testing Equipment

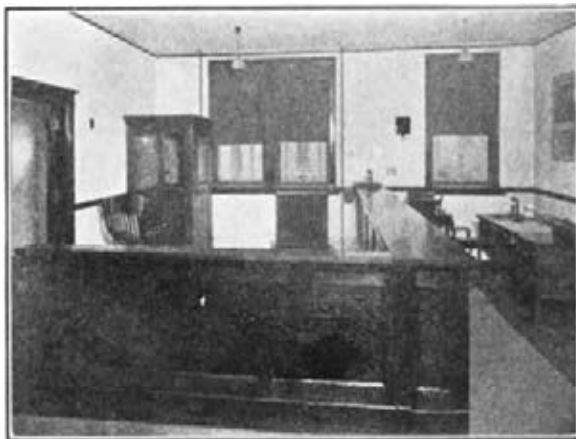
The Western Electric Company always recommends the adoption of testing equipment enabling a wire chief to keep an accurate check on the conditions of all line and switchboard circuits as well as insuring the prompt detection and location of all circuit troubles.

This equipment assumes different forms—i.e., a comprehensive type of wire chief's desk or a simple form of wire chief's turret suitable for mounting on a commercial desk as dictated by the desires of the telephone company.

Chief Operator's and Other Similar Desks

As providing suitable equipment for a chief operator enabling her to receive and originate calls with the subscribers it is customary to provide a chief operator's desk. In the case of large exchanges information desks and sometimes service observing desks are frequently desired.

The grade and finish of this equipment matches that of the switchboard with which it is used.



A Typical Central Office—Business Office

SWITCHBOARDS—CENTRAL BATTERY MULTIPLE



Exchange Building



Floor Plan

Circuits

All circuits used in Western Electric switchboards, chief operator's, wire chief's and other desks are thoroughly standardized and represent the ideas of engineers, and traffic experts thoroughly versed in the telephone switchboard art. All circuits are designed for dependability and clean-cut operation. All apparatus is of the most modern type employing materials and designs conceived or selected by and worked out by the largest and most proficient body of telephone engineers in the world operating as one organization unit.

Of particular interest in these days of using mechanical and electrical devices to decrease manual effort at the same time insuring better and more expeditious results are the automatic features which the Western Electric Company has selected for the cord circuits of its central battery multiple switchboards. The principal features are those involving automatic ringing and automatic listening (insuring an increase in operating efficiency in most cases of from 25 to 30 per cent.) as follows:

- Automatic listening.
- Automatic ringing.
- Automatic ringing tone to calling subscribers.
- Automatic ringing cut off on abandoned calls.
- Automatic ringing cut off the instant the called party answers.
- Automatic flashing recall.
- Secrecy listening in.
- Listening out.



View of Multiple Switchboard in Chelsea Office, New York City, Cut in Over Eighteen Years Ago and Still in Operation.

SWITCHBOARDS—CENTRAL BATTERY MULTIPLE

Description of Features

Automatic listening is desirable from an operating standpoint as it eliminates opening and closing the cord circuit listening key, after the answering cord has been inserted, to obtain the number desired from the calling party. With automatic listening the operator is in direct communication with the calling subscriber the instant the answering plug is inserted in the jack; when the calling plug is inserted in the called subscriber's line, the operator is automatically disconnected.

Automatic ringing relieves the operator of any responsibility regarding the ringing with the exception of setting the ringing key to select the proper current where selective ringing other than two-party jack per station is used. Ringing current supplied over the calling cord flows out over the line as soon as the calling plug is inserted in the called subscriber's line jack and the setting key operated. The ringing circuit is interrupted at regular intervals allowing the bell to ring two seconds and remain silent four seconds. This operation continues until the called subscriber answers or the calling party abandons the call. The economy effected by operator's time saved fully warrants the installation of this feature.



Automatic ringing tone to calling subscriber is a light, yet distinct, ringing tone which is carried back over the answering cord to the calling subscribers telephone. This allows the calling subscriber to "hear" his party being rung and to know that his call is getting all the attention possible.

Automatic ringing cut-off on abandoned calls is a feature that stops the ringing of the called subscriber the instant the calling party abandons the call. This eliminates any confusion which might be experienced if the called subscribers' bell were allowed to ring until the operator took the connection down.

Automatic ringing cut-off the instant a call is answered is essential as it eliminates the possibility of making angry subscribers by ringing them in their ears. The ringing current is positively disconnected the instant the receiver is removed from the called telephone either during the silent or ringing interval.

Automatic flashing recall feature has become so popular with telephone users and telephone companies that it is considered indispensable in the modern switchboard. The flashing recall feature provides a persistent signal, demanding instant attention, by flashing the cord circuit supervisory lamp. A calling subscriber after completing one conversation and replacing the receiver on the hook, desiring to call another number, may do so by merely lifting the receiver, which will start the flashing recall and intermittently flash the supervisory lamp in the cord circuit insuring immediate attention by the operator who handled the previous connection. This feature raises the quality of service to the public and makes satisfied subscribers.

Secrecy (or emergency) listening-in provides a means for the operator to talk to a subscriber after the connection has been put up. This is an advantage in clearing up confusing service conditions that are the result of a misunderstanding or misinterpretation. The operator, however, can talk or listen to only one subscriber at a time and cannot listen in on a conversation between subscribers.

Listening out is desirable as a means of speeding up service for it provides a way for the operator to temporarily isolate the occasional subscriber, who does not articulate clearly and from whom the desired number is obtained with difficulty. By this method the operator can handle the traffic on her position without interfering with the subscribers that use their telephone properly.

SWITCHBOARDS—CONVERTIBLE MULTIPLE



View of Convertible Multiple Switchboard

Convertible Multiple Switchboards

There comes a time in the life of most magneto telephone exchanges when it becomes necessary to replace the old magneto switchboard with larger, more modern equipment. If the traffic to be handled is such that three or more operators' positions are required or if it is desired to improve the service rendered, the installation of a central battery multiple switchboard is generally the logical step to take. The installation of central battery equipment, however, includes changing all local telephones to the central battery type and high grade outside plant construction to insure the satisfactory operation of the central battery system.

On account of the large immediate expense incidental to such a change it is sometimes advisable to install a convertible multiple switchboard which is in reality a central battery multiple equipment so arranged that the magneto lines can at the start be operated as such without change in the outside plant or substation equipment.

Any line or group of lines can then be changed over to central battery operation whenever desired by simply changing the telephone set at the subscribers station and making a few minor changes in the line connections at the central office, assuming that the outside construction of these lines is up to central battery standard at the time.

This system is frequently favored by many telephone men for the following reasons:—

1. The initial outlay is materially decreased as the first cost need cover only the new central office equipment and such equipment for new subscriber stations and lines as are desired to be operated central battery at the start.
2. The change from magneto to central battery may be brought about at such times and to such an extent as is found convenient or desirable by the operating company.
3. The question of increased rates for better service is more easily solved as those subscribers who do not favor an increased rate may be left on the magneto basis. Such subscribers very soon see that the central battery telephone is more convenient than the old magneto instruments and apply for the higher grade service at the higher rate applying thereto.

In appearance and design the convertible multiple switchboard is identical with a central battery multiple equipment except that the line relays are designed so that by a simple change in the connections they will provide a central battery or a magneto line operation depending on the way these connections are made. When they are connected to operate on a central battery line they function the same as line relays do in a regular central battery exchange.

The cord circuits in this type switchboard are equipped as universal cords instead of straight central battery cords. These universal cord circuits automatically adapt themselves to either central battery or magneto lines without special action on the part of the operator or change in the equipment or wiring.

Multiple convertible switchboards are manufactured in various sizes to care for small and medium sized exchanges, requiring multiple switchboard equipment.

TELEPHONES—GENERAL



**Wall Telephone
Central Battery Dial Type**



**Desk Telephone
Central Battery Type**



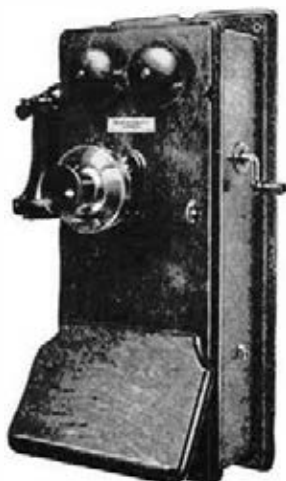
Inter-Phone

Western Electric telephones can be relied upon to give satisfactory service with minimum maintenance. Our extensive experience in the manufacture of telephone equipment for over half a century enables us to offer equipment which has proved its efficiency and reliability under most severe conditions. Through scientific design, careful construction and the use of only the best materials and workmanship, Western Electric telephone apparatus is recognized by the leading telephone authorities throughout the world as standard.

Our large output enables us to purchase raw materials under rigid specifications in large quantities at the lowest market prices. This, together with unequalled manufacturing facilities, makes it possible for us to offer standard telephones at reasonable prices. Every telephone and, in fact, every part is subject to a rigid inspection, both in the raw material and during manufacture, as well as before shipment.

Large and complete stocks of standard apparatus are carried in our numerous distributing houses, which are located in cities of the United States and are so situated as to make possible the delivery of standard goods in most cases within twenty-four hours after the receipt of the order. This system of locating distributing houses in the various commercial centers throughout the country insures prompt filling of orders, together with a considerable saving in transportation, as our prices are F. O. B. distributing houses.

There is a Western Electric telephone which will satisfactorily meet any standard service condition, the telephones listed on the following pages being considered as meeting all usual requirements. For special requirements, we have special telephones. Should special conditions be met, which are not already covered by existing apparatus, your problem will be given immediate and cheerful attention by our engineers.



**Wall Telephone
Magneto Type**



Mine Telephone



**Desk Telephone
Magneto Type**

TELEPHONES—GENERAL

Definitions of General Telephone Terms

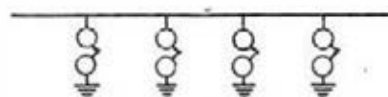
The following definitions of the terms used in connection with the apparatus in this catalog may be of interest and helpful in selecting the instruments best suited to various conditions or requirements.

Telephone Lines

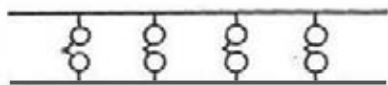
Grounded Lines. A grounded telephone line or system consists of only one wire, the ground being used for the return circuit—hence, the term “grounded line.”

Grounded lines give fairly good results, when properly constructed, provided there are no electric light, power or trolley wires in the immediate vicinity. The presence of such power wires is likely to cause objectionable humming and buzzing in the receivers, when the line is in use. Grounded lines are also subject to “cross talk”; that is, a telephone conversation on one line is liable to be heard in the telephones on adjacent lines. These objectionable features of a grounded line exist because the single wire of a grounded circuit cannot be transposed to overcome inductive influences from other circuits.

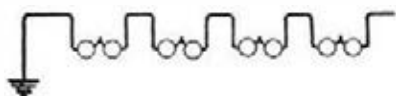
Metallic Lines. A metallic line is one consisting of two line wires, the ground not being used in this instance to complete the circuit. Metallic lines, under almost all conditions, are the most satisfactory to maintain and operate and are almost universally used, grounded lines being very rarely considered when high-class service is required.



4 Ringers “Bridged” from the line to ground of a Ground Circuit



4 Ringers “Bridged” across the two Conductors of a Metallic Circuit



4 Ringers in series with a Grounded Circuit

Bridging Lines. Practically all telephones in present day use are known as “bridging telephones.” These telephones are connected in parallel across the line wires, when used on a metallic circuit, or from the single line wire to the ground, when used on a grounded line.

Series Line—Magneto. Early in the development of the telephone art, magneto telephones were connected in series—like telegraph instruments are connected in a telegraph line. It was later found that the voice currents by passing through all the ringers connected in the line were quite seriously impeded and lost much of their strength, thus making it impractical or impossible to telephone over long distances or to place large numbers of telephones on one line and, at the same time, secure satisfactory service. As mentioned above, nearly all telephones in present day use are bridging, the use of series apparatus being discouraged, except for necessary replacement purposes.

Telephone Systems

There are two general classes of manually operated telephone exchange systems in present day use; namely “Magneto” (sometimes called “local battery”) and “Central Battery” (sometimes called “common battery” or “central energy”). These two systems differ principally in the details of operation, that is, in the method of signalling or calling the other telephones and “central” and in the method of furnishing current for talking. The use of the central battery system is practical in cases where the telephone lines are comparatively short and such systems are therefore usually used in towns where 300 or more telephones are located within 3 or 4 miles of the exchange. Central Battery (C.B.) systems are also operated by industrial concerns using a large number of telephones within a comparatively small area.

Magneto Systems. In magneto systems, the telephone user signals or calls the exchange or other telephones on the same line by turning the crank of a magneto generator, the current thus generated causing a signal to be displayed or sounded in the central office (or exchange) or the ringers of the other telephones on the line to ring.

In magneto systems, the current for talking is usually furnished by two or three dry cells, either located inside the telephone itself (in the case of a wall telephone) or nearby on a shelf or in a battery box (in the case of a desk telephone).

TELEPHONES—GENERAL

Definitions of General Telephone Terms (Continued)

Central Battery Systems. In manual central battery systems, the exchange is signalled by merely lifting the receiver from the hook on the telephone. In these systems, the telephones cannot be rung except from the exchange as they are not equipped with magneto generators.

In central battery systems, the battery (usually 24 volts) which supplies current for talking, as the name implies, is located at the central office or exchange, one battery usually supplying all the telephones connected to the exchange.

Central Battery Signalling—Local Battery Talking. In this system, as the name implies, central battery signalling is employed but current for talking is supplied by dry cells as in magneto telephones. Telephones of this type are used only on long central battery lines where the current from the central office battery would be too weak (due to the high line resistance) to give the grade of transmission desired.

Private Lines. These are lines (either grounded or metallic) the telephones on which have no connection with telephones other than those on that particular line; that is, they are not connected to a switchboard.

Private lines are principally used by railroads, mines and for farm or rural lines.

Standard bridging magneto telephones are usually employed for private line work, although special designs of telephones are available for special classes of service such as for street railway telephone systems, mine telephone systems, etc.

Private lines, as above described, should not be confused with individual or direct lines, later described, which refer to exchange lines, equipped with only one telephone.

Intercommunicating Systems. These systems include a number of lines, which usually cover a very limited area, generally within the premises of a single owner or concern. Such systems in general are of an automatic nature; that is, the user performs his own switching by pressing a button or key, which rings the bell of the desired station and connects the two lines for talking. No operator is required for these systems and, in fact, no systems requiring a switchboard and attendants are considered under this classification.

As in the case of telephones for a railway train dispatching system, the instruments used in intercommunicating systems do not fall under either the magneto or central battery classification and they are best described and known as intercommunicating telephones. The Western Electric Company's trade name for intercommunicating telephones is "Inter-phone" and on the following pages will be found a very comprehensive line of this class of equipment, under the heading "Inter-phones."

Exchange Lines

Individual Lines. An individual or direct line may be metallic or grounded and has but one telephone connected to it.

Party Lines. A party line is one having two or more telephones connected to it. The number of telephones which can be connected to a party line varies all the way from two to forty or fifty, depending entirely on the ringing system employed, the character of service desired and the local conditions encountered.

Generator Ringing Currents

Alternating Current. At each revolution of the armature of an alternating current magneto generator or a bi-polar ringing machine, current of one polarity is generated the first half of the revolution and current of the opposite polarity the other half of the revolution; this current rising from a zero value to maximum and then dropping again to zero, then building up in the opposite direction to the maximum and again dying out to zero as the cycle is completed. This is an alternating current. For ringing telephone bells, an average frequency of 16 to 20 cycles per second (in other words, 16 to 20 revolutions of the armature) has been found to give the best results.

Pulsating Current. A generator arranged to produce "pulsating" ringing current is in general the same as an alternating current one except that a two segment commutator and two brushes are added. These are arranged so that during one-half of the cycle, positive pulsating current is delivered to the positive brush and during the other half of the cycle, no current is delivered to that brush (or else it is grounded). Negative pulsating current is delivered to the negative brush in the same manner.

Superimposed Ringing Current. "Superimposed" current is obtained by connecting a storage battery in series with a generator delivering alternating current. The storage battery reduces the A.C. wave during one-half of each cycle and increases it the other half. This current is used for operating ringers selectively in the same manner as pulsating current. Ringers adjusted for operation on pulsating current will operate satisfactorily on superimposed current.

TELEPHONES—GENERAL

Definitions of General Telephone Terms (Continued)

RINGERS

Alternating Current and Pulsating Current. Ringers intended for operation on pulsating current are provided with a bias spring which normally holds the armature so that it is free to move in one direction only. In view of this, the ringer will respond to pulsating current of one polarity, but will not respond to pulsating current of the opposite polarity. In addition to the bias spring, ringers designed for operation on pulsating current have a stop screw for limiting the movement of the armature, thereby facilitating the pulsating current adjustment.

The presence of a bias spring does not necessarily indicate that the ringer is adjusted for operation on pulsating current, as the bias spring is frequently used to prevent an alternating current ringer from tapping, due to inductive disturbances on the line, and in some cases to prevent operation on pulsating current (see Center Checking System). Ringers designed for operating on pulsating current, may be operated on alternating current.

Transmission Circuits ("Talking Circuits")

Western Electric telephones are equipped with a number of different types of transmission circuits, four of which are listed below. (Interphone and short line telephone circuits are described under "Interphones.")

Type	One of the various transmitters used for this service	Receivers	Induction Coil	One telephone employing this type of transmission Circuit
A Central Battery	323BW	143AW 144AW	46	1533A
B Local Battery	323BW	143AW 144AW	13	1317N
C Local Battery Talking-Central Battery Signalling	323BW	143AW 144AW	13	1533Y
D Series Central Battery	323BW	171W ("Magnetless" receiver)	None	1533K

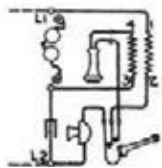
The circuit designated "A" in the above table is the Western Electric "standard" for Central Battery Service. This is the highest efficiency circuit for long line service and is used in all "Standard" Western Electric central battery telephones.

The circuit "B" is the Western Electric "standard" local battery circuit and is used in practically all Western Electric magneto telephones. This is the highest efficiency local battery circuit that has been developed up to the present time.

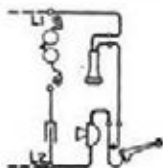
The circuit "C" is used on central battery lines which are so long that the current from the central office battery is not sufficient to provide satisfactory transmission. This circuit is the same as the standard local battery circuit except that no generator is employed and that a condenser is used, as in the standard central battery circuit, to prevent the flow of current from the central office battery through the ringer. The conditions under which this circuit is required are exceptional and it is therefore considered special.

In the circuit "D" the transmitter and receiver are connected in series across the line, no induction coil being employed. The receiver is the "magnetless" type, i. e., it has no permanent magnet. The transmission obtained with this circuit is satisfactory on short central battery lines, i. e., lines not exceeding two miles in length (using 22 B. & S. gauge cable) but on lines longer than this the transmission efficiency of this circuit is appreciably lower than that of circuit "A." In view of the fact that circuit "A" gives the best results on both short and long lines its use is recommended in preference to circuit "C."

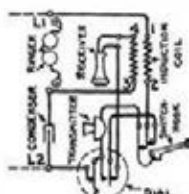
The following are diagrams of telephones employing the above transmission circuits.



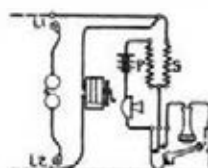
Standard Central
Battery Telephone
Circuit
(Induction Coil Type)



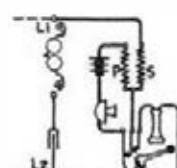
Series Type



Standard Central
Battery Telephone
Circuit with Dial



Standard Local
Battery Telephone
Circuit



Local Battery Talking
and Central Battery
Signalling Circuit

TELEPHONES—MAGNETO

Magneto Telephone Systems

Service. The number of magneto telephones that can be connected on the same line varies, ranging from 1 to 40 or more. However, a line having more than 20 or 30 telephones connected to it, is usually very unsatisfactory from a service standpoint, except in a case of necessity or for temporary service, the reason for this being that a line having so many telephones is found to be in use almost continuously, the bells ringing at very frequent intervals and the users almost sure to be "rung in the ears" or otherwise interrupted during a telephone conversation.

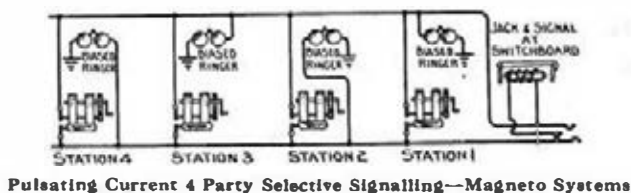
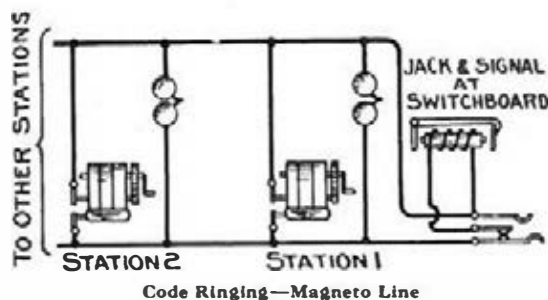
The following definitions of what may be considered a lightly loaded, medium or heavily loaded line are submitted with the thought that the limits are conservative enough so that under all but extreme conditions the figures given can be relied upon. In the following pages will be found a complete catalog of telephones and opposite each a statement as to the maximum line load under which that telephone will give best service.

The telephone lines referred to are assumed to be well insulated, free from high resistance joints, and constructed of iron wire not smaller than No. 14 B. W. G. gauge.

Light Loaded Lines. A light loaded line is one less than 15 miles in length, and not equipped with more than twelve telephones.

Medium Loaded Lines. A medium loaded line is one between 10 and 30 miles in length and equipped with from 10 to 30 telephones.

Heavy Loaded Lines. A heavy loaded line is one up to 40 or 50 miles long or equipped with up to 40 telephones. Lines loaded with this number of telephones are rapidly going out of use or are being broken up into shorter lines or equipped with fewer telephones. Lines of this length, loaded with this great number of telephones, should be discouraged in all cases except in cases of extreme necessity or for temporary service.



Code Ringing Non-Selective

The most universal method of signalling parties on a magneto telephone line is by code ringing. In the code ringing system, rings of different codes are employed for signalling each telephone, such as 2 short, 3 short, or 1 long and a short, 2 long and 2 short rings or other combinations. This system has the advantage that it can be used with a large number of telephones on the same line, any number in fact, the number which can be placed on a line depending on conditions other than ringing. Again, it is a simple system, as no special apparatus has to be used, the undesirable feature being that when one telephone is called, all the other telephones on the line are also rung, making it necessary for the user to count every signal in order to know when he is being called. This system is most commonly used on rural or farmers' telephone lines.

TELEPHONES—MAGNETO

Magneto Telephone Systems

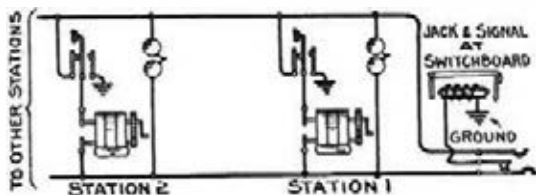
FOUR PARTY SELECTIVE—EMPLOYING PULSATING CURRENT

In this system, any one of four telephones on the same line may be rung without ringing the others. This is accomplished by sending positive or negative pulsating current out over either side of the line (through the ringers connected to that side of the line), to ground. In other words, the central office operator connects either the positive or the negative terminal of the ringing generator to either of the two line wires and as one terminal of the generator is permanently grounded a return circuit is established through the ringers. The ringers used in this service are equipped with bias springs and armature stop screws and are so adjusted that they will ring when negative pulsating current is connected to the terminal nearest the bias spring and will not ring when positive pulsating current is connected to this terminal. Two of these ringers are connected from each side of the line to ground, the ringers on the same side of the line being connected differently; in other words, one ringer is connected with its negative terminal (the terminal nearest the bias spring) to the line while the other ringer on the same side of the line has its positive terminal (the terminal opposite the bias spring) connected to the line. In view of this, it will be seen that when pulsating current is sent out over one side of the line, through the ringers, to ground only one of the two ringers will respond, depending on the polarity of the ringing current.

The generator (No. 22E) used in these telephones operates the central office drop but does not operate the ringers on the line.

CENTRAL OFFICE SELECTIVE SIGNALLING

Telephones for this service are so wired that the switchboard drop or signal may be operated "secretly," that is without ringing the bells of any of the other telephones on the same line. This is accomplished by pressing a button while turning the generator crank. We are prepared to furnish three different telephones, each equipped with a different type of push button, which performs similar service, but in a slightly different manner, the results, however, being much the same.



Wiring of Telephones and Switchboard Apparatus when No. 1006A Push Buttons Are Used

Central Office Selective Signalling Using the 1006A Push Button and A.C. Generator. Operating this push button connects the generator to one side of the line and to the ground. These telephones can be used only on metallic lines and where the switchboard drop is singly wound and has one terminal of its winding connected (or arranged so that it can be connected) to ground. When the generator is operated without pressing the push button, all the other telephones on the line are rung without operating the drop at the exchange. When the push button is pressed when turning the generator crank,

the drop is "thrown" (operated) but none of the other telephone ringers on the line are rung.

CONDENSERS—"LISTENING IN" TROUBLE

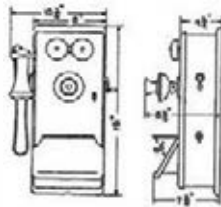
On rural lines trouble is frequently experienced, due to receivers being carelessly left off the switch-hook or due to parties "listening in," whenever their telephone rings, regardless of whether or not the call is for them. When a number of receivers are off the hook it is usually impossible to ring as they form a lower resistance path for the ringing current than the ringers. To overcome this it is customary to use telephones equipped with a condenser wired in series with the receiver. (The presence of the condenser does not appreciably affect the receiver circuit as far as voice currents are concerned, but it increases the resistance to ringing current to such an extent that the ringers receive the amount of current they require for operation.)

Practically all of our magneto telephones, arranged for code ringing, have terminals provided so that a condenser may be readily connected in the receiver circuit at any time and certain telephones are equipped with a condenser in the receiver circuit as standard. (See descriptive list of telephones).

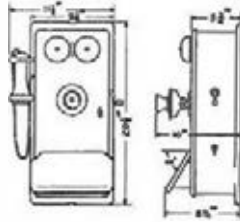
TELEPHONES—MAGNETO



2 Cell, Closed View
No. 1317 Telephone



2 Cell



3 Cell

Dimensions of 2 and 3 Cell
No. 1317 Sets



3 Cell, Closed View

No. 1317 Type Magneto Telephones

GENERAL DESCRIPTION

The No. 1317 type telephone represents the highest development attained in magneto telephone design and construction. It has been standard with the Western Electric Company for more than a decade, and its high efficiency, reliability and long life have been thoroughly proven by the hundreds of thousands in service.

2 and 3 Cell Types

No. 1317 telephones are made in two styles, namely, the "2 cell" and the "3 cell." The talking circuits of these two types are identical, i.e., they employ the same transmitters, receivers and induction coils. The battery compartment of the "3 cell" type is sufficiently large to take three standard dry cells, whereas only two dry cells can be placed in the "2 cell" type. The larger cabinet of the "3 cell" type also permits the mounting of the No. 48 type (5 bar) generator, while the "2 cell" type employs the No. 50 type (large 3 bar) generator.

The No. 50 type (large 3 bar) generator, while intended primarily for use on medium loaded lines is exceptionally powerful, and is capable of giving satisfactory service on about 90 per cent. of the lines now in use. For example this generator will ring thirty 2500 ohms ringers connected to a No. 12BB iron metallic telephone line 15 miles in length (provided, of course, that the line is properly installed and in good condition). It will operate more telephones on a line than many four or five bar generators.

Woodwork and Finish. The cabinet is made of quarter sawed oak and given three coats of high-grade varnish rubbed down by hand. Unexposed surfaces of the telephone are also given a protective finish so as to prevent warping.

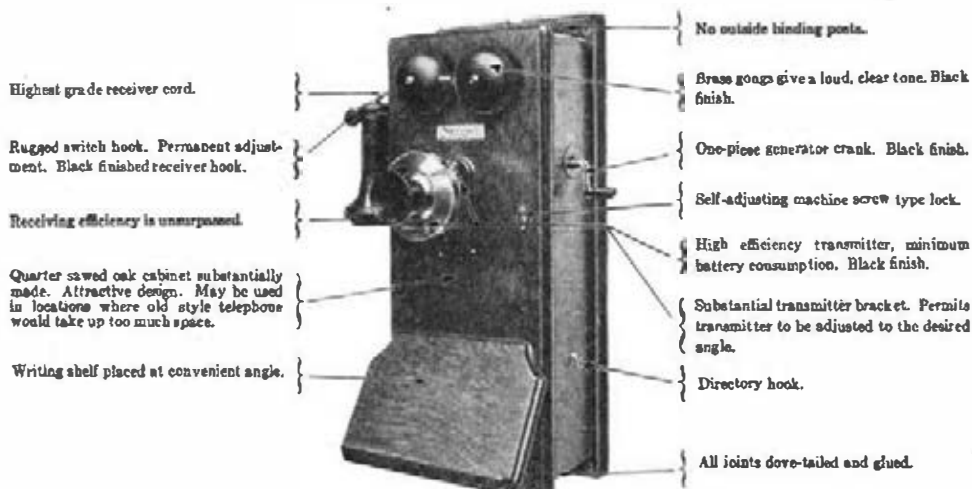
Wiring. All terminals including those for the transmitter, receiver, cord, line wires, etc., are plainly marked so that there can be no possible mistake when making connections. The various cords, such as those of the transmitter and receiver and the flexible leads running to the condenser are all furnished with cord tips.

A complete and explanatory circuit label is pasted on the inside of the door of each telephone in addition to what a booklet is furnished giving complete instructions for installation and maintenance.

Metal Finish. The transmitter bracket, gongs, switch hook, generator, crank and lock escutcheon are given an extremely durable and pleasing black finish.

Adjustment. These telephones are carefully adjusted in the factory, and should, therefore, be satisfactory for service as received by the customer unless unusual service conditions should be encountered, in which case only the ringer will require readjustment. The adjustment of the ringer is a very simple matter and instructions furnished in the booklet are so clear that no difficulty will be encountered.

TELEPHONES—MAGNETO



No. 1317 Magneto Type

NO. 1317 THREE-CELL TYPE

Code No.	Code No.	Resistance, Ohms	Generator Code No.	Condenser Code No.	Class of Signal Service		
					Telephone to Central Office	Central Office to Telephone	Line Conditions as Regards Load
1317AH	38AG	1000	22A	....	Code	Code	Lightly
1317N	38FG	1600	48A	....	Code	Code	Medium
1317R	38FG	1600	48A	21W	Code	Code	Medium
1317P	38BG	2500	48A	....	Code	Code	Heavily
1317S	38BG	2500	48A	21W	Code	Code	Heavily
1317BA	38FG	1600	48A	....	*C.O. Selective	Code	Medium

NO. 1317C TWO-CELL TYPE

1317CH	53AG	1000	22BA	....	Code	Code	Lightly
1317CN	53FG	1600	50F	....	Code	Code	Medium
1317CR	53FG	1600	50F	21W	Code	Code	Medium
1317CP	53BG	2500	50F	....	Code	Code	Heavily
1317CS	53BG	2500	50F	21W	Code	Code	Heavily

In addition to the above-mentioned apparatus, these 1317-type telephones are equipped with the following:

Transmitter	323BW	Induction coil	No. 13
Receiver	143AW	Transmitter bracket	No. 8A
Receiver Cord	No. 521 (30 ins.)	Switch-hook	No. 143Y
Transmitter Cord	1-547 (6 ins.)		

*Equipped with No. 1006A push button. Telephone user can signal central office secretly or not, as desired, and can signal other parties on the same line by code ringing (see pages describing "Magneto Telephones—Definition of Terms").

NO. 1317 TELEPHONES FOR RAILROADS

1317W Wall type telephone set for use on standard railway dispatcher's telephone circuits at sidings and similar places for use of conductors and trainmen. Provided with high efficiency transmission circuit. Employs push button for use when talking. 5 bar A.C. generator and 2500 ohm unbiased ringer. Contains:

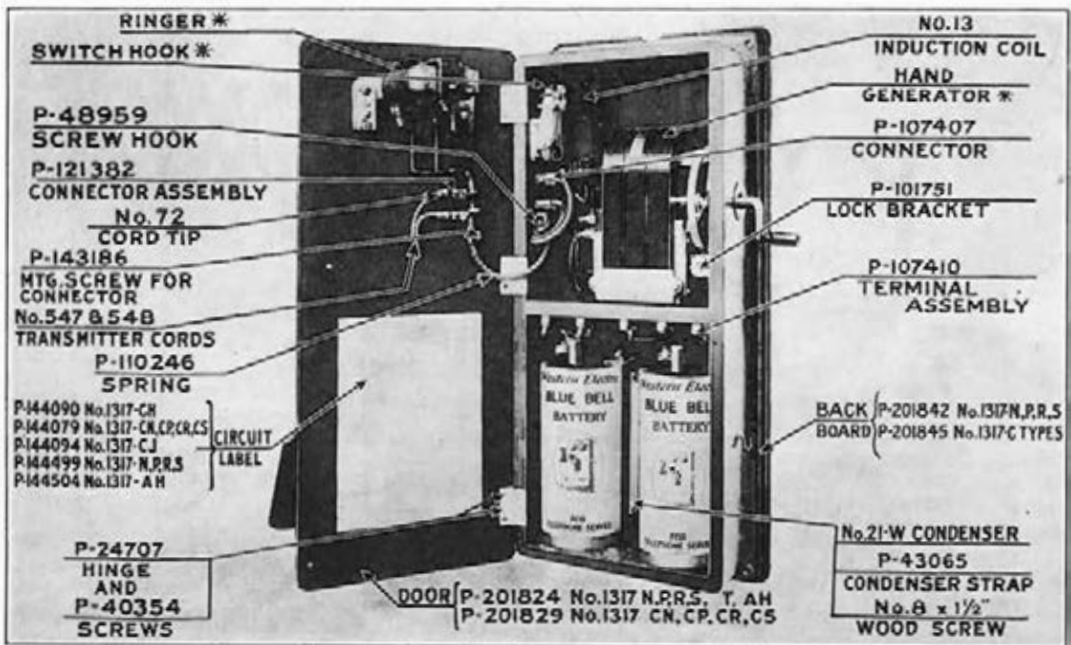
1 No. 48A generator	1 No. 143AA switch-hook	1 No. 280W transmitter
1 No. 38BG ringer	1 No. 8A transmitter bracket	1 No. 508W receiver
1 No. 21AA condenser	1 No. 1003A push button for	1 No. 547 cord
1 No. 29 induction coil	$\frac{1}{8}$ inch wood work	1 No. 548 cord
1 No. 51A retardation coil	1 2-foot No. 446 receiver cord	2 No. 540 cords

TELEPHONES—MAGNETO

No. 1317 Type Magneto Telephones (Continued)
REPLACEMENT PARTS



No. 1317 Telephone Closed View



No. 1317 Telephone Open View

Note. *Replacement parts for the ringers, hand generators, etc., as listed above are shown elsewhere under their respective headings.

TELEPHONES—MAGNETO



Desk Telephone, Magneto Type

Desk Types

Nos. 6003 AND 6004 TYPE

The Nos. 6003 and 6004 type desk telephones consist of a No. 1040AL Desk Stand and a No. 300 or 315 type Desk Set Box. These telephones comprise the combinations of desk stands and desk set boxes that are most used, and therefore, for convenience in ordering, are covered by a single code number.

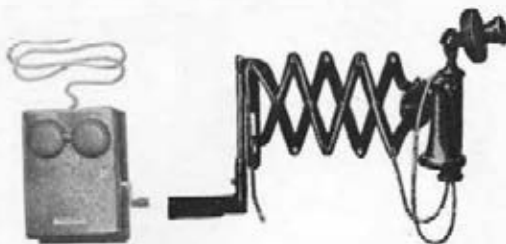
Combinations of apparatus differing from those covered by these code numbers listed may be obtained by ordering the separate items that will make up the desk telephone desired. The following items of apparatus are the electrical equivalent of the No. 1040AL desk stand and may therefore be used in connection with any of the desk set boxes listed below.

No. 1020CC Telephone Arm
No. 1048AA Telephone Arm
No. 1048AB Telephone Arm

No. 1048AC Telephone Arm
No. 1001C and H hand sets
No. 1002AC hand set



No. 315 Type Desk Set Box and No. 1020CC Type Telephone Arm



No. 300 Type Desk Set Box and No. 1048AC Telephone Arm

Code No.	Desk Stand No.	Desk Set Box No.	Desk Set Box Includes			Class of Signal Service			
			Code No.	Ringer	Operates On	Generator Code No.	Tel. to Central Office	Central Office to Tel.	Used on Lines as Regards Load
				Res. Ohms					
6003B	1040AL	315H	51AG	1000	A.C.	22A	Code	Code	Light y
6003C	1040AL	315J	49BG	2500	P.C.	22E	C.O. only	4 Party Selective	Light y
6004B	1040AL	300K	51BG	2500	A.C.	48A	Code	Code	Heavily
6004C	1040AL	300L	51FG	1600	A.C.	48A	Code	Code	Medium
6004D	1040AL	300AA	51BG	2500	A.C.	50A	Code	Code	Heavily
6004E	1040AL	300AB	51FG	1600	A.C.	50A	Code	Code	Medium

Note 2. Repair Parts for the above Desk Set Boxes and Desk Stands are shown under their respective headings.

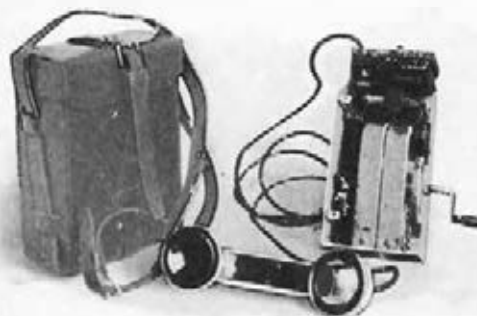
TELEPHONES—MAGNETO



No. 1330E



No. 1330E

No. 1375B
Apparatus Removed from Case

Portable Magneto Telephones

Nos. 1330 AND 1331 TYPES

These are complete hand set type magneto telephones mounted in substantial wooden cases. They are primarily for use in railway service and are designed to withstand the jarring and rough handling incident to train service. In addition to railway service these telephones are suitable for any service where an extremely substantial type of portable telephone is required. While these telephones are not waterproof they are designed to withstand ordinary weather conditions.

The Nos. 1330F and 1331F telephones are equipped with a six-foot waterproof cord and No. 146 plug for connecting them to a telephone line through a No. 186 pole jack.

The Nos. 1330E and 1331E telephones are intended primarily for use where connection to the line will be made with a line pole.

The No. 1330 type telephones are for use on heavily loaded lines.

The No. 1331 type telephones are for use on light loaded lines.

Code No.	Hand Set No.	Plug No.	Plug Cord No.	Ringer or Buzzer No.	Ohms	Con; denser No.	Generator No.	Approx. Weight, Lbs.	Overall Dimensions	Battery Used*
1330E	1001C	***	***	32B	2500	21F	48A	28	12½x13½x5¼	2 Dry Cells*
1330F	1001C	146	509	32B	2500	21F	48A	28	12½x13½x5¼	2 Dry Cells*
1331E	1001C	***	***	3B	2500	21F	22A	17	11½x10½x4¾	2 No. 790*
1331F	1001C	146	509	3B	2500	....	22A	17	11½x10½x4¾	2 No. 790*

Each set also contains a No. 29 induction coil.

No. 1375 TYPE

The No. 1375B is especially adapted for use in cases where the telephone user must carry the telephone considerable distances. While it is primarily intended for use on moderately loaded lines, the design of the generator is such that it may be satisfactorily operated on heavily loaded lines.

The case is made of high grade leather and is designed to withstand considerable rough handling.

Code No.	Hand Set No.	Buzzer No.	Ohms	Generator No.	Ind. Coil No.	Approx. Weight, Lbs.	Overall Dimensions	Battery Used
1375B	1001H	D-21141	2150	29E	D-17624	10½	9¾x7¼x4¼	1 No. 703 Eveready*

REPLACEMENT PARTS FOR No. 1375B TELEPHONE

Leather case on y.....	P-139726	Generator mounting screws.....	P-123826	Line binding posts.....	P-122930
Case mounting screws..	P-117156	Top wood block only.....	P-135285	Circuit Label.....	P-114789
Aluminum frame.....	P-141455				

Portable Railway Telephone Sets

Code No.	Description
1332A	Telephone set in portable leather case with a shoulder carrying strap for use in connection with Nos. 3 or 5 line poles on tri dispatching circuits. Contains: 1 No. 29 induction coil 2 No. 2C binding posts 3 No. 792 Eveready dry batteries furnished only when ordered. 1 No. 21M condenser 1 No. 1001C hand set The complete set weighs approximately 6 lbs. The size is 9¼ x 7¼ x 4 inches.
1332E	Same as No. 1332A, excepting that it is equipped with a No. 3B 2500 ohm buzzer.

*Batteries are not included in the Code Number of the set, but will be furnished only when specified.

TELEPHONES—MAGNETO

Mine Telephones



General

A reliable telephone system in a mine will enable the superintendent to communicate instantly with all the important parts of the plant. The saving in time and money which it effects by reliably transmitting routine orders or when there is a temporary suspension of power, a shutdown of some part of the plant, an accident or an emergency affecting both life and property, justifies many times over the investment required.

Mine Laws

No. 1336 Type Mine Telephone

That the Legislatures of many of the States have made the installation of mine telephones and signals a requirement for mine operation, is in itself sufficient endorsement of their usefulness. Those farsighted operators who so quickly and wisely responded to these demands are realizing the benefits of the increased operating efficiency that they effect in their mines along with the insurance against loss of life which was the primary object of the legislative acts.

MINE TELEPHONE SYSTEMS

In the Superintendent's office, engine house and other dry and protected parts of the Plant, which should have communication with each other and the mine, the use of standard wall and desk type magneto telephones is recommended.

In cases where all the telephones of the system are connected to a single line (party line) the telephone used should be designed for use on heavily loaded lines—for example:

No. 1336J telephones for service below ground and in exposed locations above ground.

No. 1317S telephones (wall type) (5 bar generator) for service above ground in unexposed locations or

No. 6004B telephones (desk types).

In cases where the size of the plant warrants it, the preferable arrangement is to employ a number of lines and a switchboard instead of a party line. These lines may each have a number of telephones connected to them but the most satisfactory arrangement is to have the most important telephones of the system (for example, the engine room telephone and the Superintendent's telephone) connected to individual lines. In addition to greater facility in handling calls the use of a switchboard has a number of advantages, an important one being that in case one of the lines should become broken or crossed, it would not tie up the rest of the system until the trouble is cleared.

In cases where a switchboard is employed, the telephones used below ground should be of the No. 1336 type but the lines above ground, if lightly loaded, may be equipped with telephones having 3 bar generators. For example:

No. 1317AH Telephones (wall type), or

No. 6003B Telephones (desk type).

No. 1336 Type Telephones

Briefly, these are metal case magneto telephones having all apparatus and parts treated to resist the action of moisture. They are primarily designed for use on heavily loaded lines where code ringing is employed and, while they are intended chiefly for mine service they are also recommended for outdoor use as in railway service, etc.

Moisture-Proofing

Experience has shown that moisture will condense on the inside surfaces of mine telephones regardless of whether or not they are of so called "Air Tight" construction. In view of this, the practice of employing gaskets, stuffing boxes, etc., was abandoned a number of years ago in favor of the design illustrated by the No. 1336 type. In this design small openings are provided which permit air to circulate through the telephone without exposing it to the chance of trouble due to the entrance of foreign material. An opening is also provided so that water may drain off instead of remaining in the telephone. All apparatus and parts are specially treated so that they will not be injured by moisture or fumes, and in addition the telephone is so made that the presence of moisture will not interfere with signalling or transmission. The terminals of the apparatus are imbedded in insulating compound so that they cannot be short circuited even though the apparatus is wet. The telephone is wired with heavy stranded copper wire having rubber insulation and a braiding.

Protectors

The telephones installed above ground should be equipped with protectors consisting of open space cut outs (for example the No. 60AP protector) to prevent damage to the telephone by lightning. In case there is a chance of contact between the telephone line and a power circuit protectors consisting of open space cut outs and fuses (for example the No. 58AP protector) should be used.

TELEPHONES—MAGNETO

Mine Telephones (Continued)

Dry Cells. Two standard size dry cells are required for each telephone to furnish current for talking. Western Electric Blue Bell Dry Cells are specially designed for telephone service and are recommended because they last longer and are more efficient for this class of service than other dry cells.

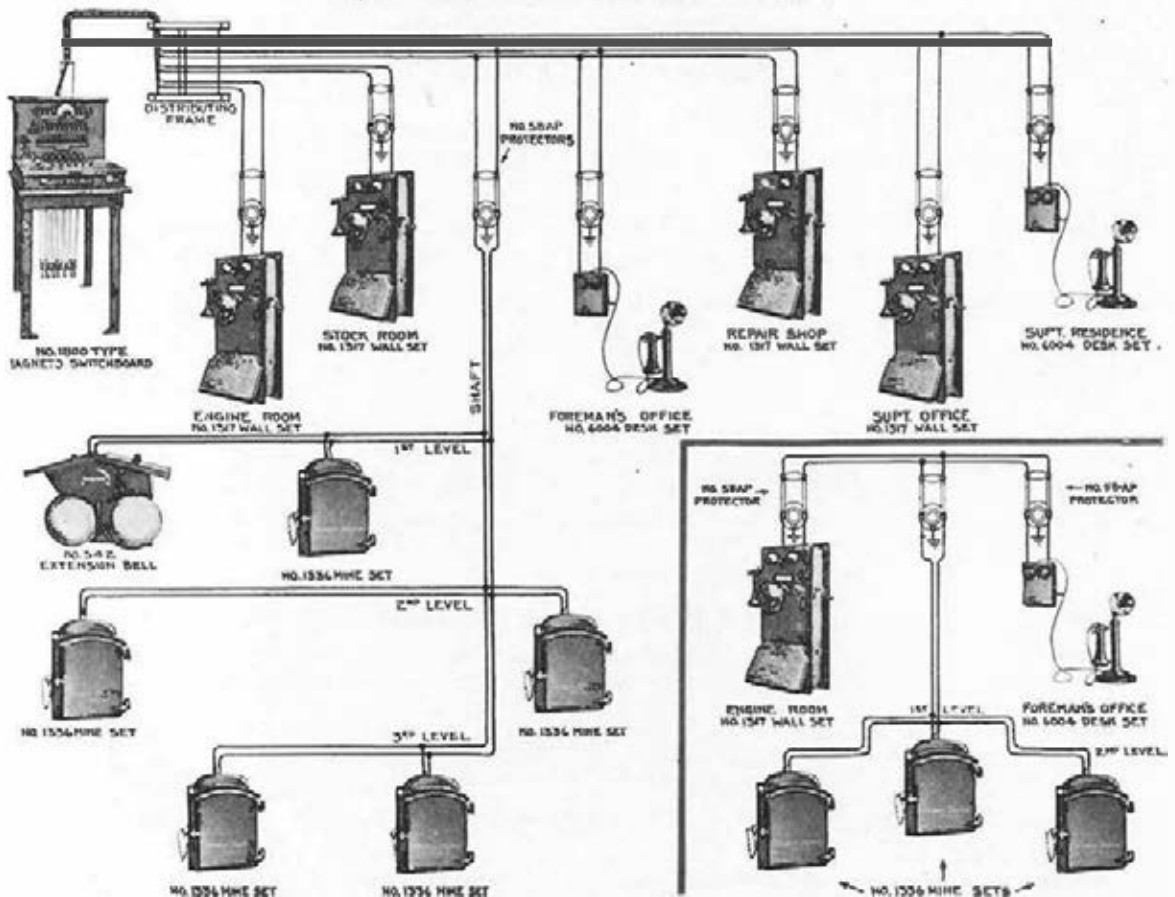
Two special Blue Bell Dry Cell cartons, impregnated with moisture-proofing compound, are furnished with each No. 1336 type telephone. These are to be substituted for the standard cartons furnished on the dry cells. These cartons resist the action of any moisture that may form on the inside of the case and prevent current leakage and rapid deterioration.

Case. The box, outer door, inner door and gong hood are of cast iron heavily coated with a rust-resisting finish. When the outer door is closed only the metal transmitter mouthpiece, receiver, receiver cord and the generator handle are exposed. When the outer door is closed these parts are protected from mechanical injury. When using this telephone it is, of course, evident that only the outer door need be opened.

Entrance for Line Wires. The line wires may be brought in either at the top or the bottom of the case. A short length of pipe is screwed into the top of the case and is covered with a pipe cap. This cap prevents water running into the set by following the line wires. In case the line wire is to be run to the telephone in pipe (conduit) no difficulty will be encountered in joining the conduit to the telephone as the wire entrance hole at the bottom as well as the top of the case is tapped.

Mounting. Wrought iron mounting bars are secured to the back of the case. The upper end of these have "pear" shaped holes, and with this arrangement the telephone can be readily mounted by one man and without any danger of damaging it. This is accomplished by driving two lag screws into the mounting surface until their heads project about $\frac{1}{2}$ inch. The telephone may then be hung upon these mounting screws (the heads of the lag screws will pass through the large end of the "pear" shaped holes) after which the lower mounting screw may be driven into place through the holes in the lower end of the mounting bars. Wrought iron mounting bars are employed as they are less subject to breakage than if lugs were cast on the case.

Typical Western Electric Mine Telephone Systems

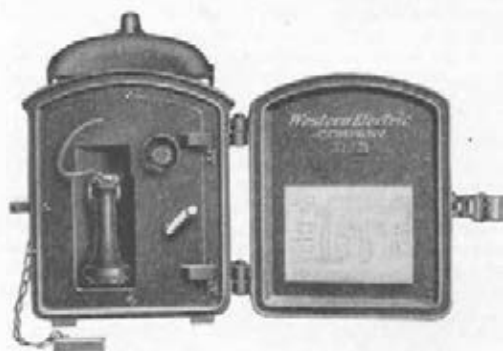


Typical Diagram Showing Method of Connecting Telephones to a Switchboard.

Typical Party Line Mine Telephone System.

TELEPHONES—MAGNETO

Mine Telephones (Continued)



No. 1336 Mine Telephone (Outer Door Open)



No. 1336 Mine Telephone (Outer and Inner Doors Open)

No. 1336 Type for Mine Use

The No. 1336A telephone is not equipped with a ringer as it is intended for use where an extension bell is preferred to the regular telephone ringer, also for service where all the calls will be outgoing.

The Nos. 1336E and K differ from the No. 1336A in that they are equipped with a ringer and an iron hood for protecting the gongs.

The No. 1336J differs from the No. 1336E only in that a condenser is provided to permit the ringers of this telephone as well as others on the same line, being rung even though its receiver may have been left off the switchhook.

Code No.	Transmitter	Receiver	Receiver Cord	Con- denser	Ringer		Signalling Generator	Service	For Line Load
1336A	312W	144AW	3 4	None	None	2500	4 C	{ Code Ring- ing }	{ Heavily Loaded }
1336E				None	45BG	2500			
1336J				21W	45BG	2500			
1336K				21W	{ (Spl.) 45BG }	1600			

In addition to the apparatus listed above the No. 1336 type telephones are equipped with a No. 143J switchhook and a No. 31 induction coil.

Special No. 1336 type telephones equipped with a heavy brass padlock with two keys are obtainable. The padlock is attached to the chain in place of the latch pin. Orders for these telephones must state that padlocks are desired.

No. 1336 Type for Railroads

Code No.

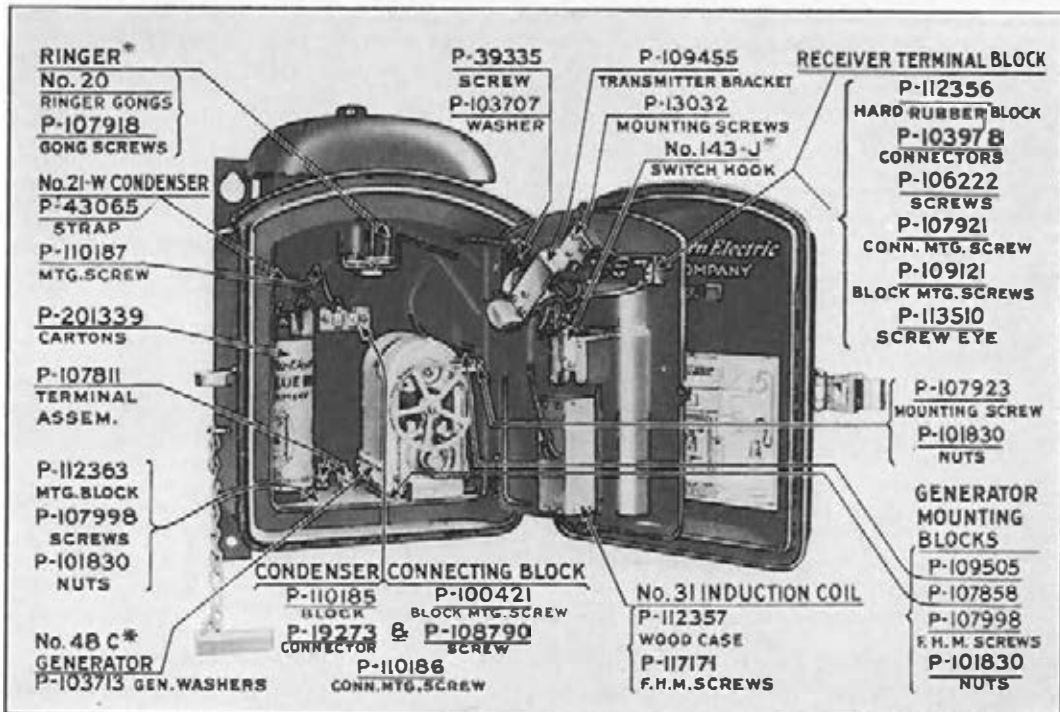
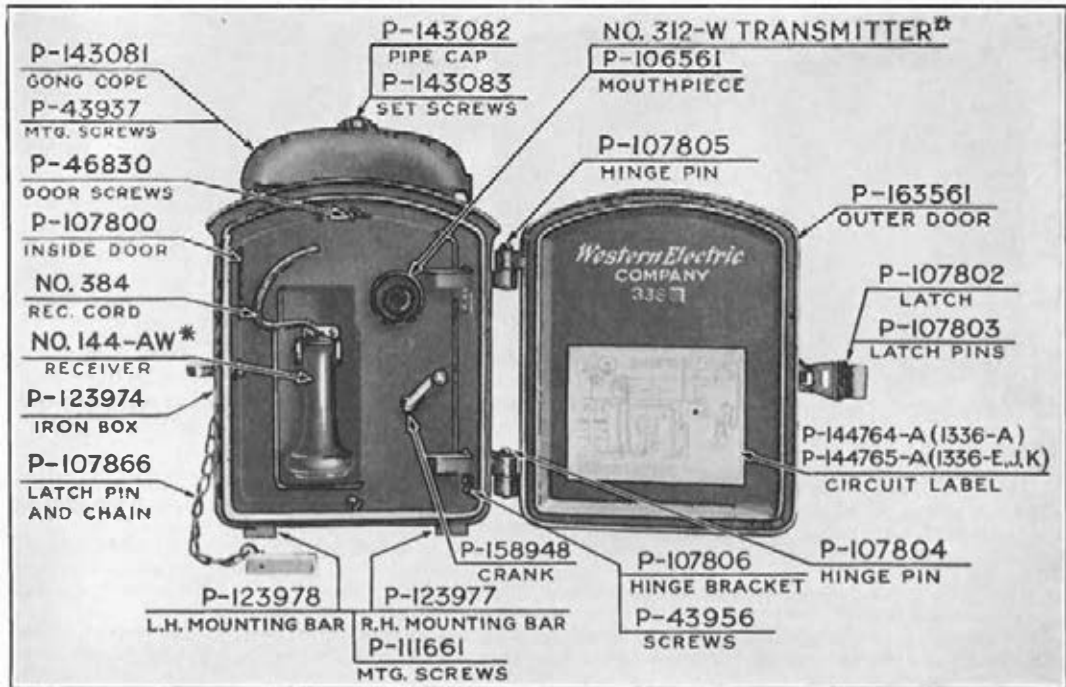
1336F For use out of doors on train dispatching circuits. Provided with high efficiency transmission circuit. Employs push button for use when talking. Five-bar A.C. generator and 2500 ohm unbiased ringer. Contains:

1 No. 48C generator	1 No. 21AA condenser	1 No. 384 receiver cord
1 No. 143K switchhook	1 Spl. No. 1002A push button	1 No. 540 cord
1 No. 45BG ringer	1 No. 292W transmitter	3 $\frac{1}{2}$ x $\frac{3}{4}$ x $2\frac{1}{4}$ inch leather cable holders
1 No. 32 induction coil	1 No. 50 W receiver	2 Blue Bell dry cells (when specified in order)
1 No. 51B retardation coil	2 No. 3 5 transmitter cords	

1336H Circuits are arranged so that it is unnecessary to use a push button for talking. Contains:

1 No. 144AW receiver	2 No. 385 cords, 7 ins.	1 No. 21AA condenser
1 No. 292W transmitter	1 No. 4 C generator	1 Special No. 30 induction coil
1 No. 540 cord	1 No. 45BG ringer	1 No. 143AA switchhook
1 No. 384 cord, 10 $\frac{1}{2}$ ins.		

TELEPHONES—MAGNETO
Mine Telephones (Continued)
REPLACEMENT PARTS
For Nos. 1336A, E, J and K



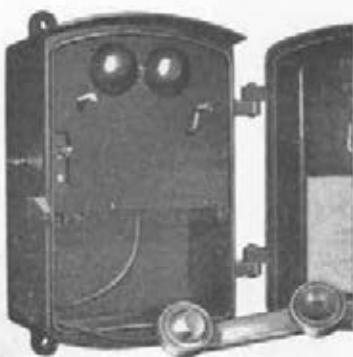
Note.* Replacement parts for the generators, ringers, etc., are shown elsewhere under their respective headings.

TELEPHONES

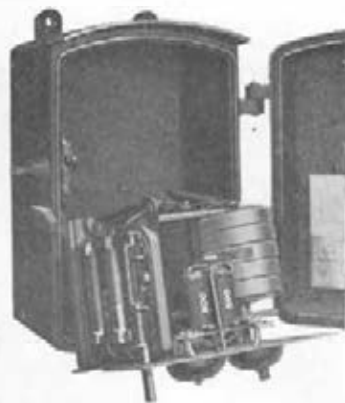
Street Railway Magneto and Central Battery Types



No. 1278 F. G. & H. Type Telephones



Open View



Apparatus Shelf partially removed

No. 1278 TYPE

No. 1278 type telephones employ weatherproof iron boxes and are provided with "insulated" circuits. They are intended principally for exterior use by street railway companies operating telephone lines on which there is a chance of crosses with low voltage power circuits.

This type telephone is arranged so that its circuit is cut off from the line except when its door is opened. When the telephone is in use a repeating coil is interposed between the line and the telephone circuit proper, so as to protect the user, as far as possible, from the chance of injury should the line become crossed with a low voltage circuit.

When the door is opened, a line switch is released which connects one winding of the repeating coil across the line and connects two fuses and two open space cut-outs into this circuit. The telephone circuit proper is connected to the second winding of the repeating coil and, therefore, has no direct contact with the line circuit. The fact that a repeating coil is interposed between the line circuit and the telephone circuit, of course, reduces the efficiency of the telephone to some extent and, therefore, the use of these telephones is not recommended on heavily loaded lines, except where the protective feature is essential. See No. 1336 type telephones.

In case a car is held up awaiting orders from the dispatcher the door of the telephone is left open so as to permit of the telephone being signalled. (It is impossible for the telephone to be signalled when its door is closed.) As the talking circuit is on y closed when the push button in the hand set is depressed, the battery in the telephone is not wasted under the above condition.

The apparatus of this telephone is mounted on an iron shelf, which may be removed as a unit from the telephone for inspection. The connection between the apparatus on the shelf and the line and ground terminals is made through the medium of clips which register with contacts mounted on a terminal block secured to the back of the case.

The case and door are of cast iron and have a galvanized finish in addition to which they are given two coats of green paint. Both the top and bottom ends of the case are tapped for receiving 1/2 inch conduit.

The telephones are equipped with a lock which is arranged so that the key cannot be removed until the door of the telephone is closed.

Code No.	Hand Set	Code No.	Ringer Resistance (Ohms)	Generator	Ind. Coil	Repeating Coil	Lock	Class of Signal Service	For Line Load
For Magneto Service									
1278F 1278G	} 1001H	51AG	1000	†48C	{ 13 29 }	25E	{ 5B 5B }	**Code	Medium

For Local Battery Talking and Central Battery Signalling									
1278J	1001H	51AG	1000	None	13	25E	5B	**Code	Medium

In addition to the apparatus listed above these telephones are each equipped with: A special door switch. A special protector.

2 D. & W. No. 5001 Type C fuses—500 volt 1 ampere.

2 No. 2 protector blocks

Dry cells are not furnished and must, therefore, be ordered as a separate item.

**The ringer is disconnected from the line when the door of the telephone is closed.

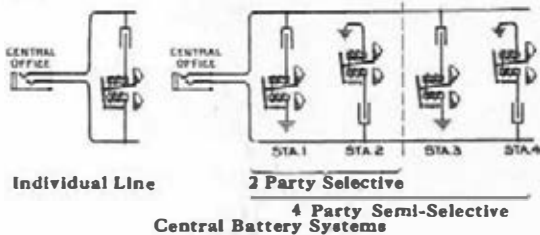
†Generators have special mounting brackets.

TELEPHONES—CENTRAL BATTERY

Central Battery Telephone Systems

SINGLE PARTY, 2 PARTY SELECTIVE OR 4 PARTY SEMI-SELECTIVE SYSTEMS
EMPLOYING ALTERNATING CURRENT

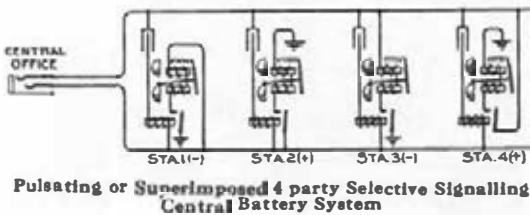
On an individual line, the ringer is bridged across the two line wires. (In the case of central battery systems, condensers are connected in series with the ringers, except in the case of ringers operated on pulsating or super imposed ringing current, as described below).



On a two-party selective line, one ringer is connected from each side of the line to ground, and on a four-party semi-selective line, two ringers are connected from each side of the line to ground, the switchboard at the central office being so arranged that by means of a key, current can be sent out over either side of the line, through the ringers connected to that side of the line, to ground. In other words, one terminal of the central office generator is connected to one of the line wires

and the other terminal to ground. It is the usual practice to temporarily ground the opposite side of the line from that to which the ringing current is connected. This is to prevent cross ringing when a receiver is lifted from the hook. (This class of ringing is often referred to as "divided circuit ringing.")

FOUR PARTY SELECTIVE—EMPLOYING PULSATING OR SUPERIMPOSED CURRENT



Condensers cannot be connected in series with ringers operated on pulsating current, because if used, pulsating current would have the same effect as alternating current and the selective feature could therefore not be obtained. In view of this and the fact that a ringer cannot be permanently bridged across a central battery line or from the line to ground unless a condenser is connected in series with it, the following arrangement is employed where pulsating or superimposed current is used for four-party selective signalling on

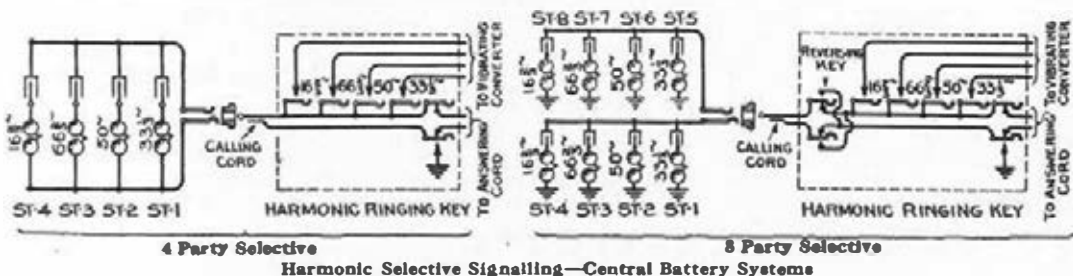
central battery lines. Each of the four telephones is equipped with a high impedance relay, which is permanently bridged across the two line wires in series with a condenser. When ringing current is sent out over one side of the line to ground (and the opposite side of the line temporarily grounded), the armature of each of the relays pulls up, thereby closing a contact. The ringers are connected to ground through these contacts; that is, the ringer of each telephone is connected to ground when the relay armature is pulled up and is cut out of the circuit as soon as the ringing current ceases. The ringers are connected as in the four party selective magneto system, described above; that is, two ringers are connected from each side of the line to ground, those connected to each side of the line being connected so that one will operate on negative pulsating current and the other on positive pulsating current.

HARMONIC—4 AND 8 PARTY SELECTIVE

The telephones used with this system are equipped with special ringers which are so made that they will ring only when alternating current of a given frequency is sent out over the line. The frequencies employed are 16 $\frac{2}{3}$, 33 $\frac{1}{3}$, 50 and 66 $\frac{2}{3}$ cycles, per second.

On a four-party selective line, each of the four telephones is equipped with a ringer which will operate on current of a different frequency than the others. These are bridged across the two-line wires.

On an eight-party selective line, four ringers are connected between each side of the line and ground. A condenser is connected in series with harmonic ringers in all cases.



TELEPHONES—CENTRAL BATTERY



No. 1533 Type Telephone on a No. 148A Backboard with a No. 146A Backboard (writing shelf)

Telephones representing the highest and most modern development in central battery telephone design are found in the Nos. 1533 and 6054 types.

In addition to the superior features represented by the individual pieces of apparatus and circuits, these telephones embody a number of features that are particularly worthy of note, namely:

Ringer and gongs are enclosed within the case thereby preventing tampering, reducing maintenance and greatly improving the appearance.

Case is made of heavy sheet steel, copper plated and finished with two coats of extremely durable black enamel (baked on) especially developed for this particular purpose.

The case is constructed so that every part of the interior is easily accessible when the cover is opened.

The base is flanged thereby giving greater rigidity and preventing base from cutting into plastered surfaces.

Unit type of construction and universal terminal block employed. This permits of the telephone being readily converted from one class of service to another. This also permits of a desk set box being converted into a wall telephone or vice versa by a substitution of covers.



No. 1533A Type Telephone



Inside View of No. 1533A Type Telephone

No. 1533 and No. 6054 Type Telephones

The No. 1533A and No. 6054A telephones are arranged for single-party, two-party, selective or four-party semi-selective ringing service from the central office.

The No. 1533K and No. 6054K are series type telephones as described under "Transmission circuits" elsewhere, otherwise used for same service as described above for the Nos. 1533A and 6054A telephones.

The No. 1533Y telephone is arranged for central battery ringing service as outlined for the No. 1533A but it is equipped for local battery talking.

The No. 1533AR and No. 6054AR telephones are equipped with pulsating current type ringers for use in four-party selective signalling from the central office.

The Nos. 1533 and 6054E, F, G and H telephones are arranged for four-party selective or eight-party semi-selective ringing service from the central office.

No. 1533 Wall Type Telephones

Code No.	Transmitter	Receiver	Ringer No.	Resistance	Condenser	Induction Coil	For Ringing Current
1533A	323BW	143AW	8AG	1400	21AP	46	A.C.
1533K	323BW	171W	8AG	1400	21F	..	A.C.
1533Y	323BW	143AW	8AG	1400	21AP	13	A.C.
*1533AR	323BW	143AW	42AG	{ 1000 and 3000 } 33 1/4 cycles 50 cycles 66 2/3 cycles 16 2/3 cycles	21AP	46	P.C.
1533E	323BW	143AW	41SG		21AP	46	Harmonic
1533F			41TG				
1533G			41UG				
1533H			41RG				

*Equipped with No. 85J Relay.

See separate listings of central battery telephones for 1801 switchboard on following pages.

TELEPHONES—CENTRAL BATTERY

No. 6054 Desk Type Telephones

Desk Telephone
Central Battery Type

The No. 6054 desk type telephones consist of a No. 1040 type desk stand and a desk set box.

Combinations of apparatus differing from those covered by the No. 6054 series of code numbers may be obtained by ordering a desk stand and a desk set box as separate items, also a telephone arm or a hand set may be used in place of the desk stand if desired.

For example, any of the desk set boxes that will function with the No. 1040AL desk stand will also function with the following:

Nos. 1020CC, 1048AA, AB and AC Telephone (Transmitter) Arms.

Nos. 1001C and H and 1002AC Hand Sets.

The Nos. 6054A, AR, K, and E, F, G, H desk type telephones are used for the same class of service as described for the corresponding Nos. 1533A, AR, K and E, F, G, H wall type telephones.

Code No.	Desk Stand	Desk Set Box	Desk Set Box Contains				For Ringing Current
			No.	Ringer	Res.	Condenser	Induction Coil
6054A	1040AL	534A	8AG	1400	21AP	46	A.C.
6054AR	1040AL	*534AR	42AG	1000 and 3000	21AP	46	P.C.
6054K	1040AH	534K	8AG	1400	21F	..	A.C.
6054E	1040AL	534E	41SG	33½ cycles	.....	46	Harmonic
6054F		534F	41TG	50 cycles			
6054G		534G	41UG	66½ cycles			
6054H		534H	41RG	16½ cycles			

*Equipped with No. 85J relay.

See separate listings of No. 534 desk set boxes and No. 1040 type desk stands for replacement parts, etc.

See separate listings of central battery telephones for No. 1801 switchboards on following pages.

No. 1320 Central Battery Type for Police Service



Special No. 1320A

The No. 1320 type is a metal case weatherproof telephone for central battery service. It was designed primarily for the Police Patrol Service, but will be found very satisfactory for general central battery service where a weatherproof telephone is required.

The apparatus is mounted on a metal frame which is removable as a unit from the case. An inner door protects the appar-



No. 1320A with Outer Door Open

atus from the weather when the outer door is open. The overall dimensions are 6 1/8 inches deep by 13 1/4 inches high by 12 3/4 inches wide.

A loud ringing extension bell may be connected in multiple with the ringer of this telephone thereby providing means of signaling a patrolman from a distance (see extension bells).

A tapped hole is provided in each end of the case for receiving conduit. Four holes are drilled in the back of the case for receiving mounting screws or mounting clamps. The lock on the outer door is designed so that the key cannot be removed until the door is closed.

A No. 1320A telephone includes the following apparatus and equipment:

No. 143AW receiver

No. 357 receiver cord, 20 ins. long

No. 21AN condenser

No. 1 CG ringer (alternating current—1000 ohms)

No. 323 BW transmitter

Special switchhook (2 make contacts)

No. 46 induction coil

No. 0357W Special lock

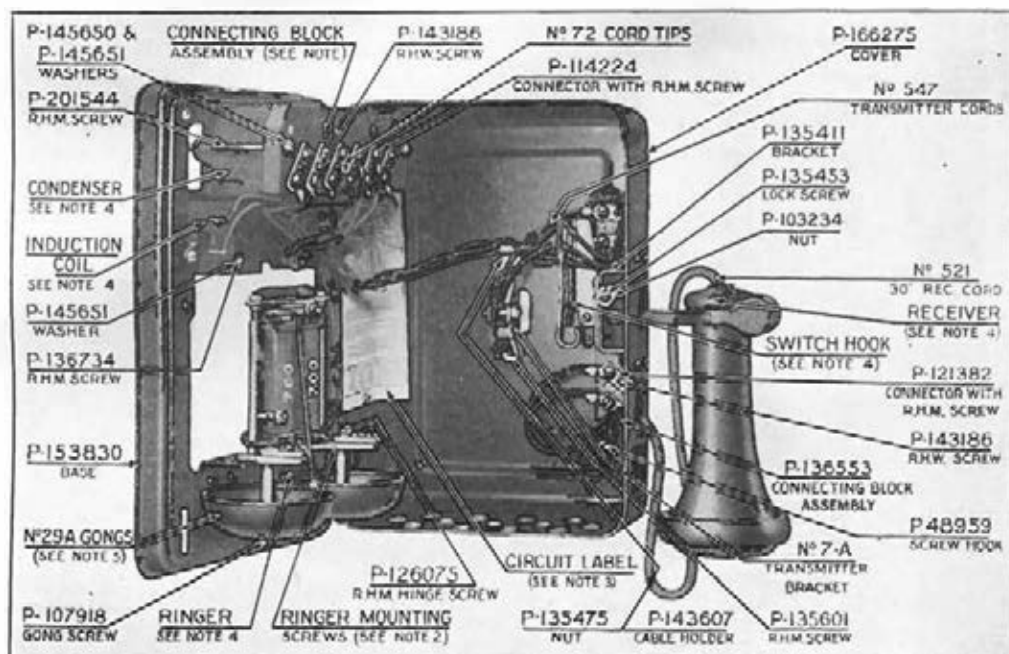
Cast iron case with inner and outer door.

Outer door is not marked. Standard finish, gray paint.

Special No. 1320A telephones may be obtained with outer doors marked (raised characters cast on door) in accordance with customer's requirements; color of finish, as specified.

TELEPHONES—CENTRAL BATTERY

No. 1533 Type Telephones (Continued)



Replacement Parts

Note 1. Connecting block assembly for:

Code No.	Part No.
1533A and E	P-158349
1533K	P-158351
1533Y	P-158354
1533AR	P-158355

Note 2. Ringer mounting screws for:

Code No.	Part No.
1533A, K, Y and AR	P-153832
1533E, F, G and H	P-145368

Note 3. Circuit label for:

Code No.	Part No.
1533A	P-144936
1533E, F, G and H	P-144606
1533K	P-144938
1533Y	P-144942
1533AR	P-244024

Note 4. These parts are shown with the Code Number listings.

Note 5. The No. 29A gong is regularly furnished. If different tone gongs are required, the Nos. 31A, 32A or 33A gongs may be used. (See description of Gongs.)

The replacement parts for ringers, etc., are shown elsewhere under their respective headings.

TELEPHONES—MACHINE SWITCHING



No. 1553A Type Telephone

No. 6534 Type Desk Telephone with
No. 50D Apparatus Blank

Central Battery Telephones—Machine Switching Service

Western Electric Company machine switching telephones, including the dials, are the result of experimental work conducted during the past fifteen years. This apparatus will operate satisfactorily with practically any type of machine switching central office equipment.

In case it is desired to temporarily operate machine switching telephones on a manual basis we are prepared to furnish them less dials and with dial openings covered with apparatus blanks. Telephones so equipped may be equipped for machine switching service by merely removing the apparatus blank and adding a dial and dial cord.

The No. 1553A and No. 6534A telephones are arranged for single party, two-party selective or four-party semi-selective ringing service from central office.

The No. 1553Y and No. 6534Y are arranged for central battery ringing service as above, and are equipped for local battery talking.

The Nos. 1553E, F, G, H and 6534E, F, G, H telephones are arranged for four-party selective or eight-party semi-selective ringing service from central office.

NO. 1553 WALL TYPE

Code No.	Dial	Ringer		Ind. Coil	Condenser	Ringing Current
		Code No.	Resistance			
1553A	As specified in order	8AG	1400	46	21AP	A.C.
1553E		41SG (33½ cycles)	....	46	21F	Harmonic
1553F		41TG (50 cycles)	....	46	21F	
1553G		41UG (66½ cycles)	....	46	21F	
1553H		41RG (16½ cycles)	....	46	21F	
1553Y		8AG	1400	13	21AP	A.C.

The following apparatus is common to the wall type telephone listed above:

One—No. 140S Switch Hook
One—No. 323BW Transmitter
One—No. 143AW Receiver

One—No. 521 Receiver Cord—18 inches long.
Two—No. 547 Transmitter Cords—6 inches long

NO. 6534 DESK TYPE

Code No.	Desk Stand	Desk Set Box	Ringer		Ind. Coil	Condenser	Ringing Current
			Code No.	Resistance			
*6534A	1051AL	534A	8AG	1400	46	21AP	A.C.
*6534E	1051AL	534E	41SG	460	46	21F	Harmonic
*6534F	1051AL	534F	41TG	285	46	21F	
*6534G	1051AL	534G	41UG	200	46	21F	
*6534H	1051AL	534H	41RG	1800	46	21F	
*6534Y	1051AL	534Y	8AG	1400	13	21AP	A.C.

INSTRUCTION FOR ORDERING MACHINE SWITCHING TELEPHONES

In addition to specifying the code number of the telephone desired, information must be given as to the dial that is to be furnished as the dial is not included as a part of these telephones (nor is it included in their price). For example, orders should read as follows:

10—No. 1553 A Telephones

or

10—No. 6534A Telephones

10—No. 2AA Dials

10—No. 2AA Dials

In case the machine switching feature is not desired, the order should read as follows:

10—No. 1553A Telephones, less dial cord

or

10—No. 1051AL or CM Desk Stands with

10—No. 50B Apparatus Blanks

10—No. 50D Apparatus blanks

See separate listings of dials, desk stands, desk set boxes and protectors.

TELEPHONES—CENTRAL BATTERY



No. 1527A



No. 6034AU



No. 6000AE



No. 1539A

Telephones for No. 1801 Switchboard Systems

Systems A and B

The telephones for the No. 1801 switchboard systems A and B are of the series talking circuit type and equipped with 140 ohm vibrating bells or buzzers (in accordance with the type of set selected), which operate on direct current.

Wall Telephones

These are black finished metal sets with nickel trimmings for surface or flush mounting as required. The Nos. 1527A and 1539A sets have watch case type receivers.

Code No.	Mounting	Transmitter	Receiver		Ringer No.	Switch-Hook	Dimensions	
			No.	Cord			Overall, Inches	
1527A	Surface	362W	179W	773	D-29431	148S	7½ x 5	x 2½
1539A	Flush	362W	179W	773	12062	148A	9	x 5½
1533N	Surface	297W	171W	92	116958	140AB	9½ x 6¾	x 3½

DESK TELEPHONE

This consists of a black finished desk stand with nickel trimmings having a 140 ohm buzzer in the base and equipped with a watch case type receiver.

Code No.	Desk Stand	Connecting Block	Desk Stand Contains			Stand Cord
			Trans.	Receiver	Rec. Cord	
6034AU	1020BJ	2-11A	323BW	179W	535	534

HAND SET TELEPHONE

Code No.	Hand Set	Apparatus Box	Hand Set Contains			Apparatus Box Contains
			Trans.	Rec.	Cord	
6043R	1003AC	383H	368W	183W	506	No. 1 buzzer 132 ohms

System C

The telephones for No. 1801 Switchboard System C may be of the same types as used for Systems A and B, but in case the system is connected to an outside exchange, telephones equipped with standard central battery induction coil talking circuit should be used in order to obtain satisfactory transmission, as follows:

WALL TELEPHONES

Code No.	Transmitter	Receiver		Ringer No.	Induction Coil	Switch Hook	Overall Dimensions
		No.	Cord				
1533M	325W	143AW	521	116958	21AP	140W	9½ x 6¾ x 3½

DESK TELEPHONE

Code No.	Desk Stand	Desk Set Box	Desk Stand Contains			Box Contains		
			Trans.	Rec.	Rec. Cord	Stand Cord	Bell	Cond. Coil
6000AE	1140CN	295AU	323BW	143AW	412	355	101398	21D 20

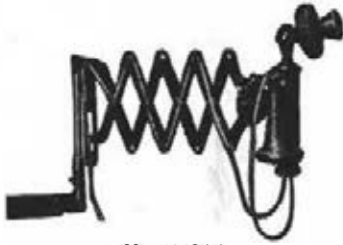
System D

Any standard central battery telephone with ringers operated by alternating current either induction coil or series types can be used with System D. The No. 1533A wall type and No. 6054A desk type telephones may be selected for this system.

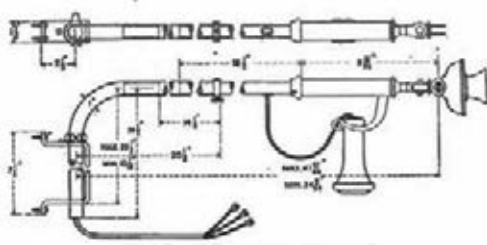
TELEPHONE (TRANSMITTER) ARMS

Telephone arms are preferred to desk stands by some telephone users as they save space and eliminate the possibility of overturning desk articles and disarranging papers, etc.

Where a desk telephone has to be used by two or more persons seated at opposite sides of a desk or table the use of a telephone arm is of great convenience and in some cases almost indispensable. Where desk stands are apt to be subjected to particularly rough handling, the cost of maintaining desk telephones can be lessened by the use of transmitter arms, but this is of course true only when the telephone arm employed is of such design as to require very little maintenance.



No. 1048AA



No. 1020CC Telephone Arm

TELEPHONE (TRANSMITTER) ARMS FOR STANDARD CENTRAL AND LOCAL BATTERY SERVICE

The No. 1020 type telephone arm is recommended where a non-collapsible rotating type of arm is required.

The No. 1048 type telephone arm is a collapsible gate type and can also be rotated in a horizontal plane. The highest grade of materials and construction are employed to assure that the arm will not sag materially even after extensive service.

These telephone arms have rust-proof black finish with nickel-plated trimmings. In addition to the component parts listed in the following, each telephone arm includes the No. 323BW transmitter and No 143AW receiver.

Code No.	Tel. Arm Bracket	Consists of			Mounting	Equivalent to Desk Stand
		Rec.	Cord Nos. Trans.	Tel.		
1020CC	----	{ 549 2 ft. 6 ins.	547 and 582 12 ins.	550 8 ft. 0 ins.	}	1020AL
1048AA	2A	{ 549 2 ft. 6 ins.	547 and 548 9 7/8 ins.	550 5 ft. 6 ins.	Either side of roll top desk }	1020AL
1048AB	2B	{ 549 2 ft. 6 ins.	547 and 548 9 7/8 ins.	550 5 ft. 6 ins.	Wall or side of flat top desk }	1020AL
1048AC	2C	{ 549 2 ft. 6 ins.	547 and 548 9 7/8 ins.	550 5 ft. 6 ins.	Top of flat top desk }	1020AL
1048BA	2A	{ 196 2 ft. 6 ins.	547 and 548 9 7/8 ins.	287 5 ft. 6 ins.	Either side of roll top desk }	1020CN
1048BB	2B	{ 196 2 ft. 6 ins.	547 and 548 9 7/8 ins.	287 5 ft. 6 ins.	Wall or side of flat top desk }	1020CN
1048BC	2C	{ 196 2 ft. 6 ins.	547 and 548 9 7/8 ins.	287 5 ft. 6 ins.	Top of flat top desk }	1020CN



No. 1048DD Telephone Arm

TELEPHONE (TRANSMITTER) ARMS

Telephone (Transmitter) Arms for Train Dispatching Service

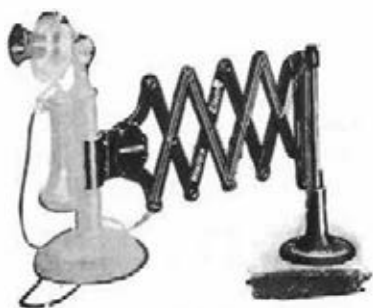
These telephone arms are equipped with high resistance (400 ohms) head type receivers and low resistance (5 to 15 ohms) transmitters, for use at way-station desks in train dispatching systems.

The No. 1020E consists of the No. 284W transmitter and the No. 186W receiver in addition to the parts listed below.

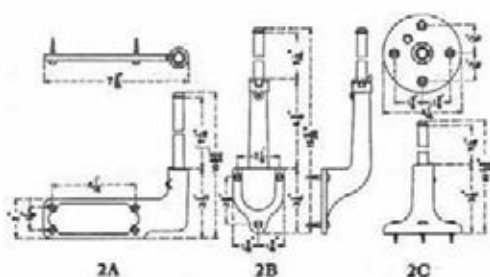
The No. 1048 type consists of the No. 280W transmitter and No. 186W receiver in addition to the parts listed below.

Code No.	Arm Bracket	Cord Nos.			Mounting	Equivalent To Desk Stand
		Receiver	Transmitter	Telephone		
1020E	--	554 2 ft. 6 in.	426 and 427 12 in.	416 8 ft.	.....	.....
1048DA or 1148DA* 2A		554 2 ft. 6 in.	426 and 427 9 $\frac{7}{8}$ in.	409 8 ft.	Side of roll top desk	1020AB
1048DB or 1148DB* 2B		554 2 ft. 6 in.	426 and 427 9 $\frac{7}{8}$ in.	409 8 ft.	Wall or side of flat top desk	1020AB
1048DC or 1148DC* 2C		554 2 ft. 6 in.	426 and 427 9 $\frac{7}{8}$ in.	409 8 ft.	Top of flat top desk	1020AB
1048DD or 1148DD* 2D		554 2 ft. 6 in.	426 and 427 9 $\frac{7}{8}$ in.	409 8 ft.	On wall near flat top desk	1020A

* Same as Nos. 1048DA, DB, DC and DD types, respectively, except equipped with No. 189W (45 ohms) receiver, equivalent to No. 1120AB desk stand.



No. 147AC



Telephone (Transmitter Arm) Brackets

The advantages incident to the use of a No. 1048 type telephone arm, may also be obtained to a large extent by the using of a Western Electric No. 147 type telephone bracket in connection with a No. 1020 type desk stand. The structural features of these brackets are the same as those of the No. 1048 type telephone arm. These brackets have a black finish with nickel plated trimmings.

Code No.	Arm Bracket	Method of Mounting	Length	Length
			Closed	Extended
147AA	2A	Either side of roll top desk	8 $\frac{1}{4}$ ins.	24 ins.
147AB	2B	Wall or side of flat top desk	8 $\frac{1}{4}$ ins.	24 ins.
147AC	2C	Top of flat top desk	8 $\frac{1}{4}$ ins.	24 ins.
147CA	2A	Either side of roll top desk	10 ins.	36 ins.
147CB	2B	Wall or side of flat top desk	10 ins.	36 ins.
147CC	2C	Top of flat top desk	10 ins.	36 ins.

The desk stand is not included in the price of the telephone bracket but must be ordered separately.

Telephone Arm Brackets

These telephone arm brackets form a part of the No. 1048 type telephone arms and No. 147 type telephone brackets.

2A Either side of a roll top desk. 2B Wall or side of a flat top desk. 2C Top of a flat top desk.

TELEPHONE TRANSMITTER ARMS, ATTACHMENTS AND BRACKET



Transmitter Arms FOR SWITCHBOARDS

Using Suspended Transmitters

The code number does not include transmitter or cords.

Code No.	Description
7A	Consists of one arm, two cord escutcheons with tubes, and two No. 103 cord weights. Furnished in brass, lacquered finish, unless otherwise specified. In ordering, specify whether 7 in. or 13 in. cord escutcheon tubes are desired.
7C	Same as No. 7A, except has a black lacquer finish.
19C	Oxidized copper finish. Dimensions A: maximum $29\frac{3}{8}$ ins., minimum $16\frac{5}{8}$ ins.
19D	Oxidized copper finish. Dimension A: maximum $20\frac{1}{8}$ ins., minimum $11\frac{1}{8}$ ins.

USING TRANSMITTER WITH A LUG

The code number does not include transmitter or cords.

No. 50 and No. 51 types have a black finish.

NO. 50 TYPE

Code No.	Dimensions, Ina.				
	B		C		D
	Max.	Min.	Max.	Min.	
50A	24 $\frac{1}{4}$	19 $\frac{3}{4}$	22 $\frac{3}{4}$	14 $\frac{1}{4}$	5 $\frac{1}{4}$
50B	17 $\frac{1}{4}$	12 $\frac{3}{4}$	22 $\frac{3}{4}$	14 $\frac{1}{4}$	5 $\frac{1}{4}$
50C	10 $\frac{1}{4}$	8 $\frac{1}{2}$	22 $\frac{3}{4}$	14 $\frac{1}{4}$	

NO. 51 TYPE

Code No.	Dimensions, Ins.			
	B		C	D
	Max.	Min.		
51A	21 $\frac{1}{4}$	16	14 $\frac{1}{4}$	5 $\frac{1}{4}$
51B	18	12 $\frac{3}{4}$	17 $\frac{1}{4}$	10 $\frac{1}{2}$

Transmitter Attachments

Code No.	Color of Strap	Description
2A	.....	Nickel plated buckle used in connection with the No. 3 type transmitter attachments.
3A	Slate	These transmitter attachments consist of a tape strap equipped with two No. 2A transmitter attachments. They are used for supporting operator's chest type transmitters. Overall length $21\frac{1}{2}$ inches. (For use with No. 234BW Transmitter.)
3B	Black	
3C	White	

Transmitter Brackets

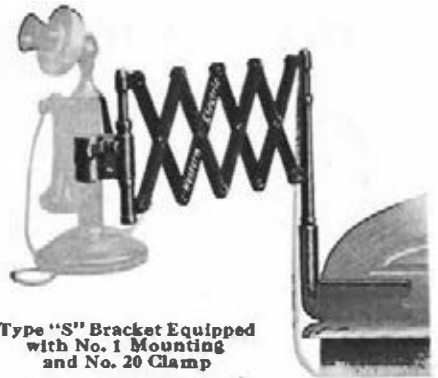
These transmitter brackets will mount any Western Electric transmitter that is equipped with a mounting lug and screw, for example the 323W transmitter.

Code No.	Finish	Description
3D	Black	For mounting old style grounded transmitters on wooden telephones. Has a stud for making the ground connection.
3E	Black	For mounting insulated transmitters. Used principally on wooden telephones.
7A	Nickel plate	For mounting insulated transmitters in a semi-flush position on metal telephones. For example, No. 1533 type and similar telephones.
8A	Black	For mounting insulated transmitters on wooden telephones. For example, No. 1317 type telephones.

TELEPHONE BRACKETS



Type "EZ" Equipped with No. 83 Mounting and "B" Clamp



Type "S" Bracket Equipped with No. 1 Mounting and No. 20 Clamp

"EZ" Telephone Brackets Type

The "EZ" Telephone Bracket permits of a deskstand being instantly adjusted to a height convenient to the user. In addition to this the arm is pivoted on its mounting and may therefore be rotated in a horizontal plane. (24-in. radius.)

An "EZ" Telephone Bracket consists of:

1 Arm

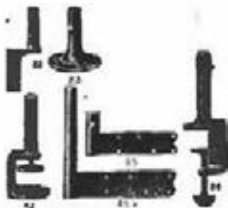
1 Mounting as specified in the order

In placing orders for this apparatus be sure and specify the mounting and clamp that is wanted.

"EZ" Type Telephone Bracket equipped with Nos. 83-85-85X, or 88 or 94 mounting and any standard clamp are standard complete equipment.

"EZ" Type Telephone Bracket equipped with Nos. 82 or 86 mounting are furnished at extra charge.

1 Clamp as specified in the order.

MOUNTINGS FOR "EZ" TELEPHONE BRACKETS

"EZ" Type Mountings

Code No.	Use
80	For wall, post, window frame, etc.
81	Used on wall or side of flat top desks.*
83	Used on top of flat desk.
85	Used on either side of flat or roll top desk.
85X	Used on either side of flat or roll top desk.*
88	Clamps on edge of flat top desk.*
94	Used on wall or partition.
98	For window ledge, railing, etc.

CLAMPS FOR "EZ" TELEPHONE BRACKETS

Code Letter	Use
B	This clamp fits desk telephones with cylindrical stem such as No. 1020 type desk stands.
G	Old style automatic stand with bulging stem.
H	For box telephone or for attaching to flat surface.

*Not stocked. Furnished on order.

"S" Type Telephone Brackets

This bracket is of the "folding gate" type, and is arranged so as to revolve on its base. Furnished in 24 and 36 inch length. The desk stand swivels on the front rod. The bracket will be furnished with any of the mountings described below and with either of the clamps listed.

When ordering specify the letter of the clamp and mounting that is wanted in addition to the code number of the telephone bracket.

Code No.	Length of Bracket Extended, Ins.	Approximate Shpg. Wt., Lbs.
S-8	24	5
S-14	36	6 1/2

Complete equipment consists of bracket, one mounting, one receiver hook, one telephone clamp, one set of eyelets for holding cord, but does not include desk stand.



Type "S" Mountings

MOUNTINGS FOR "S" TYPE TELEPHONE BRACKETS

Code No.	Use
1	For use on side of flat or roll top desk.
2	For use on top of flat top desk.
3	Clamps on edge of flat top desk.*
4	For use on wall or partition.
5	For use on side of flat top desk.*

Code No.	Use
6	For use on side of roll top desk.*
6A	For use on side of flat or roll top desk.*
7	For use on side of flat top desk.*
9	Attachment fits any mounting and holds two brackets.*

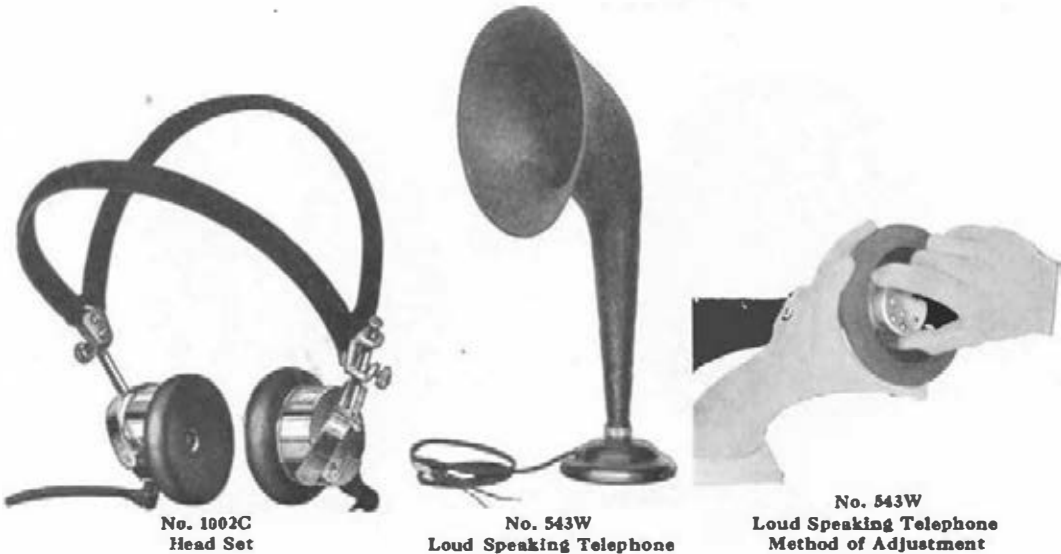
CLAMPS FOR "S" TYPE TELEPHONE BRACKETS

Code No.	Use
20	This clamp fits telephones with a cylindrical stem such as the No. 1020 type.
21	This clamp fits telephones with convex shaped stems.

*Not stocked. Furnished on order only.

TELEPHONES

Head Set and Loud Speaking Telephone



No. 1002C
Head Set

No. 543W
Loud Speaking Telephone

No. 543W
Loud Speaking Telephone
Method of Adjustment

NO. 1002C HEAD SET

The telephone head set is an important accessory of the radio receiving set. The No. 1002C head set is one in which every feature has been carefully studied and neither time nor expense has been spared in producing the very best known to the art. The cases of the individual receivers are of brass nickel plated.

The inductance of each of the coil windings is held within exceedingly close limits by measurements made with a special type of alternating current Wheatstone bridge. The two coils employed in each receiver are each wound with copper wire to a direct-current resistance of approximately 550 ohms. This gives a total of approximately 2,200 ohms D.C. resistance when the two receivers are connected in series. The alternating current impedance of the receivers connected in series when measured at voice frequencies is approximately 20,000 ohms.

The pole pieces of the receiver are made of a special grade of silicon steel which insures the maximum alternating magnetic field with a minimum loss due to eddy currents.

The head band supplied with the No. 1002C head set is of a design that insures a close and comfortable fit to the head. It is made of non-corrosive phosphor bronze spring wire, covered with a heavy textile webbing and is equipped with adjustable yokes, slide rods and thumb screws to clamp the yokes in any desired position.

Replacement Parts

Replacement parts for the No. 1002C head set are: No. 509W Receiver Unit complete, Ear Cap P99768, Diaphragm P98387, No. 1B Head Band and No. 763 Cord.

NO. 543W LOUD SPEAKING TELEPHONE

The Western Electric No. 543W Loud Speaking Telephone, when used as an adjunct to a radio receiving set and supplied with sufficient energy, at audio frequencies, will produce a volume of sound distinctly audible in every part of the living room of the average home. This instrument meets the demand for an inexpensive loud speaking telephone for direct connection to the ordinary forms of vacuum tube receiving sets.

Provision for adjusting the unit to the current output of the radio receiver enables the No. 543W loud speaking telephone to operate at maximum efficiency at all times.

Through an opening in the base of the stand, the unit can easily be turned with the fingers, to increase or decrease this air gap and thus adjust the loud speaking telephone to the power output of the radio receiving set. The adjustment is maintained.

The horn and the base are 23 inches high over all. The opening at the large end of the horn is 10 inches in diameter. The telephone unit has a direct resistance of 1100 ohms and an impedance of 11,000 ohms to alternating currents of average frequency.

It may, therefore, be connected without a transformer in the plate circuit of the ordinary vacuum tube amplifier.

TELEPHONES**Loud Speaking Telephones**

No. 540AW Front View



No. 540AW Side View

The No. 540AW loud speaking telephone is a portable sound projecting device mounted on a metal stand suitable for placing on the table of a living room.

The projector consists of 2 cones of specially selected material, having their bases cemented together. The apex of one cone is connected by a driving rod to an electro magnetic unit that responds to current impulses from the radio receiving set and thereby causes the cones to vibrate and reproduce the sound that is being sent out by radio telephony.

The design of the No. 540AW loud speaking telephone is such that the low notes of the 'cello, organ and piano and the brass instruments of the lower register are faithfully reproduced. This gives to the reproduction of instrumental music true depth and richness, thus making it satisfy the most exacting. But while particular stress has been laid on the reproduction of the low notes, because this is the more difficult, it should be borne in mind that the No. 540AW loud speaking telephone reproduces the high notes of the scale with great fidelity.

This telephone may be used in connection with any radio receiving set or audio-frequency amplifier capable of operating an ordinary type of loud speaker. As a rule 2 stages of audio-frequency amplification will be sufficient.

However, to obtain the best volume and quality of reproduction, it is advantageous to use a receiving set or amplifier which contains a power tube in the last stage.

The cones are approximately 18 inches in diameter and the distance between the apex of the front cone and the grating at the back is about 5 inches. The whole assembly stands approximately 21 inches high and weighs 7 pounds. No additional battery is required to operate this loud speaking telephone.

Replacement Parts

P-205745, Paper Cone.

P-204895, Thumbscrew.

No. 862 cord, 6 feet long unless otherwise specified.

No. 15A Bracket

Consists of the parts required for mounting the No. 540AW loud speaking telephone on a wall. Bracket mounts to the wall by means of 2 round head wood screws or 2 nails fastened in a vertical line approximately $5\frac{1}{8}$ inches apart.

TELEPHONES

Loud Speaking Telephones

(Continued)



(Front View)
No. 548AW
Loud Speaking Receiver



(Side View)
No. 548CW
Loud Speaking Receiver

NO. 548 TYPE LOUD SPEAKING TELEPHONES

The Bell Telephone Laboratories have developed for Public Address Systems a cone type loud speaker of the same general design as the No. 540-AW, except that it has a larger diaphragm. It is also suitable for use in connection with radio receiving sets. As in the No. 540 type, the projector consists of two cones of specially selected material, having their bases cemented together. The apex of one cone is connected by a driving rod to an electro-magnetic unit that responds to current impulses from the Address System amplifier or the radio receiving set and thereby causes the cones to reconvert the electrical energy into sound.

The cones are approximately 36 inches in diameter and the distance between the apex of the front cone and the grating at the back is about 8 inches. The whole assembly, including floor pedestal, stands approximately 49 inches high. No additional battery is required to operate this loud speaking telephone.

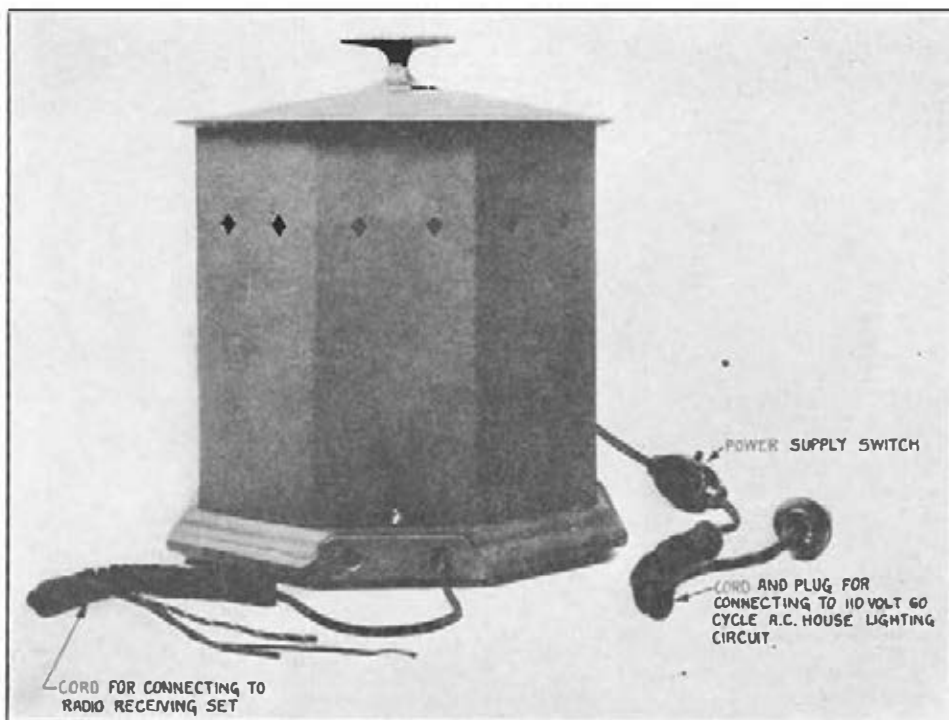
When used with a radio receiving set and supplied with sufficient energy at audio frequencies—usually two stages of audio frequency amplification being required between the detector and loud-speaking telephone—the No. 548 Type Loud Speaking Telephone will produce a volume of sound distinctly audible in every part of the living room of the average home or in any other place of moderate size where it is desired to reproduce speech or music for the benefit of a small group of people.

The design of the No. 548 Type Loud Speaking Telephone is such that it has a slightly broader range of reproduction than the No. 540-AW type with its 18 inch diaphragm. The low notes of the cello, organ and piano, and the brass instruments of the lower register are faithfully reproduced. This gives to the reproduction of instrumental music true depth and richness. But, while particular stress has been laid on the reproduction of the low notes, the No. 548 Type Loud Speaking Telephone also reproduces the high notes of the scale with great fidelity.

It is offered under two designations: one, the No. 548-AW, mounted on a stand; the other, the No. 548-CW, equipped with a bracket for wall mounting.

TELEPHONES

Loud Speaking Telephones



No. 6025B Amplifier

No. 6025B Amplifier

A good loud speaking telephone requires more electrical energy for its proper functioning than most audio-frequency amplifiers in common use are able to deliver without overloading the vacuum tube in the last stage.

It is generally possible to secure ample volume with the amplifiers, but at the expense of the quality of reproduction due to the distortion which results from this overloading. The No. 6025B amplifier is intended for use as an adjunct to a loud speaking telephone to furnish sufficient undistorted electrical energy at audio-frequencies so that the loud speaking telephone may function at maximum capability.

It consists essentially of a single stage amplifier with a self-contained current supply set for both the vacuum tubes used in it. It employs 2 Western Electric No. 205D vacuum tubes, one as an amplifier and the other as a rectifier.

No batteries are required for the operation of this amplifier. The only current supply necessary is the ordinary 110-volt, 60-cycle A.C. house lighting current. No other form of house lighting can be used with this apparatus. The house lighting supply is transformed, rectified and filtered by the self-contained current supply set so as to properly energize the amplifier without the use of batteries. The amplifier consumes about 40 watts, that is, it takes about the same power as a medium sized incandescent bulb.

When used in conjunction with a radio receiving set this amplifier is not intended to provide all the audio-frequency amplification necessary for proper loud speaking telephone operation, but only that portion of the amplification where there is most likely to be overloading, that is, the last stage. Thus if satisfactory volume is obtained in a headset from the detector tube of a radio receiving set one stage of ordinary audio-frequency amplification plus the No. 6025B amplifier will provide sufficient energy to operate a loud speaking telephone so as to be audible throughout a good sized room.

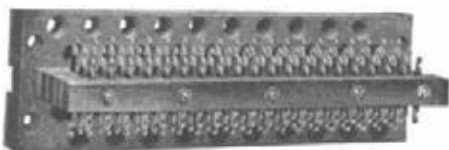
The amplifier is equipped with a cord to connect it to a radio receiving set and also a cord with a plug to connect it to the lighting circuit. A switch in the latter cord is furnished to turn the power on or off and is the only control on the amplifier. The apparatus is contained in a metal cabinet, octagonal in shape with approximate dimensions of 12¾ inches high and 9 inches wide.

Replacement Parts

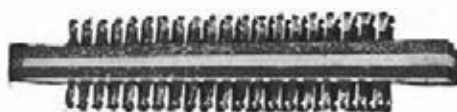
No. 205D vacuum tubes (orders should state "intended for use in No. 6025B amplifier.")

No. 196 cord, 6 feet long. If a complete cord, switch and plug assembled together for connecting the amplifier to the lighting circuit are required they may be obtained from a dealer or the nearest Western Electric House and should be ordered as follows: P-168816 cord and plug assembly.

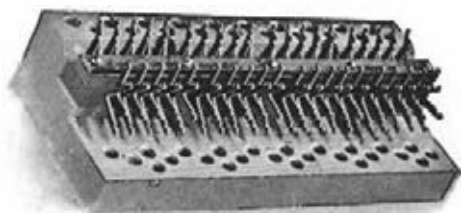
TERMINAL STRIPS



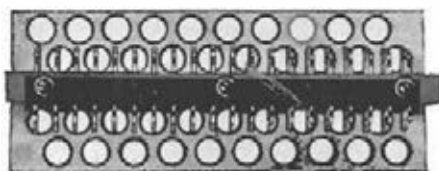
No. 35



No. 53



No. 65



No. 100A and 101A

Terminal Strips

The Nos. 53 and 69 terminal strips are composed of a 3 ply laminated maple wooden base having holes into which the terminal punchings are driven.

All other models have a solid maple base upon which are assembled hard rubber insulating strips which hold the terminal punchings in place. The base is drilled to act as a fanning strip for wires and the holes are chamfered to prevent injury of the insulation. These terminal strips are furnished unnumbered unless otherwise specified. The Nos. 100 and 101 types are provided with a clamping strip which is wide enough to permit of four characters being used for each stack of terminals. The Nos. 100 and 101 types are arranged to mount on a $\frac{1}{2}$ inch by $\frac{1}{2}$ inch bar by means of two $\frac{1}{4}$ inch No. 10-32 round head iron machine screws, which are furnished with the terminal strips.

The No. 65 type is for use with main distributing frames.

The Nos. 53 and 65 types are for use with No. 9 switchboards.

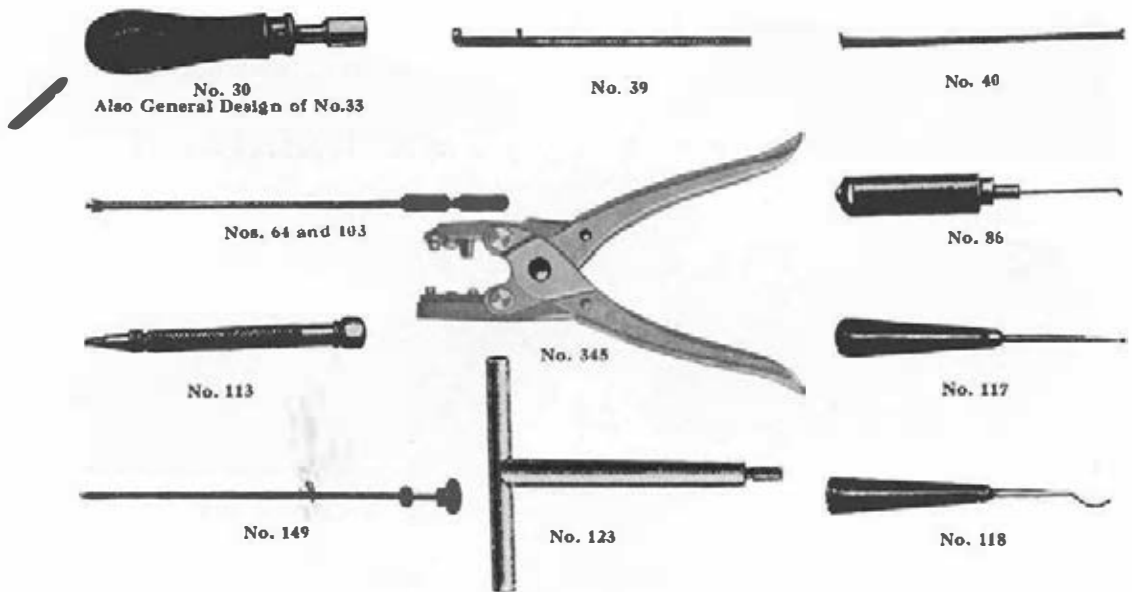
The Nos. 35 to 70 types are for use with intermediate distributing frames.

The Nos. 100 and 101 types are for general switchboard purposes.

Code No.	Number of Terminals per Row	Number of Rows of Terminals	Length of Strips in Ins.	Width	Height Overall
35	20	3	7 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$
36	20	4	7 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$
37	20	5	7 $\frac{1}{2}$	2 $\frac{1}{2}$	3 $\frac{1}{2}$
38	20	3	6 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$
39	20	4	6 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$
40	20	5	6 $\frac{1}{2}$	2 $\frac{1}{2}$	3 $\frac{1}{2}$
41	20	6	6 $\frac{1}{2}$	2 $\frac{1}{2}$	3 $\frac{1}{2}$
51	20	6	7 $\frac{1}{2}$	2 $\frac{1}{2}$	3 $\frac{1}{2}$
53	20	2	10	2 $\frac{1}{2}$	2
65	*40	1	7 $\frac{1}{2}$	3 $\frac{1}{2}$	2 $\frac{1}{2}$
69	20	3	10	2 $\frac{1}{2}$	2
70	20	7	7 $\frac{1}{2}$	2 $\frac{1}{2}$	4
100A	20	3	6 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$
100B	20	4	6 $\frac{1}{2}$	2 $\frac{1}{2}$	3 $\frac{1}{2}$
100C	20	5	6 $\frac{1}{2}$	2 $\frac{1}{2}$	3 $\frac{1}{2}$
100D	20	6	6 $\frac{1}{2}$	2 $\frac{1}{2}$	4 $\frac{1}{2}$
100E	20	7	6 $\frac{1}{2}$	2 $\frac{1}{2}$	4 $\frac{1}{2}$
100F	20	8	6 $\frac{1}{2}$	2 $\frac{1}{2}$	4 $\frac{1}{2}$
100G	20	9	6 $\frac{1}{2}$	2 $\frac{1}{2}$	5 $\frac{1}{2}$
100H	20	10	6 $\frac{1}{2}$	2 $\frac{1}{2}$	5 $\frac{1}{2}$
100J	20	11	6 $\frac{1}{2}$	2 $\frac{1}{2}$	5 $\frac{1}{2}$
101A	20	3	7 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$
101B	20	4	7 $\frac{1}{2}$	2 $\frac{1}{2}$	3 $\frac{1}{2}$
101C	20	5	7 $\frac{1}{2}$	2 $\frac{1}{2}$	3 $\frac{1}{2}$
101D	20	6	7 $\frac{1}{2}$	2 $\frac{1}{2}$	4 $\frac{1}{2}$
101E	20	7	7 $\frac{1}{2}$	2 $\frac{1}{2}$	4 $\frac{1}{2}$
101F	20	8	7 $\frac{1}{2}$	2 $\frac{1}{2}$	4 $\frac{1}{2}$

*Three way.

TOOLS



CABLE AND CABLE TERMINAL TOOLS

Code Co.	Use	Approximate Dimensions Inches, Overall
93	Maple wedge for use as a multiple cable lifter.	18 x 5 x 1
216A	Combination double end screw driver and double end socket (taking hexagonal nuts, $\frac{3}{8}$ in. and $\frac{1}{4}$ in. across flats) for use in placing fuses in cable terminals and connecting wires to fuses and binding posts. The socket wrench may be extended beyond the screw driver ends and locked in position or may be released to turn freely over the screw driver shank.	$6\frac{3}{4}$
287	A flat steel blade with a slot at one end which is bent up at an angle of 15 degrees. Has wood handle. Intended for sewing switchboard cable in run.	6
288	A spring steel blade mounted in a metal handle. Blade is slotted at the edge at 15° angle, the inside edge of which is sharpened. For use in stripping braid from switchboard cable.	$5\frac{1}{2}$
311	A double ended socket wrench for use on $\frac{3}{8}$ in. or $\frac{1}{4}$ in. hexagonal nuts, also has slots at either end for inserting a screw-driver.	.....

DISTRIBUTING FRAME TOOLS

33	Socket wrench for use on $\frac{1}{2}$ in. hexagonal nuts on distributing frames, shank.	$1\frac{1}{8}$ x $\frac{1}{4}$
39	Shutter support adjuster, used on drops.	$5\frac{3}{4}$ x $\frac{1}{4}$ x $\frac{1}{4}$
40	Double screw-driver for use on drops. One end bent at angle of 90 degrees.	7 x $\frac{3}{4}$ x $\frac{1}{4}$

JACK TOOLS

64	Wrench and screw-driver for adjusting Nos. 4, 6, 7, 10, 11, and 15 jack fasteners.	27 x 1
86	Jack cleaner with $\frac{1}{4}$ in. wide blade.	4 x $\frac{1}{4}$
103	Wrench and screw-driver, similar to No. 64, except arranged for adjusting No. 16 jack fastener.	27 x 1
113	A steel holder with a removable steel blade having a screw-driver edge at one end. Approximate diameters; holder $3\frac{1}{2}$ inches long; blade $\frac{1}{2}$ inch long. Intended for use in removing the underlining of jack mountings.	$4\frac{1}{8}$ x $\frac{3}{8}$
117	Adjusting tip and ring springs of No. 92 jacks. Used with No. 118 tool for adjusting abnormally bent ring springs.	$7\frac{1}{8}$ x 1
118	With No. 117 tool for adjusting abnormally bent ring springs of No. 92 jacks.	$7\frac{3}{8}$ x 1
123	Jack sleeve remover. For use in removing sleeve from a worn No. 49 jack without interfering with other jacks in strip and without removing the strip from the switchboard. Used in connection with No. 124.	$5\frac{1}{4}$ x 4
124	For use in replacement of No. 49 jack sleeves. Has a socket adapted to fit over soldering terminal of jack sleeve used in connection with No. 123 tool.	$14\frac{1}{8}$ x $\frac{1}{4}$
149	Spring tweezers for use in holding wires to jack terminals while soldering.	$21\frac{1}{2}$ x $1\frac{1}{4}$
274	For use in extracting signal plugs from multiple jacks.	$5\frac{1}{8}$ x $\frac{3}{4}$
345	Consists of a parallel jaw plier handle and two tool heads, one on each jaw, arranged so that they may be rotated in turret fashion. For use on No. 92 jacks to remove old sleeves and replace them with new sleeves.	.....

TOOLS



No. 316



No. 90



No. 323



No. 116



No. 87



No. 213

KEY TOOLS

Code No.	Use	Approximate Dimensions Inches, Overall
105	Adjusting springs on No. 453 or vertical type keys.	$3\frac{1}{2} \times \frac{1}{4} \times \frac{1}{4}$
143	Adjusting springs of horizontal type keys.	$4\frac{1}{4} \times 3\frac{3}{4} \times \frac{1}{4}$

LAMPS AND LAMP CAP TOOLS

85	Extracting No. 4 type lamps.	$3\frac{1}{2} \times \frac{1}{4}$
87	Extracting No. 8 type lamp caps.	$2\frac{1}{8} \times \frac{3}{4} \times \frac{1}{2}$
116	Removing No. 2 type lamps.	$3\frac{1}{8}$
146	This tool is used in removing No. 2 type lamp cap, type 59, 60 and similar type number plates from switchboards. It consists of pincer or forceps for gripping the number plate on which is riveted a hook that is pivoted at its fastening and can be opened out when necessary for prying loose such number plates as have become stuck in the jack mounting.	$3\frac{1}{8}$
319	For removing No. 2 type lamp caps and No. 60 type number plates. Similar to the No. 58 tool.	$4\frac{5}{8} \times 1\frac{1}{8}$

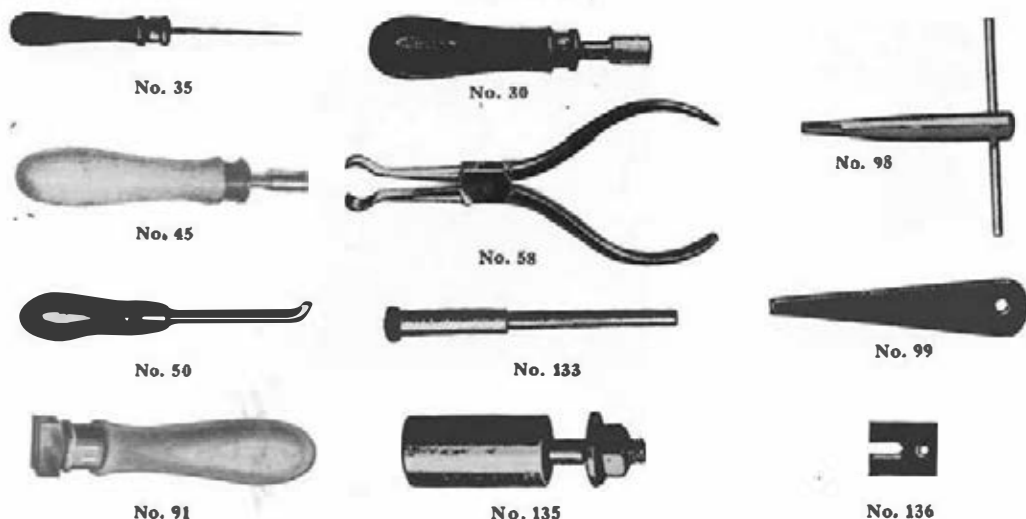
MESSAGE REGISTER TOOL

90	For removing caps of Message Registers.	$6\frac{1}{8} \times 1\frac{5}{8} \times \frac{1}{2}$
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Plug Tools

213	Socket wrench for use in adjusting nuts of Nos. 103 and 137 plugs and consists of a hardened steel socket attached to a wood handle.	$6\frac{1}{2} \times 1\frac{1}{4}$
316	Consists essentially of a hollow shaft which is equipped with a crank and contains a chuck. This shaft is provided with a collar whereby the chuck is adjusted to grip the stop shoulder of a No. 109 or No. 110 plug. Replaces combination of Nos. 200, 201 and 202 tools.	$6 \times 7\frac{1}{4}$
317	Same as No. 316 tool, except arranged to accommodate the No. 47 plug.	$6 \times 7\frac{1}{4}$
323	Consists of a 6 ft. flexible shaft arranged at one end to connect with a motor having a $\frac{1}{2}$ in. diameter straight shaft and provided at the other end with a handle equipped with a non-revolving shell, arranged to hold a chuck. Two chucks are furnished, which are capable of carrying drills up to $\frac{1}{4}$ in. The shaft, holder, coupling, extra chuck and an adjusting wrench for the handle are mounted in a wooden box $20\frac{3}{4}$ in. long, $14\frac{3}{4}$ in. wide, and $2\frac{1}{4}$ in. high, in which space is provided for the Nos. 133, 134 and 135 tools as described under "Protector Tools." Replaces No. 132 tool.	
KS-2348	Combination tool for inserting and extracting shell and connecting screws of plugs. (Replacing No. 109.)	

TOOLS (Continued)



PROTECTOR TOOLS

These Include Fuse, Heat Coils, Etc.

Code No.	Use	Approximate Dimensions Inches, Overall
30	Socket wrench for use on $\frac{1}{8}$ in. hexagonal nuts on No. 7 type protector fuses, shank end.....	$1\frac{1}{8} \times \frac{5}{8}$
84	Wrench and screw-driver for No. 7 type fuses. Fits $\frac{1}{8}$ hexagonal nuts.....	$2\frac{5}{8} \times 1\frac{5}{8} \times \frac{5}{8}$
133	Wire bristle brush in a brass holder for use with No. 323 tool for cleaning protector springs.....	4
134	Wire bristle brush with wooden center for use with No. 135 tool for cleaning heat coil washers.....	3
135	Steel coupling for mounting the No. 134 tool on a $\frac{1}{2}$ inch motor shaft.....	$2\frac{1}{8} \times \frac{1}{4}$
KS-2827	Pliers for use in handling heat coils of protectors.....	.....

RELAY TOOLS

35	Screw-driver with blade $\frac{1}{8}$ in. wide used with relays, shank.....	$3\frac{1}{8}$
45	Socket wrench for $\frac{1}{8}$ in. hexagonal armature adjusting nuts of relays, shank.....	$1\frac{1}{8} \times \frac{1}{8}$
46	Removing $\frac{3}{8}$ in. hexagonal cap nuts from relays of No. 122 type, shank.....	$1\frac{1}{8} \times \frac{1}{8}$
48	Wrench and screw-driver for adjusting armature contacts of relays. Will fit $\frac{1}{4}$ in. hexagonal nuts.....	$4\frac{5}{8} \times \frac{3}{8}$
50	Relay spring adjustment.....	$5\frac{1}{4}$
72	Wrench and screw-driver for adjusting armature contact screws. Same as No. 48 except arranged for $\frac{1}{8}$ in. and $\frac{1}{4}$ in. hexagonal nuts.....	$4\frac{5}{8} \times \frac{1}{8}$
91	Removing cover of No. 89 type relay, shank.....	1 x $\frac{3}{8}$
98	For use in adjusting and bending the springs of No. 177 type relays.....	$2\frac{1}{4} \times 2\frac{1}{4}$
99	Gauge for adjusting air gap between armature and pole piece of No. 177 relays.....	3 x $\frac{1}{4}$
130	For use in adjusting the middle bank of springs on the No. 125 type relays.....	$5 \times 1\frac{1}{8} \times \frac{1}{4}$
136	For use in opening relay contacts. Inserted between the adjusting nut and the armature of flat type cut-off relays preparatory to a cut-over from an old to a new exchange.....	$\frac{3}{8} \times \frac{1}{2}$
147	Screw-driver for adjusting contact screws of relays same as the screw-driver part of No. 72 tool.....	$4\frac{5}{8} \times \frac{1}{8}$
206	An off-set screw-driver used with the No. 207 tool for adjusting the screws holding the springs on flat type relays ("E" types) after the relays have been mounted.....	5 x $\frac{1}{4}$
207	Used with No. 206 tool.....	5 x $\frac{1}{4}$
212	A non-magnetic tool used for adjusting contact and pole piece screws of the Nos. 206 and 209 type relays.....	$2\frac{1}{8} \times \frac{3}{4}$
220	Socket wrench for $\frac{1}{8}$ in. hexagon nut, arranged to fit over the screw driven shank of the No. 35 tool.....	$3\frac{1}{4} \times \frac{1}{8}$
221	Consists of a combination of the Nos. 35, 219 and 220 tools.....	$7\frac{1}{8}$
252	An offset contact clip for making connections with relay springs under operating conditions.....	$1\frac{1}{8} \times 1\frac{1}{8} \times \frac{1}{8}$
259	A single piece, bar shaped, vanadium steel tool. From the side of one end extend two beveled tipped jaws. These tips are so proportioned that they can be inserted between the springs of the "A" and "E" type relays thus permitting of adjusting them to the proper tension.....	$5\frac{1}{8} \times \frac{1}{8}$

TOOLS

(Continued)



No. 96



No. 129



No. 48 Tool



No. 144 Tool



No. 115 Tool



No. 145 Tool

RELAY TOOLS (CONTINUED)

Code No.	Use	Approximate Dimensions Inches, Overall
265	Designed for cleaning and burnishing the contact points of relays. Consists of the No. 266 tool mounted in a small brass chuck which is provided with a hard rubber handle, also includes a cap similar to a fountain pen cap for covering the chuck of the No. 266 tool when not in use.	$3\frac{1}{2} \times \frac{1}{4}$
266	Part of the No. 265 tool for cleaning and burnishing the contact points of relays.	$1 \times \frac{1}{16}$
268	For adjusting contact springs of relays. For use in P.B.X. switchboards of the No. 550 S.C. type.	$5\frac{1}{2} \times \frac{1}{4}$
269	A hollow end screw-driver for use in mounting relays in P.B.X. switchboards of the No. 550 S.C. type.	$6 \times 2 \times \frac{1}{16}$
270	For use in adjusting contact springs of relays used in P.B.X. switchboards of the No. 550 S.C. type.	$3\frac{1}{8} \times \frac{1}{4}$
292	For use in adjusting springs in flat type ("E" type) relays. Has slot .045 inch wide.	$7\frac{1}{16}$
293	Same as No. 292 tool, except has slot .022 inch wide.	$7\frac{1}{16}$
340	For adjusting armature and contact air gaps on polarized relays of the Nos. 206 and 215 types.	$3 \times \frac{1}{4}$
349	A double-ended wrench, one end fits hexagon nuts of "E" type relays which are $\frac{1}{16}$ inch across flats—other end fits nuts of No. 207 relays which are $\frac{1}{16}$ inch across flats.	$1\frac{1}{16} \times \frac{1}{8} \times \frac{1}{16}$

RESISTANCE COIL TOOLS

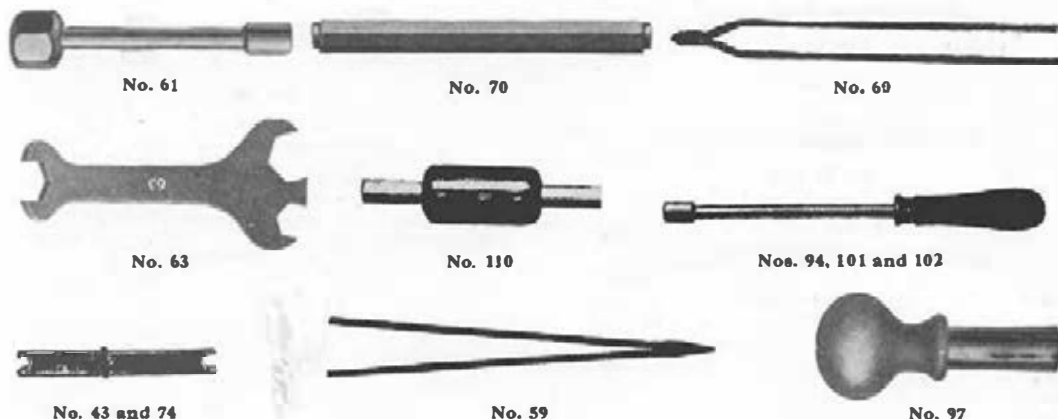
276	Socket wrench for adjusting mounting nuts of Nos. 18 or 19 resistances. (Similar in design to No. 94 tool.)	$9\frac{3}{4} \times 1\frac{1}{4}$
277	Open end off-set wrench intended for use on mounting nuts of Nos. 18 or 19 type resistances when wired in position.	$9\frac{1}{4} \times \frac{1}{4}$

RINGER TOOLS

96	Double screw-driver for ringers.	$3\frac{1}{4} \times \frac{1}{8} \times \frac{1}{16}$
122	A flat wrench with off-set handle arranged with jaws to take $\frac{1}{16}$ inch hexagonal nuts used for adjusting the air gap between the armature and core on harmonic ringers.	
129	Double wrench for adjusting armature pivot screw nuts and adjusting posts of ringers.	$3 \times \frac{1}{2}$
48	Used for adjusting Nos. 50A and 50B selectors. Consists of a wrench and screw-driver. Will fit $\frac{1}{4}$ inch and $\frac{1}{8}$ inch nuts.	
115	Used for changing Nos. 50A and 50B selectors to call different stations. It is a small double ended tool, one end consisting of a wrench for $\frac{1}{4}$ inch hexagonal nut; the other end a small wire hook.	
144	Used for changing Nos. 60A and 60B selectors to call different stations. Consists of a socket wrench and screw driver.	
145	Used for changing Nos. 60A and 60B selectors to call different stations. Small double ended tool, one end consisting of a wrench for $\frac{1}{8}$ inch hexagonal nut; the other end a small wire hook.	

TOOLS

(Continued)



SWITCHBOARD CORD TOOLS

Code
No.
312
313
314
315

Use

Approximate
Dimensions
Inches, Overall

A set of tools for use in repairing the No. 447 and No. 448 switchboard cords.

TELEPHONE SET TOOLS

Including Transmitters, Receivers, Etc.

61	Socket wrench for use on $\frac{3}{4}$ in. hexagonal nuts on binding posts of telephone sets	$5\frac{1}{8} \times 1$
63	Triple wrench for use on nuts of binding posts of receivers and transmitters.....	$2\frac{3}{8} \times 1\frac{1}{8}$
70	Double socket wrench for use on $\frac{3}{4}$ and $\frac{1}{2}$ in. hexagonal nuts on receivers, transmitters and telephone set binding posts.....	$6 \times \frac{1}{2}$
106	Deflector for use on No. 7 coin collector.....	$1\frac{1}{8} \times 1\frac{1}{8}$
110	Double socket wrench for No. 20 type desk stands and No. 48 type telephone arms. Fits $\frac{1}{8}$ and $\frac{3}{8}$ inch hexagonal nuts.....	4×1
138	For adjusting stops and lugs of No. 50 type coin collectors.....	$4\frac{1}{8} \times \frac{1}{4} \times \frac{1}{8}$
139	For use in leveling coins in No. 50 type coin collectors when coin box becomes so full as to interfere with operation of collector.....	$8 \times \frac{1}{4}$

WIRE TOOL

71	Wire skinner for use in removing the insulation from braided rubber covered wire. Has adjustable blades arranged to receive wire of different gauges.....	$4 \times 3\frac{1}{2}$
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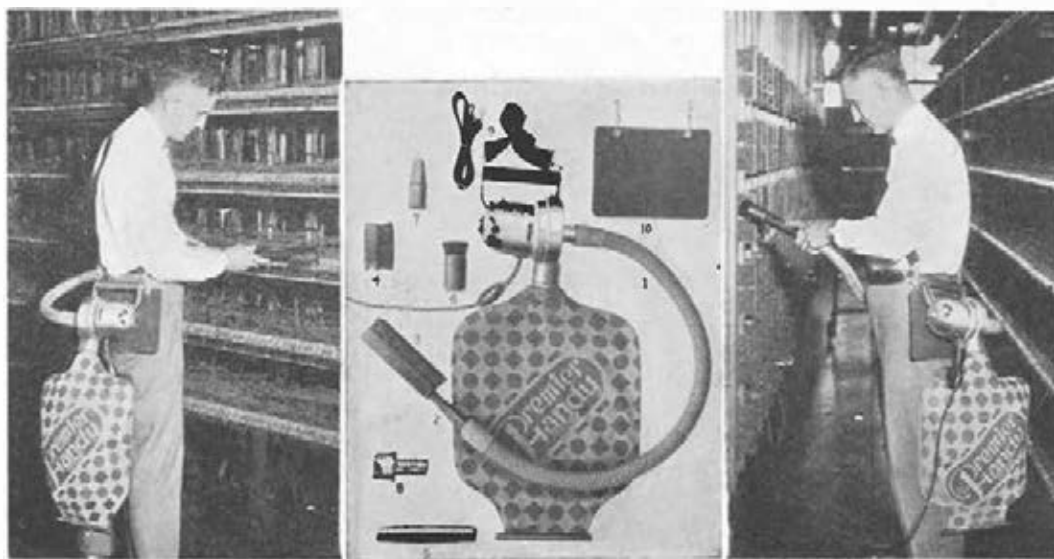
MISCELLANEOUS TOOLS

Code
No.

Use

59	Long handle round nose pliers.....	$19 \times 2\frac{1}{8} \times \frac{1}{8}$
60	Long handle diagonal cutting pliers.....	$18 \times 1\frac{3}{8} \times \frac{3}{8}$
74	Double wrench; same as No. 43 except arranged for $\frac{1}{2}$ in. and $\frac{1}{4}$ in. hexagonal nuts	$4 \times \frac{1}{2}$
94	Socket wrench for use on $\frac{1}{8}$ in. hexagonal nuts.....	$12 \times 1\frac{1}{2}$
97	Socket wrench for use on $\frac{3}{8}$ in. hexagonal nuts.....	$3\frac{3}{8} \times 1\frac{1}{2}$
101	Socket wrench for use on $\frac{1}{2}$ in. hexagonal nuts, shank.....	$4\frac{1}{8} \times 1\frac{1}{2}$
102	Socket wrench for $\frac{5}{8}$ in. hexagonal nuts. Similar to No. 94 except for size of hexagonal nut, shank.....	$7\frac{1}{4} \times \frac{1}{8}$
298	A test pick having a 6 in. handle of insulating material and equipped with a connecting cord.....	$5'-6 \times \frac{3}{8}$

VACUUM CLEANER TOOLS FOR SWITCHBOARDS



PREMIER HANDY ELECTRIC VACUUM CLEANER

The Premier Handy Electric Vacuum Cleaner is for use in cleaning switchboards, cable runways, relay racks, distributing frames, and for general cleaning of telephone equipment and apparatus. It is supported by a strap over the operator's shoulder. The weight with cleaning tools is $8\frac{1}{2}$ pounds. It is equipped with an air-cooled motor with precision ball bearings packed with sufficient lubricant to last for years. No oiling is required. Tool descriptions are as follows:

No. 1. Forty-two inch flexible Braided Hose sufficiently flexible to allow free use of the tools, but not so flexible as to make careful guiding impossible.

No. 2. Eleven Inch Fiber Adapter. This Fiber Adapter is forced into one end of hose No. 1. The other end slides into brush tools Nos. 3 and 4.

No. 3. Seven and one-half inch Vacuum Counter Brush with soft one inch bristles. This is an indispensable tool for cleaning flat surfaces, large areas, and as a vacuum duster for wires, cables or runways, and the backs of switchboards. Fiber Adapter No. 2 slides into this brush.

No. 4. Four Inch Vacuum Military Brush with two rows of one inch bristles. Due to the convenient size and shape of this brush, it is of great value in cleaning and dusting intricate wiring and connections in main frame equipment. Fiber piece No. 2 also slides into this brush.

No. 5. Eight Inch Fiber Tube. Insert one end of this tube into hose No. 1. Tools Nos. 6 and 7 engage on the other end.

No. 6. Vacuum Sash Brush. This circular brush with diameter $1\frac{3}{4}$ inches, sliding on the end of tube No. 5, will be found most convenient for cleaning in hard-to-get-at places. The operator can easily reach a distance of 15 inches from his hand by this tool at the end of tube No. 5. This Sash Brush has been carefully designed for special cleaning jobs on distributing frames.

No. 7. Four Inch Soft Rubber Nozzle attached to Fiber Piece No. 5. For removal of dirt from jacks by suction. This tool may also be used for blowing dirt and dust out of all corners, parts and surfaces inaccessible to the suction tools. Use for blowing as outlined in No. 8.

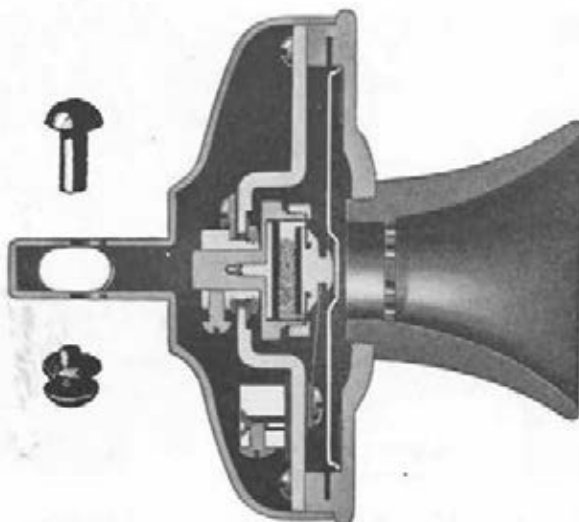
No. 8. Blower Coupling. This is attached to the cleaner at the exhaust from which the bag has been detached. The operator may then force the hose over this coupling, using the rubber nozzle No. 7 through No. 5 at the end of the hose, or he may force the rubber nozzle immediately over the blower coupling, eliminating the use of the hose.

No. 9. Black Shoulder and Belt Straps. One of these straps fits over the shoulder of the operator, and the other around the waist. The cleaner is then held rigidly against the body, and if the operator stoops, the cleaner cannot swing out and damage any delicate equipment.

No. 10. Flat Fiber Shield. This Shield is of black fiber $7\frac{1}{2} \times 10$ inches in size, equipped with buckles. These buckles snap into waist or shoulder Belt Buckles, and the cleaner when in use then rests against this Fiber Shield. This is to prevent any inconvenience to the operator in case motor should heat up a few degrees during long use.

TRANSMITTERS

Western Electric transmitters represent the highest development from all angles, and are recognized as standard throughout the world by leading telephone authorities.



Cross-Section of No. 323 Transmitter



No. 312-W



No. 353-W

Standard Central Battery and Local Battery Transmitters

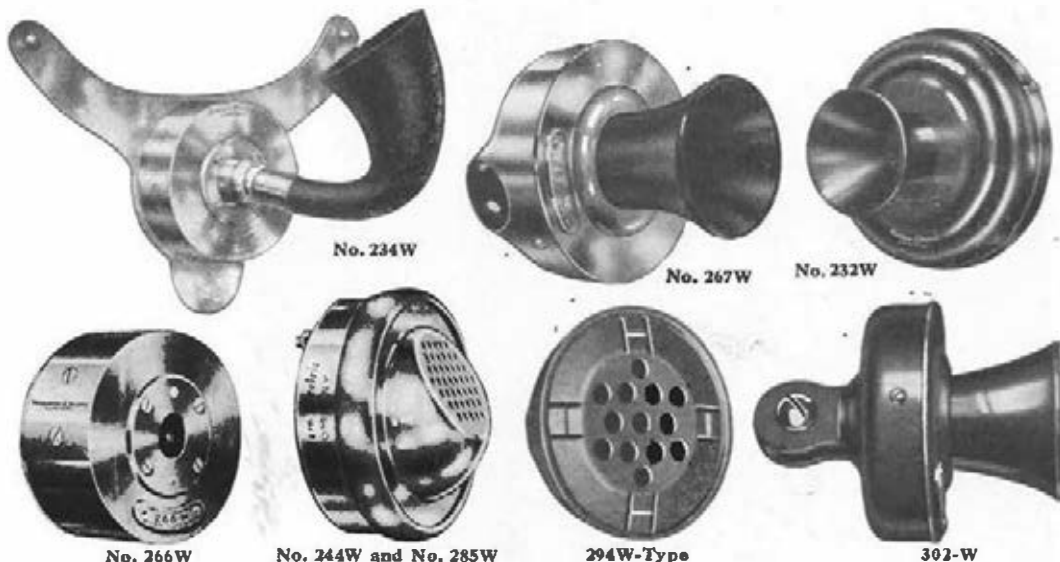
The average resistance of the following transmitters in service is from 35 to 50 ohms.

Wall and Desk Set Types

Code No.	Service
312W	For use in No. 1336 type mine telephones. Treated to resist the action of moisture and fumes. Nickel plated finish with black finished brass mouthpiece. Drilled and topped for mounting screws.
323BW	General standard transmitter for telephones and desk stands. Black finish. Mounts by means of bolt and screw. Same as No. 323W except finish.
337BW	For use on long subscribers loops. Similar to the No. 323BW. Black finish. Mounts by means of bolt and screw.
353BW	Former standard for wall type magneto telephones. Transmitter mounts on an adjustable arm bracket and has an overall length of 8 3/4 inches. Black finish.

TRANSMITTERS

(Continued)



Standard Central Battery and Local Battery Transmitters Switchboard Types

- Code No.**
232W A switchboard operator's suspended type transmitter having one side of circuit grounded on the frame. Arranged to be suspended by means of two transmitter cords. Has a black finish.
234BW Operator's chest type transmitter having an adjustable mouthpiece. Arranged for but not equipped with a No. 3 transmitter attachment.

HAND SET TYPES

- 244W** For use on No. 1001 type hand sets. Has perforated metal mouthpiece secured to case by a clamping ring. Has nickel plate finish.
285W For use on No. 1001C hand set for train despatching circuits. Same as No. 244W except equipped with a low resistance button.
267W For use on No. 1002 type hand sets. Has nickel plate finish.

TEST SET TYPES

- 266W** No. 1017 type test set transmitter. Mounts on back of perforated plate in test set. Has black finish and is equipped with mounting screws.

STANDARD INTER-PHONE TRANSMITTERS

These transmitters have different electrical characteristics from the transmitters for standard central battery and local battery service listed above, and should, therefore, not be used for service other than that for which they are intended. These are extra high resistance types of transmitters.

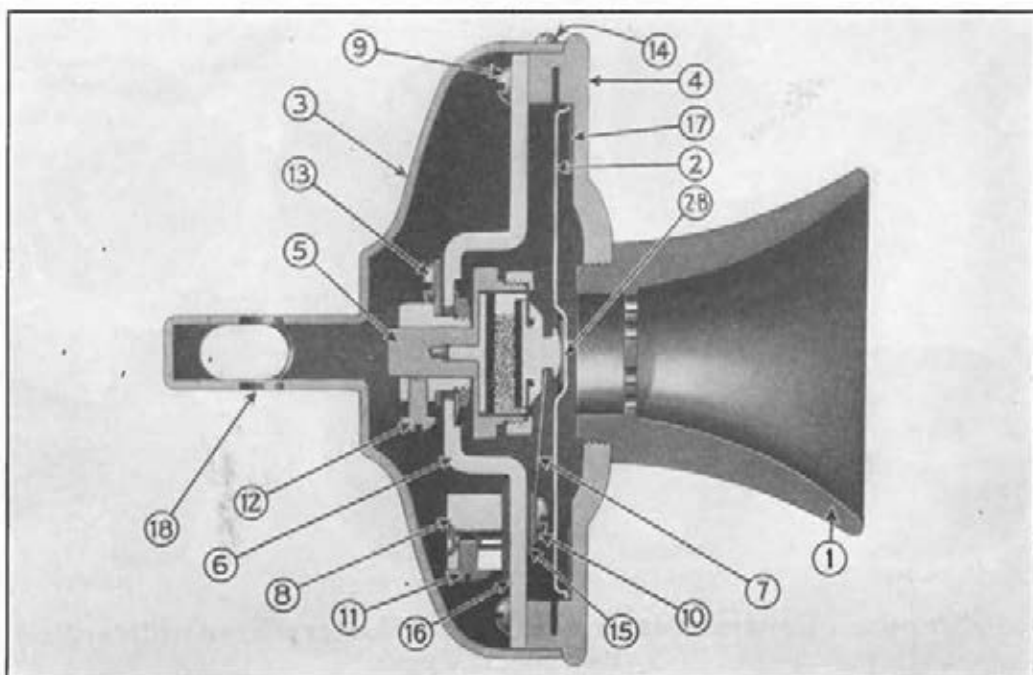
- 294W** A capsule type transmitter having a carbon diaphragm not insulated from case. Used in No. 1527C and 1539C types of wall Inter-phones.
302W A No. 294W mounted in a metal case for use on desk type Inter-phones. Has bolt and screw mounting. Nickel plate finish.
362W A unit capsule type transmitter, but differing in construction from the No. 294W type. Mounts in the Nos. 1527A and 1539A Inter-phones as used in the No. 1801 switchboard systems.

TRANSMITTERS FOR TRAIN DISPATCHING

The low resistance type of transmitters as indicated below have a resistance of from 5 to 15 ohms in operation.

- 286W** A high resistance insulated short arm bracket type black finish transmitter for use with the No. 1312A telephone set.
292W An insulated low resistance bridge type, moisture-proof nickel finish transmitter, arranged for mounting in the Nos. 1336F and H telephone sets.
349BW An insulated black finish transmitter similar to the standard No. 323BW except that it is equipped with a low resistance button. For use in No. 1317BU telephone set.
359BW Similar to the standard No. 323BW transmitter except that it is equipped with a reinforced mouthpiece used in No. 1305AC telephone set.
386W A low resistance insulated aluminum centrally damped local battery breast transmitter used with No. 375 cord in dispatchers' switchboard.

TRANSMITTER PARTS AND ACCESSORIES



Transmitter Parts

Transmitter Code Numbers

Sym- bol	Name of Part	Transmitter Code Numbers					
		232W	234W	244W 285W 312W	267W	292W	323BW 337BW 349BW 353BW 359CW
1	Mouthpiece.....	P- 84570	P- 91818	(Note 1)	*P- 84570	P-106561	**P- 84570
2	Diaphragm.....	P- 90689	P- 90168	P- 90513	P- 89099	P- 93248	P- 97905
	Diaphragm Band.....	P- 89052	P- 89047	P- 89048	P- 89047		
2B	Diaphragm Nut or Screw.....	P- 95093	P- 82278	P- 82278	P- 95093		
	Insulating Disc.....						P- 97570
3	Bac Case or Bell.....	P- 95228	P- 97247	(Note 2)	P- 90145	P- 90021	† P- 99304
4	Transmitter Face.....	P- 90768	P- 99262	(Note 3)	P- 88325	P- 91786	P- 99190
	Transmitter Face Ring.....			P- 81487			
5	Granular Button.....	P- 95172	P- 99377	(Note 4)			
6	Bridge and Center.....	P- 95192	P- 98453	P- 84761	P- 90527	P- 94020	(Note 5)
7	Damping Spring.....	P- 89587	P- 86542	P- 86547	P- 88343	P- 93250	P- 95751
8	Terminal Block.....		P- 85472	P- 84780		P- 92962	P- 92962
9	Machine Screw.....	P- 85787	P- 85990	P-128914		P- 98336	P- 98336
10	Machine Screw.....					P- 98334	P- 98334
11	Set Screw.....		P-115484		P- 39656	P-129702	P-129702
12	Adjusting Screw.....	P- 85545	P- 81389	P- 84808		P- 91810	P- 91810
13	Terminal Screw.....		P-116353			P-129702	P-129702
14	Rim Mounting Screw.....	P- 82291			P-180658	P- 99649	P- 99649
15	Washer or Insulator.....		P- 5112		P-101428	P- 99369	P- 99369
16	Terminal Insulator.....		P- 86769		P- 88339	P- 99370	P- 99370
17	Cloth Washer.....	P- 95195	P- 88333	P- 81697	P- 88333	P- 93249	P- 97904
18	Bolt P-97904; Washer P-92381 and Screw, P-92378.						

*P-80543 Mica Diaphragm.

**P-93553 for No. 349BW.

†P-99526 for No. 353BW.

Note 1. P-106561 for No. 312W.

Note 2. P- 90077 for No. 244W; P-91163 for No. 285W and P-98072 for No. 312W.

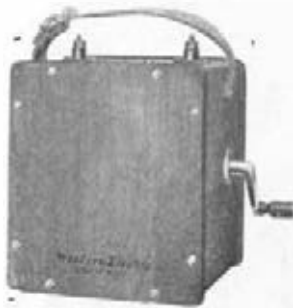
Note 3. P-81501 for Nos. 244W and 285W; P-98074 for No. 312W.

Note 4. P-85577 for Nos. 244W and 312W; P-91162 for No. 285W.

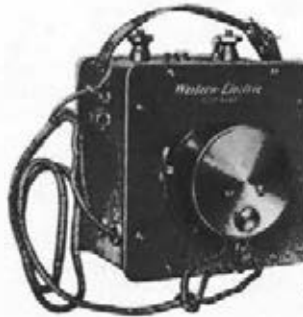
Note 5. P-95756 for Nos. 323BW, 353BW and 359BW; P-98994 for No. 337BW and P-99264 for No. 349BW.

TESTING APPARATUS

(Continued)



No. 90530 Test Set



No. 1006D



No. 1017B Test Set

Linemen's Test Sets

No. 1017 TYPE

The No. 1017B linemen's test set contains a two-position dial switch actuated by a knob and located at the top of the cabinet. A push-button is located on the front of the cabinet. The dial switch is marked "Talk" and "Ring." In the "Talk" position, the operator can listen-in directly on the line. When he wishes to talk he must depress the push-button and keep it depressed while talking. In the "Ring" position the buzzer and hand generator are connected in series to the line. The generator will operate the buzzer through a total line resistance of 2,500 ohms.

The No. 1017C test set is more efficient than the No. 1017B set in that it is equipped with a more powerful generator and instead of using a push-button in the battery circuit, a receiver switch is provided which is actuated by the removal or replacement of the receiver in the side of the cabinet. The dial switch is marked "Talk and Listen," "Open," and "Listen Only." In the "Talk and Listen" position, the removal of the receiver from the side of the cabinet closes the transmitter and battery circuit for talking and listening purposes. In the "Listen only" position, the transmitter battery circuit is open. This position of the switch enables the lineman to listen continuously on a connection without running down the battery. The buzzer and hand generator are connected in series on an open circuit, the operation of the hand generator will close the circuit and will operate the buzzer through a total line resistance of 5,000 ohms. The generator will operate a No. 19A drop through 11,500 ohms resistance.

The No. 1017E test set is the same as the No. 1017C test set except that it has a larger cabinet and is equipped with the No. 6000A interrupter. This is a high speed interrupter operated by the generator gear wheel and is used for furnishing high frequency current for ringing on composited lines. The interrupter consists of a commutator, a No. 21K condenser equipped with leads, and a small switch for cutting the commutator in and out of the circuit. (Other apparatus listed below.)

Code No.	Transmitter	Receiver	Receiver Cord	Generator	Buzzer (100 Ohms)	Battery (Eveready)	Size of Case, Inches
1017B	266W	515W	572 (2 ft.)	29B	2D	703	8 1/4 x 6 1/2 x 4 1/2
1017C	266W	515W	572 (2 ft.)	29F	2D	703	8 1/4 x 6 1/2 x 4 1/2
1017E	266W	515W	572 (2 ft.)	29F	2D	714	9 1/4 x 6 1/2 x 4 1/2

Note. In addition to the above each set also contains a No. 13 induction coil.

No. 1006 TYPE

Wooden box test set in which the No. 125W receiver is also used as a transmitter Cherry finish.

Code No.	Will Ring Through	Contains	Size of Case, Inches
1006B	5000 ohms	1 No. 2A buzzer; 1 No. 22B generator; 1 No. 125W receiver	6 3/4 x 6 3/4 x 4 1/2

Nos. 90512 to 90530

Consist of a generator and ringer, in series for testing through various line resistances.

The case of the set is finished in birch and is designed to withstand rough handling. A leather strap handle is provided.

List No.	Generator	Type	Ohms	Gen. Operates Ringer Through	Size of Case in Ins.
90530	22K	19B	2500	10,000 ohms	5 3/4 x 6 5/8 x 5 1/4
90510	22K	19H	500	35,000 ohms	
90511	22N	19A	1000	50,000 ohms	
90512	22N	19B	2500	100,000 ohms	

TESTING APPARATUS

Linemen's Test Sets (Continued)



No. 16A Test Set



No. 1020C Test Set

No. 16A Test Set

This set is used by cablemen when splicing cables as a means of identifying any particular wire in the cable and in testing the continuity of circuits. A telephone receiver is used in connection with this test set but is not included in the apparatus composing the set.

Arranged for 6 Type III Columbia Invincible dry cells, which are not furnished unless specified in order.

The No. 16A set contains 1 No. 31A condenser, 1 No. 13115 switch, 1 No. 12036 buzzer and 4 No. 2A binding posts.

The woodwork is oak and the case is supplied with a leather carrying strap having an adjusting buckle.

No. 1020C Test Set

This portable cable test set consists of a special vibrating device, an exploring coil and a receiver. It is used for locating short circuits, grounds and wet spots in cable and it is so designed that it may also be utilized in testing the continuity and insulation of the conductors or to locate special pairs of wires. This set, therefore, includes the usual cable splicer's equipment as well as the exploring coil features.

In operating the set for the location of grounds and short circuits, the vibrating element is used to place a varying voltage upon the line being tested and the operator, by passing along the cable with the exploring coil and telephone receiver, can tell when he passes the fault for which he is testing by the change which then results in the sound produced in his telephone receiver.

An electro-magnetic mechanism is provided for making interruptions in the circuit of the vibrator, producing a distinctive tone which can easily be recognized. The design features of the vibrating coil give a long battery life.

The exploring coil is waterproofed in order that it will not be injured through accidental contact with water when being passed over cable in man-holes, etc.

The set is accurate in its results, simple and easy to operate and requires no mathematical calculations.

An instruction book for adjusting, operating and maintaining is furnished with each set.

The No. 1020C test set is a combination of No. 20C and No. 1019C test sets.

The No. 20C test set consists of 3 No. 540 Cords, 1 No. 18AC resistance, 1 No. 21K condenser, 1 vibrators 1 interrupter and 1 two-point switch.

The No. 1019C test set consists of 1 No. 19C test set (exploring coil), 1 No. 747 cord, 1 No. 186 plug and 1 No. 528BW receiver.

Overall dimensions 12 x 10½ x 6½ inches.

Material, birch with mahogany finish.

Weight, without batteries, 12½ pounds.

All metal corner pieces, lock, etc., are finished in nickel. The leather carrying strap has an adjusting buckle.

TESTING APPARATUS

No. 1407C Testing Cabinet



View of No. 1407C Test Cabinet

This cabinet provides adequate, efficient, and reliable testing equipment, which is adaptable to either magneto or central battery systems. All classes of trouble, such as grounds, short circuits, crosses, open circuits, high resistance, can be tested for and the location calculated from the direct reading volt meter with no complicated mathematical calculations involved.

On exchanges where the installation of a regular wire chief's desk is not warranted, the installation of the No. 1407C testing cabinet is the ideal testing equipment. It can be installed at either side of the switchboard or at the end of the main frame, or any convenient place in the central office. The operation is simple and the operator can be trained to assist in making tests which would aid materially in clearing up trouble after a storm.

The consistent application of the simple tests featured in this cabinet will eliminate the guesswork from small exchange maintenance and tend to raise the service on the exchange to a higher level by clearing troubles with the utmost dispatch. The cabinet is compact (height 18 ins., width 12 ins., depth 9 1/4 ins.) and constructed of quarter sawed oak with a durable finish.

Equipment

It is equipped with the standard "Weston Voltmeter" which is well-known for its accuracy and reliability. Also a full complement of testing keys, ringing keys, and taps for connecting in the Wheatstone Bridge unit. For convenience and to cover the various conditions several groups have been devised as follows:

Group No. 1

Consists of 1 No. 1407C testing cabinet for local battery (magneto) systems complete, ready for voltmeter testing (except 30 volt dry cell battery) including the following circuits:

1—Testing circuit, arranged for single or two-party ringing complete with 10000-ohm Weston voltmeter, keys for making tests, testing cord, and grounding cord.

1—Operator's circuit, complete with head receiver and chest type transmitter.

Note. The equipment covered by the following groups is not included under Group No. 1.

Group No. 2

Consists of hand generator equipment for single or two-party ringing.

This group is not necessary in all cases because ringing current can frequently be obtained from the hand generator on the switchboard, alongside of which the No. 1407C cabinet is sometimes mounted, or from the interrupter or ringing machine.

Group No. 3

Consists of one 10 foot cord and No. 147 plug (or shoe) for use in testing at the protector frame. This No. 147 plug fits only our Nos. 4, 65, 78, 84, 89, 1168 and 1169 type protectors. If protectors of other than Western Electric manufacture are used, a suitable plug should be obtained from the manufacturer who made the protector.

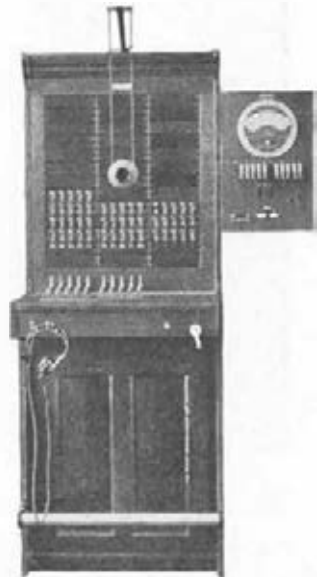
Group No. 4

Consists of 30 Blue Bell dry cells. It will usually be found advisable to furnish the dry cells separately and not to include this group with the cabinet.

Group No. 5

Consists of 1 No. 1407C testing cabinet for central battery systems, complete. This group includes all the apparatus covered by group No. 1, and in addition, such other necessary equipment as to make the No. 1407C testing cabinet applicable for use with central battery.

Note. The equipment covered by the preceding (except Group No. 1) or following groups is not included in Group No. 5.



Showing Cabinet Mounted on Switchboard

TESTING APPARATUS

No. 1407C Testing Cabinet—Continued

Group No. 6

Consists of apparatus necessary for placing howler current on the testing cord.

Group No. 7

Call circuit and telephone line equipment for magneto system. This is used when the Testing Cabinet is located away from the switchboard, and enables the test man to receive and send calls.

Group No. 8

Consists of the necessary keys and apparatus to provide for four-party harmonic ringing.

Group No. 9

Consists of the necessary keys and apparatus to provide for four-party pulsating machine ringing.

Group No. 10

Consists of hand generator equipment for four-party pulsating ringing. This group is not necessary in all cases of four-party pulsating ringing, as ringing current can frequently be obtained from the hand generator on the switchboard, alongside of which the cabinet is sometimes mounted, or from the interrupter or ringing machine.

Group No. 11

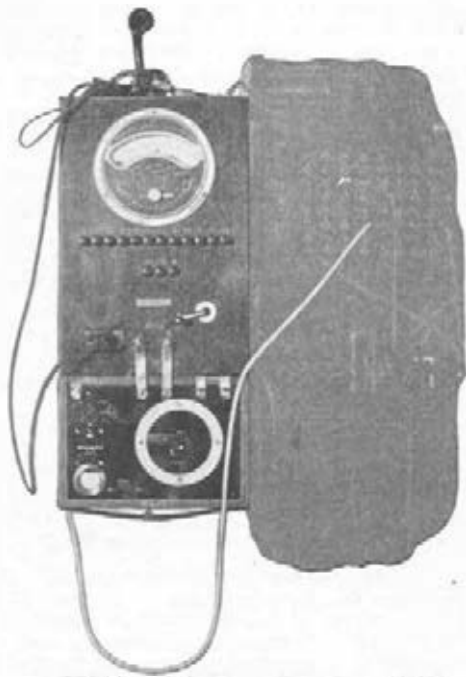
Call circuit and telephone line equipment for central battery system. This is used when the testing cabinet is located away from the switchboard, and enables the test man to receive and send calls.

Group No. 12

Consists of the necessary apparatus to provide for single or two-party machine ringing using machine or interrupter.



No. 1407C Testing Cabinet connected to Main Distributing Frame



No. 1407 Testing Cabinet with No. 1407 Bridge Unit Attached to the Side of a Switchboard

Auxiliary Equipment for Use With No. 1407C Testing Cabinet

No. 1407A Bridge Unit

For a more accurate means of making resistance measurements than is possible with a voltmeter, the No. 1407A bridge unit was developed. It consists of a Wheatstone bridge outfit and is so designed that it will line up and attach by means of No. 1407B bracket unit to the bottom of a No. 1407C testing cabinet.

With this equipment Murray and Valley loop tests as well as straight resistance measurements can be quickly made in addition to the regular voltmeter testing possible with the No. 1407C testing cabinet.

Unknown resistances can be read directly from the scale without referring to tables or other data, and such readings are accurate up to one-half of one per cent.

This bridge unit is easily detached from the testing cabinet by loosening the binding posts holding the bracket unit straps and moving the bridge about an inch to the right. When removed it can be used as a portable bridge. A cover and carrying strap are provided.

TESTING APPARATUS

(Continued)



Type T Testing Set

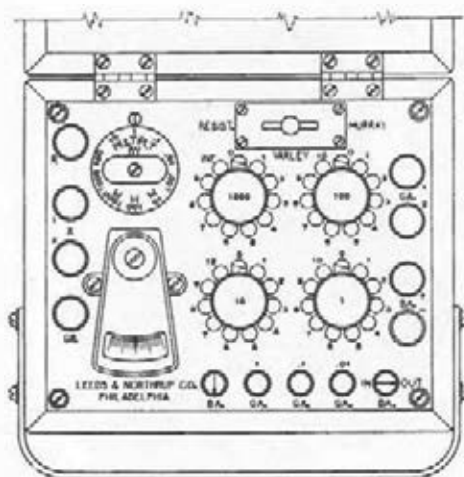


Diagram Type T Testing Set

Type T Testing Set

The features that are included in the Type T set make it especially satisfactory in the maintenance of telephone, telegraph and other electrical transmission lines; but it is equally adapted to any measurement within ordinary Wheatstone bridge range for which there may be occasion in shop, field or laboratory. The six features described below will indicate its completeness as regards the number of tests and measurements that can be made with it and show how conveniently it may be operated.

1. **Three-way Switch.** The circuit connections for Varley or Murray loop tests and for making resistance measurements are made by the simple movement of a three-way key which is marked "Varley," "Murray" and "Bridge" as shown above. The operator has indicated before him in plain marking the name of the test for which the set is at any time being used.

2. **Ratio Arms.** A single ratio dial is used. This dial is shown in the illustration just above the galvanometer. It is so arranged that by its operation the user automatically selects that particular ratio which gives the maximum sensitivity in the measurement being made. Calculations are simplified by the use of a single dial, as a multiplication is always made and the multiplier read direct from the ratio dial.

3. **Galvanometer Shunt.** An Ayrton three-way shunt is so wired in the set that it is operated by the three push button keys marked "GA-1," .1 and .01 respectively. The "GA-1" key connects the galvanometer into the circuit with its full sensitivity; the other push buttons reduce the sensitivity as indicated. Operation by means of these push buttons is convenient and rapid.

4. **Galvanometer.** This set is provided with a suspended system pointer galvanometer. As there is no pivot friction in this type of instrument, there is no chance for sticking of the pointer or for false indications. The sensitivity is one megohm, that is a current of one microampere gives a deflection of one scale division. This galvanometer will withstand more hard use without loss of accuracy than the ordinary portable voltmeter.

5. **Rheostat Arm.** There are four decades. The units, tens and hundred decades are made up of ten coils each. The thousands dial has nine coils and an infinity, or open, point. The range of the rheostat is therefore 0-10110 ohms. All coils are adjusted to a guaranteed accuracy of .1 of 1 per cent.

With complete ten-coil decades, accurate location of opens by "tone-test" with a buzzer becomes possible, since the variation of tone in the telephone receiver is continuous on either side of the minimum.

The infinity point on the thousands dial makes possible an unmistakable test of an open circuit in the "X" arm of the bridge. The "open" is indicated by no deflection of the galvanometer when the dial is set on "INF," and the galvanometer key is depressed.

An extra binding post on the set permits the use of the four dial rheostat independently of the set.

6. **Provision** is made for connection of an external battery and galvanometer in the few instances where this may be necessary; and without changing connections, either internal or external battery or galvanometer may be used. Protective resistances in both internal and external battery circuits guard against burn-outs or over-heating of the adjusted coils in the set.

List
No.

5410 L. & N. Type T portable testing set
5301 Leather carrying case for above
5308 Extra Battery

List
No.

5412 Buzzer for use with above set
9872 Telephone receiver, with head band
2325 Extra galvanometer system

Approximate over all dimensions, $8\frac{1}{2} \times 7\frac{3}{8} \times 4\frac{1}{2}$ inches. Weight $7\frac{1}{2}$ lbs.

TESTING APPARATUS

(Continued)

Artificial Lines and Cable

These instruments are designed for use in telephone transmission and telegraph line testing.

The one illustrated contains the necessary resistance and capacity to represent a total length of 32 miles of standard No. 19B, & S. gauge cable, having a loop resistance of 88 ohms per mile and a mutual electrostatic capacity of .060 M.F. per mile, and is so arranged by means of switches that various sub-divisions to form any length between 1 mile and 32 miles can be made.

Other standard sizes having a total length of 1, 5 or 10 miles can be furnished.

These artificial lines and cables are made to order owing to the varying conditions that are encountered in practice. They are available in standard or special sizes, as desired.



Artificial Lines and Cable

Peerless Improved Lineman's Fault Finder

This instrument is especially adapted for the use of wire chiefs in locating crosses, grounds and other cases of line and cable trouble, as well as for straight resistance measurements.

It may be used either as a portable or stationary set and is arranged for mounting vertically or horizontally on desk or wall.

Unknown resistances can be read directly from the scale thus avoiding reference to tables or other data in working out resistance problems.

It is simple, accurate and dependable when an accuracy not higher than $\frac{1}{2}$ of 1% is desired.

Test set No. T-2062 is the same as the Western Electric No. 1407A except that it has contacts and other facilities for connecting it directly to the No. 1407 testing cabinet.

Approximate overall dimensions, 15 x 8½ x 6½ inches.

List No.

T-2062

Peerless improved fault finder.

T-2063

Sole leather carrying case.



Peerless Fault Finder

No. 1407A Bridge Unit

Used in connection with a No. 1407 testing cabinet. This bridge unit is the same as No. 2062 Peerless Improved Lineman's Fault Finder above described, except that it has facilities for attaching direct to the No. 1407 testing cabinet by means of the No. 1407B bracket supporting unit. A further and more comprehensive description of this equipment will be found in connection with the No. 1407 testing cabinet listed elsewhere in this catalog.

Approximate overall dimensions, 12 x 8 x 6 inches.

List No.

1407A

Western Electric Bridge Unit.

1407B

Bracket Supporting Unit.

Direct Reading Ohmmeter

These instruments are built in the laboratory type open form, or the combination laboratory and portable type equipped with a cover which can be closed and locked and the instrument used as a portable. The cover in this case is on detachable hinges so that it may be taken off and the set used in the laboratory. The ohmmeters are made with single, double and triple scale and are built complete with contained standard galvanometers and with or without self-contained battery.

Price applications should state range and style required.

Approximate overall dimensions, 10 x 8 x 5½ inches.



Direct Reading Ohmmeter

TESTING APPARATUS

(Continued)

Peerless Portable Plug Set

The bridge arms in this set are reversible and are arranged as follows:

Bridge coils in "A" arm have values of 1, 10 and 100 and are accurate to 1/20 of 1%.

Bridge coils in "B" arm have values of 10, 100 and 1000 and are accurate to 1/20 of 1%.

The rheostat coils are arranged in units, tens, hundreds and thousands with multiples of 1, 2, 2 and 5 of each denomination, producing a total of 11,000 ohms. By using the 1 to 1000 ratio on the bridge, a range of 11 megohms in single ohm steps may be obtained. The rheostat coils are accurate to 1/10 of 1%.

Provision is made for an outside battery in case a higher E.M.F. than that of the cells in the set is required.

The set is designed for ease in reading. The bridge is at the top, out of the way of the tester. The plugs are in vertical columns, beginning with the thousands at the left-hand side and followed by the hundreds, tens and units. When balance is obtained, the desired result is obtained by adding the values of the resistances plugged out, in the same way that a column of figures is added.

The case is of highly polished mahogany and the metal work of polished brass, gold lacquer.

The weight, complete, is 7½ lbs.; the size, 8 x 5½ x 5½ inches.

List No.

T-2010 Peerless plug type testing set.

T-2016 Sole leather carrying case for T-2010.

T-2040 Folding tripod for supporting T-2010 in street.

Government Standard Testing Set

Government standard, testing set, made in strict accordance with the rigid requirements of the United States Navy Specifications, 17-12.

A high-grade type of "plug-in" set.

Battery consists of 6 silver chloride cells.

Bridge values in the A and B arms, 1, 10, 100, 1000 and coils are accurate to 1/20 of 1%. Rheostat on the decade plan, with 10 coils on each decade, of the values of units, tens, hundreds and thousands.

Approximate over all dimensions, 12 x 8 x 6 inches.

List No.

T-2070 Peerless G.S. decade portable testing set.

T-2085 Carrying case of sole leather, with shoulder strap.



Peerless Portable Plug Set



Government Standard Testing Set

The Peerless Switch Dial Set

The bridge arms in this set have values of 1, 10, 100 and 1000 in each arm. The coils are accurate to 1/20 of 1%.

Rheostat has four dials of 10 coils each, with values of units, tens, hundreds and thousands. The coils are adjusted to an accuracy of 1/10 of 1%.

An Ayrton shunt is part of the set apparatus. Provision is made for outside galvanometer and outside battery. Any commercial cell may be used for the latter.

A specially designed switch, with negligible contact resistance, is furnished.

The sets are equipped with quick make and break switches for changing from test to test.

Weight, complete, 7¼ lbs.

Approximate over all dimensions, 9¼ x 5¼ x 5½ inches.

The case is of highly polished mahogany and the metal work of polished brass, gold lacquered.

List No.

T-2000 Peerless switch dial decade testing set.

T-2015 Sole leather carrying case for T-2000.

T-2020 Flexible contact clutches for gripping heavy conductors.

T-2040 Folding tripod for supporting T-2000 in street.



Peerless Switch Dial Set

TESTING APPARATUS

(Continued)



No. T-3000

Universal Ayrtton Shunt

The Universal Ayrtton Shunts are designed for use with any galvanometer. They have a new type of switch construction, and are rapid to manipulate, as well as being extremely accurate. These Shunts are made in a number of sizes, and can give 1, .1, .01, .001, .0001 of the full current through the galvanometer.

The approximate overall dimensions are 3 x 5 x 3½ inches.

List No.	Description
T-3000	Ayrtton Universal Shunt of about 100,000 ohms, for galvanometers having resistances of 3000 to 10,000 ohms.
T-3005	Ayrtton Universal Shunt of about 20,000 ohms, for galvanometers having resistances of 1000 to 3000 ohms.
T-3010	Ayrtton Universal Shunt of about 10,000 ohms, for galvanometers having resistances of 500 to 1000 ohms.
T-3015	Ayrtton Universal Shunt of about 3000 ohms, for galvanometers having resistance of 100 to 500 ohms.

Vawter Indicating Ohmmeter

The operation of this instrument is extremely simple. The resistance to be measured is connected to the line posts and the position of the index on scale gives the resistance directly. There are no calculations to be made and no dials to adjust.

Readings are accurate, within 1 per cent. for the standard types, and to within 1/10 of 1 per cent. for a special type which can be supplied when such accuracy is required.

While various types of these instruments are made, the most generally useful type is that in which the E.M.F. is in the instrument, making it completely self contained. This E.M.F. consists of small flashlight batteries, easily replaced and obtainable from any electrical dealer.



Vawter Ohmmeter

The multiplier switch is an entirely new feature in ohmmeter operation. By setting a switch marked "Mult," the scale of the instrument is at once made to indicate 0.1 or 10 times its calibrated values. It being independent of voltage and magnetic variations, no magnetic shunt is required in connection with the operation of this ohmmeter, nor is any calibration required before making readings.

Approximate overall dimensions 8 x 8 x 5½ inches.

List No.	Range Ohms	Notes
VA-124	0-.01	One range
VA-125	0-.1	One range
VA-126	0-1	One range
VA-127	0-10	One range
VA-128	0-100	One range
VA-224	0-10 0-100 0-1000	Double range
VA-225	0-1000 0-5000 0-10000	Double range
VA-226	0-10000 0-100000	Double range
VA-227	0-10 0-100 0-1000	Triple range
VA-324	0-100 0-1000 0-10000	Triple range
VA-325	0-1000 0-10000	Triple range

Note—Any range supplied on special order.

TESTING APPARATUS

(Continued)

T-2002 Switch Dial Decade Test Set

This instrument is of the standard Wheatstone Bridge type and has in its rheostat for decades. The coils have values of units, tens, hundreds and thousand ohms. The bridge is controlled by a

single multiplying dial, giving ranges varying from .001 to one thousand times the rheostat readings. The rheostat coils are accurate to 1/10 of 1 per cent. and the bridge arm coils to 1/20 of 1 per cent.

This set makes all the tests of resistances of the Standard Wheatstone Bridge Sets and has provisions for making the Murray and Varley Loop Tests for fault location in lines and cables.

The galvanometer is of the high sensibility and dead beat D'Arsonval type.

A commercial battery is used.

The set has been simplified so that technical education is not required to operate it.

Approximate overall dimensions, $9\frac{1}{4} \times 5\frac{3}{4} \times 5\frac{1}{2}$ inches deep.



T-2002 Switch Dial Decade Test Set

List No.	Description
T-2002	Peerless switch dial decade testing set.
T-3015	Sole leather carrying case for T-2002
T-2020	Flexible contact clutches for gripping heavy conductors.
T-2040	Folding tripod for supporting T-2002 for field work.

Plug Type Resistance Box and Wheatstone Bridge

The resistance units in the rheostat are adjusted to an accuracy of 1/10 or 1 per cent. and the bridge arms to 1/20 of 1 per cent. These are built on the well-known post office plan, and are very satisfactory for ordinary testing work. The coils are carefully treated and aged, and are wound on wooden spools. The plugs are carefully made to an exact taper, and will fit in the plug holes smoothly, with practically no contact resistance. The line posts are of a double-grip type, for gripping small or large sized wire, and all binding posts are of a substantial size throughout.



Plug Type Resistance Box and Wheatstone Bridge

List No.	Description
T-1550	Resistance box and Wheatstone Bridge. Approximate overall dimensions: $9 \times 5\frac{1}{2} \times 3\frac{3}{4}$ inches deep. Resistance coils, 1, 2, 2, 5, 10, 20, 20, 50, 100, 200, 500, 1000, 2000, 2000, 5000; ratio coils—A arm 1, 10, 100 and 1000; B arm 1, 10, 100 and 1000; supplied with battery and galvanometer key having a short circuit strap.
T-1552	Resistance box. Approximate overall dimensions: $9 \times 3 \times 3\frac{3}{4}$ inches deep. Resistance coils of 1, 2, 2, 5, 10, 20, 20, 50, 100, 200, 500.
T-1554	Resistance box, similar to the above, except coils of 1, 2, 2, 5, 10, 20, 50, 100, 200, 500, 1000, 2000, 2000, 5000. Approximate overall dimensions: $9 \times 3 \times 3\frac{3}{4}$ inches deep.

TESTING APPARATUS

(Continued)



No. T-4042



100 Cell Silver Chloride Testing Battery

Peerless Portable D'Arsonval Galvanometers

These instruments are of extremely high sensibility, and are built to stand rough usage, being capable of handling the same as one would handle an ordinary voltmeter. They will show a deflection on a variation of 1/10 of 1 per cent. in the resistance measurements. The sensibility ranges from one half of a megohm, in the less expensive types, to a full megohm in the better grades, this meaning that one volt, through a resistance of 500,000 ohms, will cause the pointer to move 1 millimeter division over the scale in the cheaper forms, and that one volt through a resistance of 1,000,000 ohms will cause the pointer to move 1 millimeter division over the scale in the higher grade instruments. The scale is well lighted and easily read, is uniform throughout, and is divided into 30 millimeter divisions of 15+ and 15—, with center zero. The scale is so calibrated that the divisions are proportional to the current, a feature which is not usually furnished without extra charge.

These instruments are recommended for use with Wheatstone bridges for all commercial purposes; they will also meet the requirements in a large number of laboratory applications.

List No.	Description
T-4040	Peerless Portable D'Arsonval Galvanometer
T-4041	Peerless Portable D'Arsonval Galvanometer, with Shunt.
T-4042	Same as T-4040, but mounted in a carrying case with lid and leather handle.
T-4043	Same as T-4042, except with self-contained four point shunt.
T-4047	Government standard type.
T-4048	Government standard type, four point shunt.
T-4049	Government standard type, complete with carrying case, lid, and leather handle.
T-4050	Same as T-4049, but with addition of four point shunt.

Silver Chloride Testing Battery

The chloride of silver cell has the advantage over the ordinary dry cell of not deteriorating as a result of not being used, uniform electromotive force, and small size. Each cell will give between .8 and .9 of a volt. A battery of these cells forms a valuable adjunct for a testing equipment. Any individual cell or the total number can be placed in the circuit. The 100 cell battery measures 2 x 8 x 6 inches.

List No.	No. of Cells	List No.	No. of Cells
T-2080	100	T-2087	30
T-2089	75	T-2086	15
T-2088	50		

Single cells may be ordered separately.

TELEGRAPH APPARATUS



No. 9044



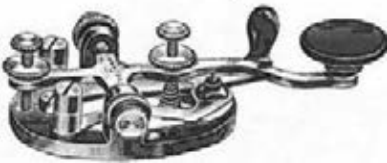
No. 9046

Steel Lever Solid Trunnion Keys

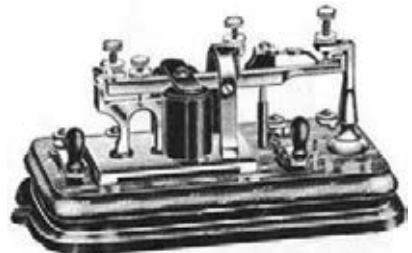
The lever used in this instrument is only one-half the weight of the ordinary brass lever. The lever and trunnions being made of but one piece of fine wrought steel, the common defect of loose trunnions is avoided. Strength is obtained with much less weight of metal, and, by the perfect bearing which the solid trunnion gives, together with the use of perfected contact points, sticking is absolutely prevented.

Their size and proportion make these keys ideal for operating either for the hand of the skilled and rapid expert, or for the beginner.

List No.	Description	List No.	Description
9044	Leg key with Tungsten contact points	9046	Legless key with Tungsten contact points
Full nickel plated keys will be supplied at an added cost.			



No. 9050



No. 592

The Triumph Key

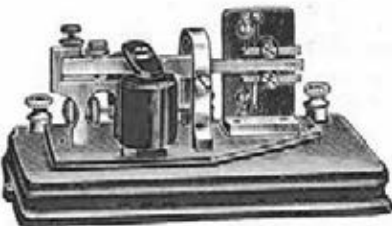
This new model legless form of steel lever key has been adopted as the standard of the Western Union and Postal Telegraph & Cable Co.

In addition to the well-known superior points of the standard steel lever keys, it has Bakelite insulations, lips for "Bug" wedge, and other valuable improvements.

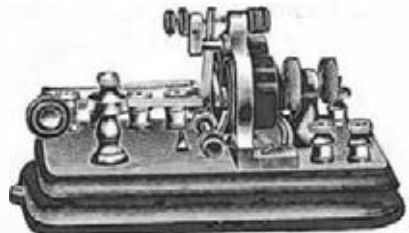
List No. 9050 Triumph key with perfected contacts

Milliken-Hicks (or Atkinson) Repeater Transmitter

List No. 592 Repeater Transmitter



No. 600



No. 601

Battery Pole Changer

List No. 600 For duplex and quadruplex work

Smith Neutral Relay

List No. 601 Three coil, for quadruplex circuits

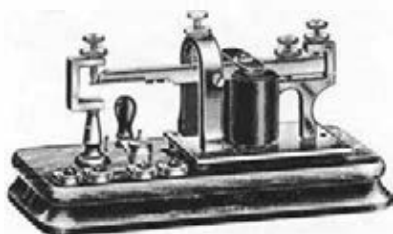
Rheostats

Improved solid top, with coils carefully and accurately adjusted.

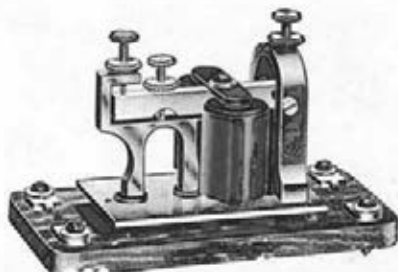
List No.	Description	List No.	Description
1248	Standard rheostat. Capacity $\frac{1}{2}$ to 10000 ohms	7554	Smith rheostat. Capacity 700 ohms each side
7551	Quadruplex rheostat. Total capacity 20025 ohms	7553	Standard duplex rheostat. Capacity 6300 ohms each side

TELEGRAPH APPARATUS

(Continued)



No. 514



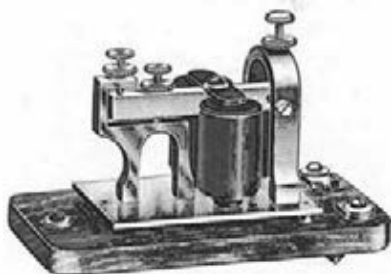
No. 9109

Repeating Sounders

List
No.

Description

- | | |
|------|--|
| 514 | The standard spring point repeating sounder. |
| 9109 | 4 ohm "Quad" repeating sounder, Giant pattern, with rigid points. |
| 9110 | 20 ohm "Quad" repeating sounder, Giant pattern, with rigid points. |



No. 500



No. 515

The New Aluminum Lever Giant Sounder

For use where tone, loudness, and quick action are desired.

List
No.

Description

- | | |
|-----|--|
| 500 | Original Giant sounder, wound to 4 ohms. Requires half the usual amount of local battery. |
| 501 | Wound with fine wire to 20 ohms resistance; for main line use (without relay) on lines up to 15 miles in length. |

Note. Old style sounders, with brass levers, will be furnished when desired at the same prices as the above instruments. Nickel plated sounders will be furnished at an increased cost.

The "1892" Giant Sounder

With Large Magnets and Important New Improvements

These sounders have aluminum or brass levers, and will give a loud, clear and quick stroke with on cell of local crowfoot battery.

List
No.

Description

- | | |
|-----|----------------------------|
| 515 | Wound to 4 ohms resistance |
|-----|----------------------------|

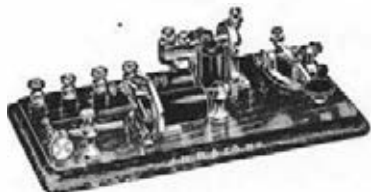
List
No.

Description

- | | |
|-----|-----------------------------|
| 516 | Wound to 20 ohms resistance |
|-----|-----------------------------|

Relay, Steel Lever Key and Giant Sounder Combination Set

A complete set of best quality instruments, mounted on a polished mahogany base 13 inches long by 6 $\frac{3}{8}$ inches wide. Designed for use as special office sets, and as testing sets at the switchboard.



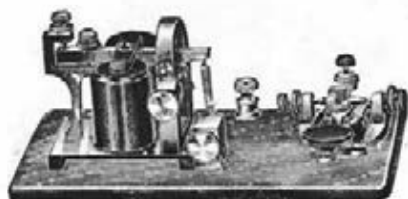
No. 9062

List
No.

Description

- | | |
|------|-------------------------------------|
| 9062 | Wound to 150 ohms |
| 9063 | Wound to 250 ohms |
| 9066 | With large relay, wound to 250 ohms |

Note. Nickel plating on the metal parts of the above sets will be furnished at an increased cost.



No. 759



No. 392

New Main Line Sounders

"MCM" Model

This instrument provides instantaneous adjustment of both armature spring and distance from magnet cores, both adjustment nuts being conveniently located at the front. The MCM model is intended for use on main lines in place of the ordinary relay, and makes the use of a local sounder unnecessary, thus saving the continual expense of maintaining local batteries.

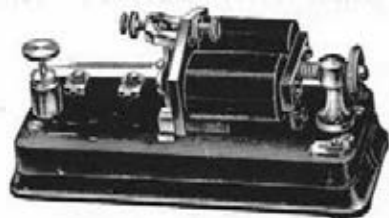
List No.		List No.	
559	150 ohms, with key on base.	563	250 ohms, with key on base.
560	150 ohms, without key.	564	250 ohms, without key.
561	Mahogany case for wrecking sets.	565	20 to 100 ohms, with key on base.
562	Leather case.	566	20 to 100 ohms, without key.

Nos. 563 to 566 are designed for use on all circuits from 1 to 1000 miles in length and, with ordinary main battery power suitable for such lines, they are equal to the best local sounders.

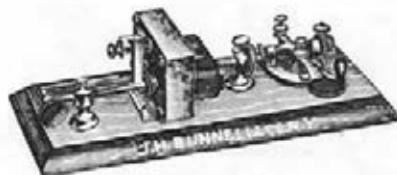
The New Ghegan Main Line Sounder.

Methods of adjusting the magnetic circuit of main line telegraph instruments, which heretofore has been done by varying the space between the magnet cores and armatures, is one of the novel features of the Ghegan Main Line Sounder in which the same result is obtained by moving the yoke or back iron to whatever distance from the cores the line conditions may require.

392	Main line sounder, 50 ohms	395	50 ohm sounder with key on base.
393	Main line sounder, 100 ohms.	396	100 ohm sounder with key on base.
394	Main line sounder, 150 ohms.	397	150 ohm sounder with key on base.



No. 9070



Barclay Box Relay

C. Q. A. Relay

By means of a new magnet adjustment, the magnets may be instantly moved to any desired distance from the armature. The dimensions of subbase are only $8\frac{1}{2}$ inches long by $3\frac{1}{2}$ inches wide. The C.Q.A. relay is mounted on slate instead of wood. It is furnished with the latest style of W. U. clamp connections to which the magnet and local wires are soldered, thus making such a thing as a loose connection impossible. The magnets are supported and protected by a spectacle frame. An automatic stop prevents contact between the magnet cores and the armature.

The C.Q.A. relay will be furnished regularly with hardened silver contact points as adopted by the Western Union and Postal Telegraph Companies.

9070	Wound to 150 ohms resistance.	9072	Wound to 250 ohms resistance.
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Barclay Box Relays

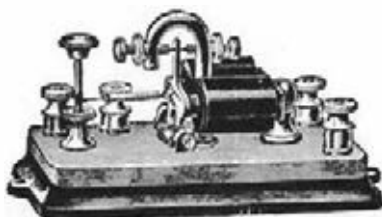
The snare drum principle produces a clear, pleasing sound that is very penetrating, consequently can be easily read even in noisy places or on lines having weak currents.

404	150 ohms, with key and local contacts.	426	150 ohms, without key with local contacts.
405	150 ohms, with key without local contacts.	427	150 ohms, without key or local contacts.

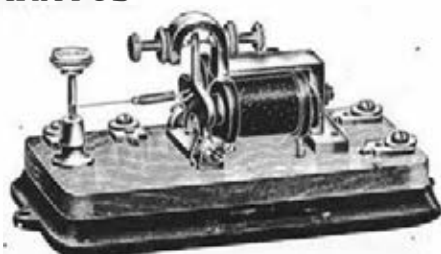
For 250 ohms, an added charge is made.

TELEGRAPH APPARATUS

(Continued)



No. 567



No. 570

List No.

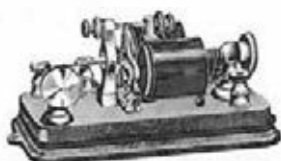
- 567 20 ohms, non-adjustable rubber covered magnets.
 568 20 ohms, non-adjustable cloth covered magnets.
 569 20 ohms, adjustable rubber covered magnets.

The Dandy Pony Relay

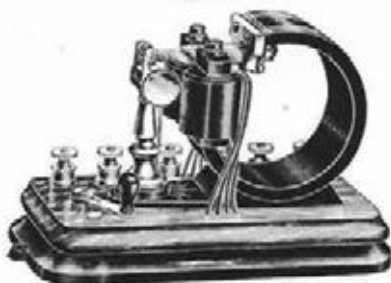
Novel Form Pony Relay

For lines of less than 75 miles in length. A finely finished instrument. Mounted on polished mahogany base, with ornamental subbase. Size of base, $6\frac{1}{2} \times 3\frac{1}{2}$ inches.

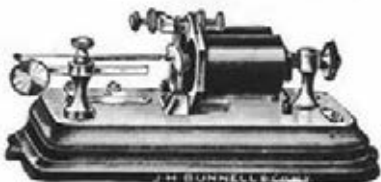
- 570 20 ohms resistance or under, for lines up to 15 miles in length.
 571 50 ohms resistance, for lines 20 to 40 miles long.
 572 75 ohms resistance.
 573 100 ohms resistance for lines of 75 miles.
 574 With polished rubber magnets, extra.



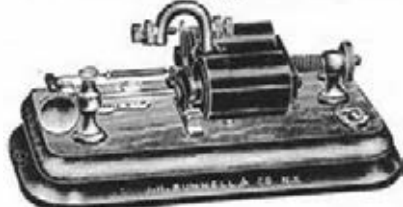
No. 575



No. 554



No. 533



No. 536

The "1900" Model Pony Relay

An improved form of Pony Relay, with rubber covered, adjustable magnets, etc. Finely finished.

- | List No. | Description |
|----------|-------------------------|
| 575 | Wound to 20 or 30 ohms. |
| 576 | Wound to 50 ohms. |
| 577 | Wound to 75 ohms. |
| 578 | Wound to 100 ohms. |

Standard Polarized Relays

- | List No. | Description |
|----------|----------------------------------|
| 554 | Differentially wound 400 ohms. |
| 557 | Polarized relay No. 2, 50 ohms. |
| 558 | Polarized relay No. 2, 100 ohms. |

The improved form of clamping binding posts are used on all instruments.

Main Line Relays

These relays are wound with silk covered wire, have polished rubber covered coils, mahogany base, extension adjustment and are mounted on ornamental subbase. The armature and lever are made from a single piece of malleable iron.

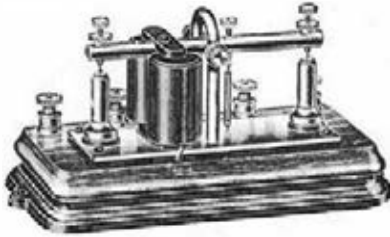
- | List No. | Description |
|----------|---|
| 533 | Standard No. 1 main line relay, 150 ohms. |
| 534 | Standard No. 1 main line relay, 250 ohms. |
| 535 | Standard No. 1 main line relay, 300 ohms. |
| 536 | Standard No. 2 main line relay, 150 ohms. |
| 537 | Standard No. 2 main line relay, 250 ohms. |
| 538 | Standard No. 2 main line relay, 300 ohms. |

The standard No. 2 main line relay has been adopted by the Western Union and Postal Telegraph Companies.

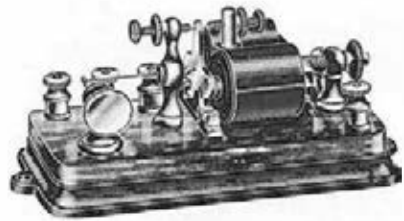
Nickel plated relays will be supplied at an additional cost.

TELEGRAPH APPARATUS

(Continued)



No. 603



No. 604

Standard Dynamo Pole Changer

List

No.

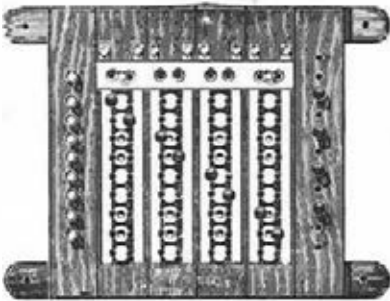
603

For duplex and quadruplex circuits.

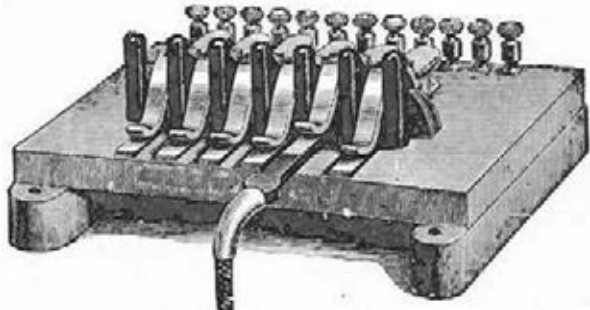
Penn. R. R. Model

604

30 ohms or under, for duplex and quadruplex circuits.



Western Union Button Switch



No. 1268 Spring Jack

Western Union Button Switch, with Plate Lightning Arrester

List No.	Line	Perpendicular Bars	List No.	Line	Perpendicular Bars
1236	1	2	1242	7	14
1237	2	4	1243	8	16
1238	3	6	1244	10	20
1239	4	8	1245	12	24
1240	5	10	1246	Extra pins	
1241	6	12			

In ordering switches for large offices, give full particulars as to number and changes of wires, loops, batteries and instruments to be provided for. Information on larger sizes furnished upon application.

Western Union Spring Jack with Wedge and Cord

List No.	Per line (state number of jacks required in ordering).	List No.	Wedge, with 4 ft. cord, extra.
1268		1269	

In ordering or requesting prices on spring jack switchboards state the number of lines for which they are wanted, how many horizontal rows of discs, and whether a single or double row of jacks is required. Prices on spring jack switchboards, lampboards and terminal boards, furnished on application, accompanied with particulars of requirements.

Loop Peg and Cord

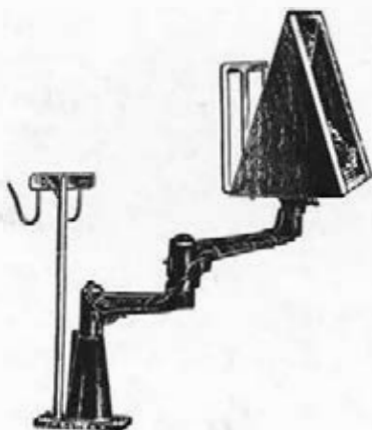
Split peg or pin for use with Western Union Button switch to loop in an instrument.

List No.	Loop peg, without cord.	List No.	Loop peg, with three-foot cord.
1234		1235	

Western Electric

TELEGRAPH APPARATUS

(Continued)



No. 7971



No. 619



No. 7972

Acme Adjustable Resonator

(Western Union Standard E. M. 33A.)

With double swing arm and swivelled hood.

The stand and arm are of iron finished in black japan, the hood of finely finished resonant wood; the message stand and rack are brass finished in gold lacquer, making a ver handsome and attractive combination.

The height of the hook stand is 10½ inches, arm spread 15½ inches.

Made in three styles, as follows: Without message rack or stand; with message rack on wood, without stand; with message rack and stand, as shown in illustration.

List No.

7969 Without message rack or stand.

7970 With message rack without stand.

List No.

7971 With message rack and stand.

Mascot Resonator

Portable, can be moved to any desired position within range of cord. The cord enters base and passes through hollow stem to sounder.

619 Without sounder.

Acme Portable Resonator

(Western Union Standard E. M. 5A.)

A very popular and efficient type.

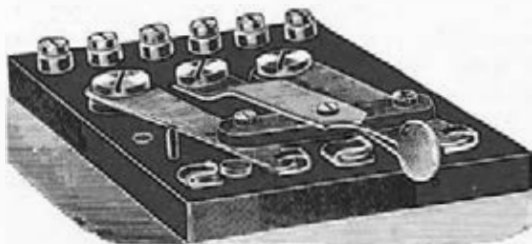
Furnished with or without message rack on back of hood.

7972 Without message rack (without sounder).

7973 With message rack (without sounder)



No. 1322



No. 1321



Table Jack Switch No. 634

Quadruplex Switches

Rubber Base with Spring Clip Contact

List

No.

8602 Single 3 point.

1321 Double 3 point.

Quadruplex Switches, Slate Base

8528 3 point, 1 lever.

8529 6 point, 2 lever.

1322 7 point, 3 lever.

Table Jack Switches

For switching resonator set of instruments to any desired line.

633 3 line table jack.

634 Over 3 lines, per line.

635 Wedge with 4 foot cord, extra.

SCIENTIFIC EQUIPMENT

No. 224 A Vacuum Tubes

The Western Electric No. 224 A Vacuum Tube is a Cathode Ray Oscillograph Tube which may be used to obtain the performance characteristics of nearly every kind of electrical apparatus. It particularly fills the need for an oscillograph operating at frequencies up to a million or more cycles per second.

The spot of light produced by the cathode ray on a screen within the tube may be moved simultaneously in two directions by varying voltages applied to two pairs of internal deflector plates, or by current passing through external coils, the resulting trace giving the relation between the two currents or voltages. A deflection of one inch is produced by 25 volts on a pair of deflector plates or by 25 ampere turns in suitable coils.

The power equipment required for the tube is a 300 volt B battery and a 6 volt storage battery.

Vacuum Thermocouples

The Western Electric Vacuum Thermocouple is a hot wire instrument for use in making accurate measurements of the values of feeble alternating currents.

Vacuum thermocouples are manufactured in sixteen standard types. Each of these types may be assembled in any of three different types of containers known as the 20, 21, and 22 types. Type 20 container consists of a square mahogany box with binding posts mounted on the cover. Type 21 container consists of a cylindrical metal can with a hard rubber base through which the terminals project and to which leads may be soldered. Type 22 container is similar to Type 21 except projecting terminals are designed to make contact with the springs of a standard vacuum tube socket.

By the proper choice of these instruments used in connection with a 12 ohm galvanometer having a scale length of 130 millimeters and a full scale deflection on a current of 200 microamperes, any current from .0005 to 1 ampere may be measured with an accuracy of plus or minus 1% of the minimum deflection.

Below is a table which shows the principal characteristics of each type of vacuum thermocouple. From these values the range of each vacuum thermocouple with the particular type of galvanometer with which it is associated can be determined by the application of Ohm's law.

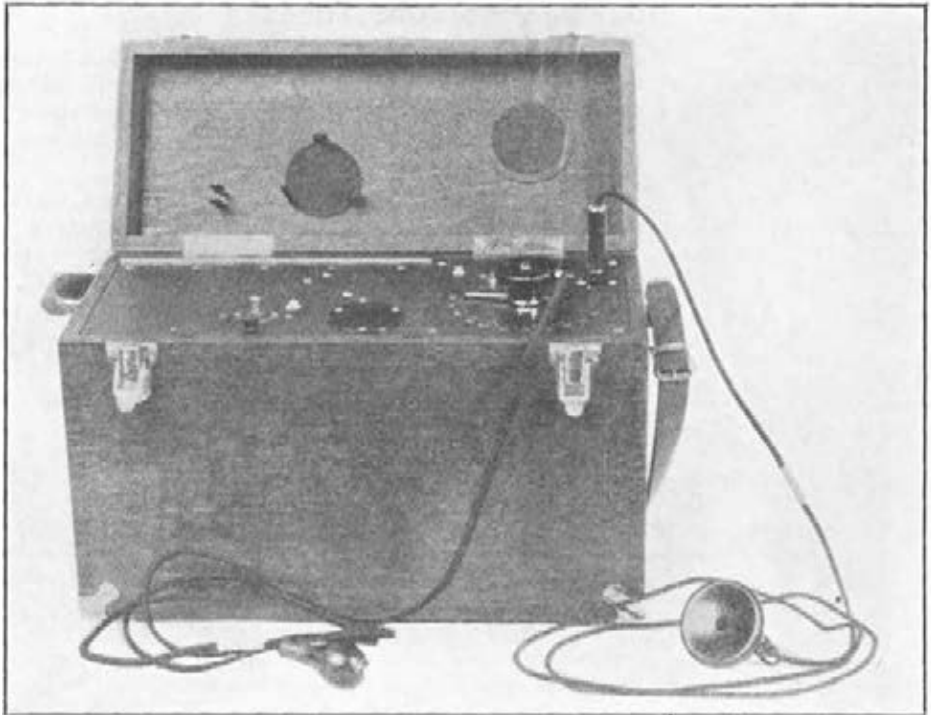
Type	Heater Resistance	Couple Resistance	Maximum Current Through Heater to Produce an Open Circuit Electromotive Force of—	
			.005 Volt	.015 Volt
A	.3 ohms	3 ohms	.500 ampere	1.00 ampere
B	.6 ohms	3 ohms	.25 ampere	.50 ampere
C	5 ohms	3 ohms	.0375 ampere	.075 ampere
D	35 ohms	12 ohms	.008 ampere	.016 ampere
E	43 ohms	30 ohms	.0075 ampere	.015 ampere
F	46.5 ohms	30 ohms	.0075 ampere	.015 ampere
G	200 ohms	12 ohms	.0065 ampere	.015 ampere
H	400 ohms	12 ohms	.0035 ampere	.007 ampere
J	600 ohms	12 ohms	.002 ampere	.005 ampere
K	750 ohms	12 ohms	.0018 ampere	.005 ampere
L	1000 ohms	12 ohms	.0016 ampere	.004 ampere
M	1120 ohms	12 ohms	.0035 ampere	.007 ampere
N	46.5 ohms	12 ohms	.0075 ampere	.015 ampere
P	600 ohms	45 ohms	.002 ampere	.005 ampere
R	1.3 ohms	12 ohms	.085 ampere	.166 ampere
S	10 ohms	12 ohms	.017 ampere	.035 ampere



Type 20 Vacuum Thermocouple

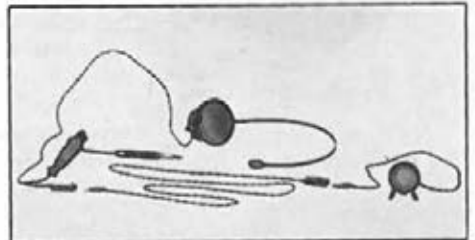
No. 224 A Vacuum Tube and Socket

Western Electric
SCIENTIFIC EQUIPMENT



No. 3-A Audiometer

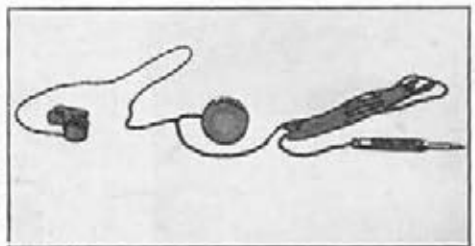
The No. 3-A Audiometer is an instrument for use in determining the percentage of loss of hearing. This instrument has been developed to fulfill the requirements of examining boards, athletic directors and others interested in a quick, accurate test of the sense of hearing. Railroads, large industrials, schools, automobile examining boards, etc., cannot afford to be without this apparatus.



**Showing Watchcase Type Receiver with Headband,
Transmitter with Attachment to Use on Desk**



Audiphone



**Showing Receiver with Moulded Ear Piece,
Transmitter to be Worn on Clothing**

The Audiphone is an instrument designed to aid those with impaired hearing. It is a special vacuum tube amplifying equipment which intercepts sound waves and transmits them to the user's ears. The type shown is one of the several types manufactured by the Western Electric Company.

PUBLIC ADDRESS SYSTEMS



A Western Electric Public Address System Is Used in The Georgia House of Representatives

Public speaking plays an important part in our everyday commercial and social activities. Until the development of the Western Electric Public Address Systems, the number of persons who could be reached by a speaker was limited by the carrying power of his voice and the acoustic properties of the place where the audience was assembled.

Western Electric Public Address Systems increase the range of speakers' voices sufficiently to cover any requirements in regard to the size of the audience. (Audiences of over 200,000 have been enabled to hear clearly.) By permitting the speaker to reach his audience with natural tones these systems prevent voice strain and thus increase greatly the amount of speaking possible without voice fatigue or injury.

Western Electric Public Address Systems reproduce the voice of the speaker in clear and natural tones.

The speaker has a comparatively large amount of freedom. He is not hampered by having to speak in a loud voice nor does he have to direct his words into the mouthpiece of the telephone transmitter.

Large outdoor crowds can be easily handled. Individuals hundreds of feet from the speaker may be addressed and requested to come to the platform. Medical assistance may be summoned in the case of illness and descriptions of children lost or found may be broadcast.

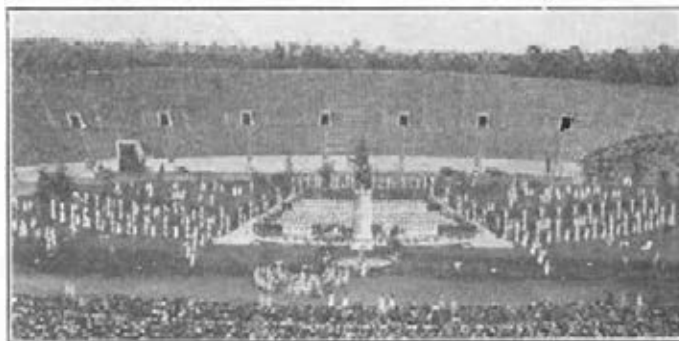
In intervals between speeches music may be transmitted to the audience through the Public Address System.

The apparatus is rugged in construction and once installed requires only a moderate amount of attention from the persons who operate it.

Western Electric Public Address Systems are flexible in their application and can be arranged to serve large gatherings, either indoors, or outdoors, or both, or overflow meetings or two or more meetings held simultaneously in different localities.



Public Address System Being Used in Dedication of New Building



Public Address System Being Used at Graduation Exercises
Rose Bowl, Los Angeles

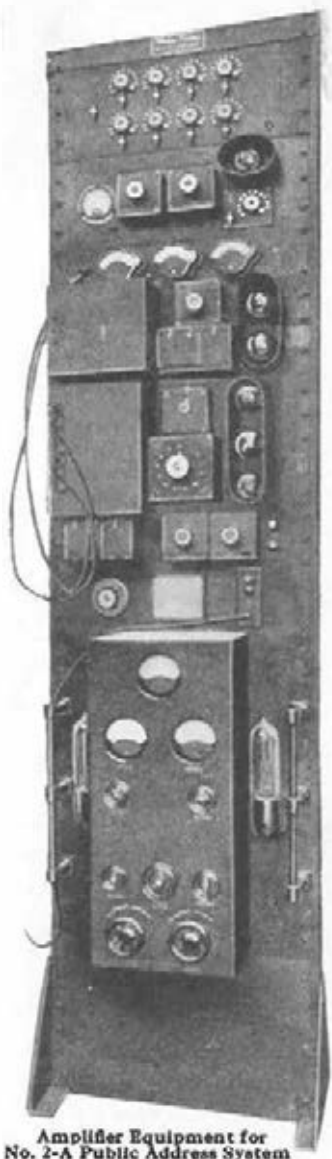
PUBLIC ADDRESS SYSTEMS



Public Address System in use at
Hotel Astor, New York



A Church Installation



Amplifier Equipment for
No. 2-A Public Address System

The Western Electric No. 1-A Public Address System is designed for use with the largest audiences outdoors and indoors. It is adapted for either permanent or temporary installation. The efficiency of this system was demonstrated during the inauguration ceremonies of the late President Harding on March 24, 1921, when by its use an audience of more than 125,000 people gathered before the National Capitol at Washington, was enabled to hear distinctly the President's Inaugural Address.

The same system was used on March 4, 1925, when President Coolidge was inaugurated. This system not only made it possible for a gathering of many thousand people assembled on the Capitol grounds to hear the address, but in addition, through wire connections, the message was distributed to numerous radio broadcasting stations which broadcast the message over the greater part of the United States.

At both the Republican and Democratic Conventions of 1924, the Western Electric No. 1-A Public Address System served the purpose of transmitting the words of the speakers to the vast audiences present in the convention halls and to widely scattered radio audiences.

In addition to its temporary use on occasions of national importance, the Western Electric No. 1-A Public Address System is installed permanently in many large auditoriums and stadiums.

Though somewhat smaller than the No. 1-A Public Address System, the No. 2-A is capable of taking care of large crowds either outdoors or indoors. The No. 2-A System is at present giving satisfactory service in many auditoriums and hotel banquet halls throughout the country.

A few of the many possible applications of the No. 2-A Public Address System follow.

WHERE THE WESTERN ELECTRIC No. 2-A PUBLIC ADDRESS SYSTEM CAN BE USED

Hotels, for use in Banquet Halls, for reproducing music of an orchestra in as many locations as desired and for paging guests and making announcements in cases of emergency.

Theaters and other auditoriums.

Stock markets and trade exchanges.

Colleges and schools for use in large lecture rooms and for emergency announcements or for directing class drills.

Dance halls.

Steamships, steamship piers.

Department stores.

Prisons.

Hospitals.

County Fairs.

Private Pullman car or automobiles so audiences assembled around them may be addressed.

THE No. 3-A PUBLIC ADDRESS SYSTEM



Vacuum Tube Amplifier used with No. 3-A Public Address System

The Western Electric No. 3-A Public Address System comprises microphones, a vacuum tube amplifier with a control system, loud speaking telephones, and batteries to supply electrical energy. Storage batteries are used to supply the filament current and either storage batteries or dry cells may be used to provide plate current. To recharge the storage batteries, equipment for either A.C. or D.C. power supply can be furnished.

The system is suitable for use in auditoriums, the cubical contents of which do not exceed 150,000 cubic feet. For example, an auditorium approximately 100 feet by 75 feet by 20 feet high. Where it is desired to transmit the sound into adjoining rooms and corridors the cubical contents of the combined space should be somewhat less than 150,000 cubic feet, but the total area over which satisfactory loudness and quality of sound can be maintained depends largely on the size and configuration of the separate areas and the amount of disturbing noise that may enter these

areas. For larger auditoriums or groups of rooms the Western Electric No. 1-A or No. 2-A Public Address System should be used.

This amplifying system may be used to transmit music from one part of a building to another—as in a hotel where there are several dining rooms.

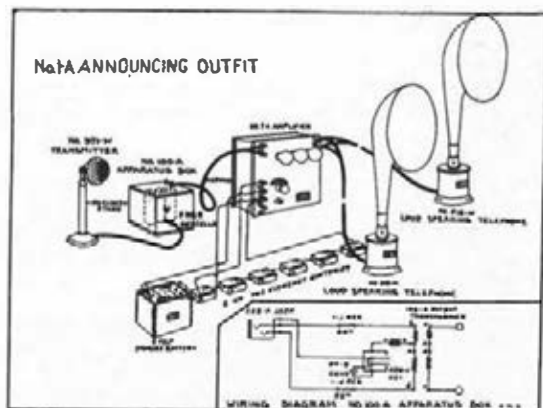
In schools and colleges this system may be used to transmit a lecture to several class rooms or to transmit music for drills, for marching in the halls and stairways, and for assemblies.

THE No. 1-A ANNOUNCING OUTFIT

This small announcing system is built on the same well demonstrated principles of speech amplification and transmission as are used in the larger Western Electric Public Address Systems. The 1A announcing outfit differs from the larger systems in capacity only. It is particularly adapted for use in rooms whose volume does not exceed 14,000 cubic feet and outdoor areas where the sound is not to be projected any considerable distance.

For operation, the desk stand is connected to the apparatus box which contains the batteries for the transmitter and a coil for the proper connection of the transmitter to the input of the No. 7-A amplifier. The two No. 518-W receivers are connected to the output of the No. 7-A amplifier, which obtains its filament current from the 6-volt storage battery and its plate current from six No. 766 Eveready batteries connected in series.

The sounds to be reproduced enter the transmitter which converts them into electrical impulses. These are passed into the No. 7-A amplifier and amplified, after which they are impressed on the No. 518-W receivers. These amplified vibrations are reconverted into sound by the receiver but at an increased volume.



No. 1-A Announcing Outfit

Western Electric WOOD POLES



WESTERN ELECTRIC POLES

Selection of poles for outside wire lines is based on three determining factors:

- 1—Species of wood to meet specific requirements;
- 2—Quality of the poles;
- 3—Service on shipments.

SPECIES

The first factor—that a certain species of wood is best fitted for one kind of installation to the exclusion of other species—is fully recognized by the Western Electric Company. In recognition of this we have available in various pole yards throughout the country one or more of the six species that are generally used for poles—(1) western red

cedar; (2) northern white cedar; (3) creosoted yellow pine; (4) chestnut; (5) cypress; (6) juniper.

Western red cedar and northern white cedar are pre-eminently the woods for poles.

The use of cedar poles effects a great economy in the construction work. They weigh about one-half as much as chestnut poles—in fact, they are the lightest of poles but are very strong and long lived. Cedar poles, therefore, require less men for pole setting work. Furthermore, they strip clean and do not have to be reshaved before setting. This lower installing cost more than offsets the slightly higher first cost of cedar.

Chestnut is important in pole use. It possesses ample strength to withstand severe weather; is long lived. Chestnut for obvious reason is mainly used in regions near the source of production. This is also true of cypress and juniper poles. Creosoted pine poles when properly treated also have specific economic appeal for certain type of work.

POLE QUALITY

Poles sold by Western Electric are quality products in the best sense of the term. All conform to nationally accepted standards. Inspections are thorough. Poles are inspected and measured on the ground immediately after felling and stripping. Another inspection is made before they are placed in stock. A third inspection takes place before shipping.

All poles that are delivered are guaranteed to be in accordance with the specification under which they are ordered.

SERVICE ON SHIPMENTS

There is a total of thirty-five well-stocked pole yards containing western red cedar and northern white cedar in all standard sizes and in accordance with accepted standard specifications. At Minneapolis and Everett, Wash., cedar poles are concentrated, handled by steam equipment, etc. The stock runs fifty thousand poles and more.

On the outskirts of Chicago, at the Western Electric Company's Hawthorne Works, there is a large cedar pole yard, ideally situated for service to every part of the middle western, eastern and southern sections of the country. East of this yard there is still another at Toledo, Ohio. These yards have modern equipment.

The many bases of supply for chestnut, cypress and pine are so situated throughout the regions in which these woods are grown that shipments can be made in any quantity and at any time.

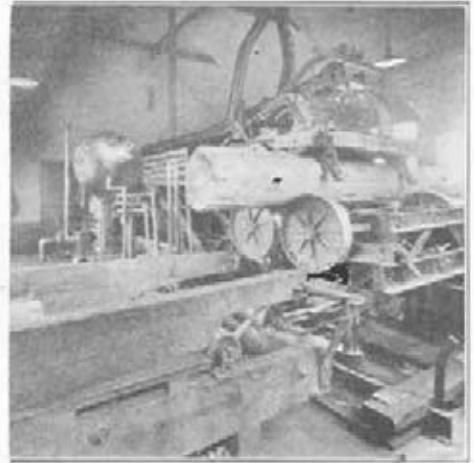
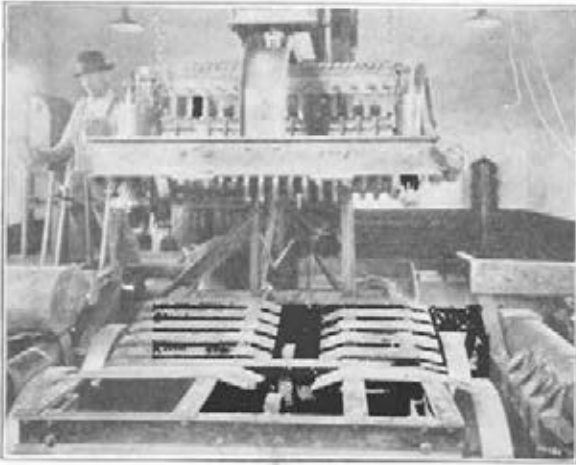
Emergency service is always available to supply need when the unforeseen happens.

And this applies not only to poles, but to everything needed for lines—cross arms, pins, insulators, hardware, wire tools.



One of the Creosoting Plants

PRESERVATIVE TREATMENTS



Showing Pentrex Machine Ready to Receive a Pole Coming in from the Left for Perforating. Note Carriage in Low Position, which is Afterwards Raised to Head of Machine

Pentrex Machine with Pole in Position Ready for Puncturing. Oil Lift that Raises the Lower Carriage into the Head of the Machine and Acts as a Cushion while Machine is in Operation

Observation of experimental lines, by engineers of large pole users has demonstrated that the life of poles can be increased by proper butt-treatment. A prominent engineer, after making careful study, made this statement: "If a satisfactory penetration is obtained in the ground line area, I am convinced that the life of a pole, butt-treated in creosote, will depend upon the mechanical wear of the pole above."

Another prominent engineer says, "The depth of penetration of the preservative exercises the controlling influence on the durability of poles. At least ninety percent of the chestnut, western red cedar and northern white cedar poles butt-treated with creosote by the open-tank process were sound after eleven to fourteen years' service. The slight decay in the relatively small number of the poles affected was usually in small pockets and occurred in checks through the treated wood."

This additional expenditure for treating poles with preservative is a sound investment because the initial investment for the pole itself and the cost of erection has been amortized at the end of its natural life as an untreated pole. The percentage of increased life depends largely on the soil and climatic conditions existing in the locality in which they are set, the size of the pole and the kind of treatment given.

Users are assured by results obtained in experimental lines in all parts of the country, that a good penetration at the ground line will greatly increase the life of a pole. This more than doubles its value, as the original factor of safety is maintained far beyond the replacement date of the untreated pole.

Six standard ways of treating poles have been accepted:

1. Brush treatment at individual pole yards.
2. AA treatment with open tanks (15 minutes hot creosote).
3. A treatment with open tanks (15 minutes hot creosote). More expensive but no more efficient than the AA treatment. (We do not supply this treatment.)
4. B treatment with open tanks (4 hours hot—2 hours cold creosote).
5. Pressure treatment throughout the entire length of the pole.
6. Puncturing treatment guaranteeing penetration.

If the best material and workmanship is used, any one of these methods is beneficial but varies in degree of success with the grade of material and workmanship. The first four methods can be used profitably only with seasoned poles. Authorities agree that penetration and oil stability are essential to lasting results. Any method selected insures greater line life if pure distillate of coal tar is used. The purity of the distillate is of paramount importance.

PRESSURE TREATMENT

The pressure or cylinder treatment impregnating the entire length of the pole is not required for the preservation of the more durable species of wood such as chestnut, northern white cedar and western red cedar, as these are subject to rapid decay only at the ground line. Pressure treatment is applied, however, for the different species of southern pine, as they decay rapidly even in the sections of the pole above the ground line.

PUNCTURING TREATMENT "PENTRIX"

For a period of years we have experimented with puncturing the ground line area of cedar poles to be able to guarantee penetration by open tank creosoting.

Pentrex is a revolutionary departure from old methods. It overcomes entirely objections to puncture-treating. Never before has it been possible to secure such uniform penetration. A conservative estimate of the life the Pentrex treatment adds to western red cedar poles is from fifteen to twenty-five years.

PRESERVATIVE TREATMENTS

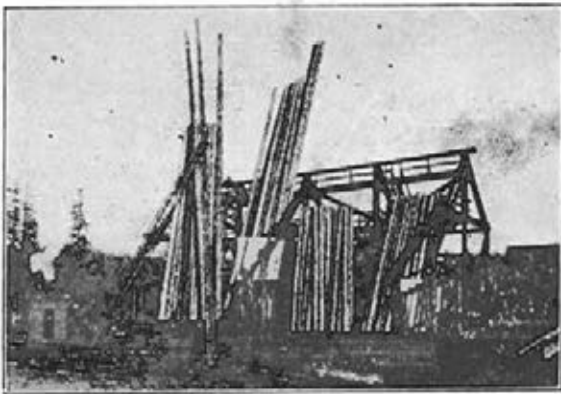
PRESSURE TREATMENT (Continued)

Cedar wood cells grow one above the other, opening lengthwise one into the other. It is well, therefore, to puncture the poles scientifically to enable the creosote to flow through the greatest distance up and down with the least possible rupturing of the wood fibres. In no case will penetration be greater than the thickness of the sap wood. Creosote will not penetrate the heart of cedar. Frequently, sap wood does not exceed three-eighths inch in thickness.

Our special Pentrex machine minimizes the tearing of the cells. The perforations are so made that they practically seal themselves up in the treating tanks, overcoming another objection in the early stages of Pentrex development. Puncturing makes possible the treating of green poles and certain other poles known as case hardened poles. Case hardened poles are those that will not ordinarily take a satisfactory penetration due to their peculiar wood structure. Care should be taken to dry green poles while in process of treating, otherwise it is possible to encourage interior rot which is the most dangerous form of deterioration in a pole. Our engineers have this problem under scientific control.

Our plant at Minneapolis, handling the cedar pole treating work, is the most scientifically operated plant in this country. This plant treats by all of the standard methods previously mentioned. Its capacity is 15 carloads of poles daily.

BRUSH TREATMENT



Brush treatment of poles consists in applying hot preservative to the surface of a pole with a brush. This method is not in general use among pole dealers, but is used by operating companies for local treatment.

For effective brush treatment the highest boiling point coal tar distillate obtainable is essential. High boiling creosote oils penetrate the wood readily. They are free from black and sticky tars that do not penetrate but concentrate on the outer wood cells. Western Electric "Sozol" was developed for this work. It is superior to any wood preservative on the market.

Treatment AA. Treatment AA consists of dipping the pole butts in boiling creosote and allowing them to remain for 15 minutes.

Treatment A. Treatment A consists of dipping the pole butts in boiling carbolineum and allowing them to remain for 15 minutes. Treatment AA is quite as effective and costs less.

Treatment B. Treatment B provides for submersion of pole butts in hot creosote for several hours, after which the bath is changed to cold creosote, the duration of each immersion depending upon several factors, but principally upon the degree of seasoning. The intent of treatment B is to give poles as near a full sap penetration as possible but there is no guarantee penetration of one-half of the sap wood on B treatment. Reports of line experiences so far available indicate that an average life of twenty years may be expected from poles properly treated by the B method. This method has a recognized place in the industry where changing conditions will not force obsolescence. For example, toll line poles are not so subjected to change from conditions outside the life of the pole itself to the same extent as exchange poles.

SOZOL

For Bush and Open Tank Treating

Sozol is a wood preserving oil for brush application for poles and all light construction woods including chestnut, cedar, pine and fir.

From a quality standpoint there is nothing on the market comparable with it. It is pure distillate of coal tar, that is, it is a product obtained directly by distilling off the volatile products of coal tar, and when obtained it is not adulterated by adding any other substances. It is not a by-product, that is, the distillation process is primarily for the purpose of securing this particular oil—not for some other distillate of coal tar in which this oil or a modification of it would come off in the distilling process. All creosote wood preserving oils have two faults in a greater or less degree. Either they are so thin and volatile that when applied with a brush or by open tank method, they partially evaporate or leak out and their preserving qualities are thus impaired, or, they are adulterated with heavier coal tar oils and these heavier constituents clog up other cells of the wood and prevent the penetration required for effective treatment.

This new oil, Sozol, is of a much higher specific gravity and greater body and, in consequence, is more stable than the pure creosote oils sold for wood preserving. It is not as volatile as these oils; at the same time it has absolutely no viscous properties which interfere with effective penetration as in the case of mixed oils. In short, it has absolute permanency with maximum penetration. It is more than a creosoting oil. It is a special wood preservative.

Sozol is supplied in drums, barrels and cans.

RED CEDAR POLES

WESTERN RED CEDAR ASSOCIATION OFFICIAL SPECIFICATIONS

TOP MEASURE POLES

TABLE NO. 1—MINIMUM OF MEASUREMENT

Top Designation, Ins.	Circumference, Ins.	Top Designation, Ins.	Circumference, Ins.	Top Designation, Ins.	Circumference, Ins.	Top Designation, Ins.	Circumference, Ins.
6	18½	9	28	8	25	..	..
7	22	10	31				

TABLE NO. 2

Poles 35 feet and longer shall have a minimum circumference measurement at extreme butt as follows:

7 In. 8 In. 9 In.				7 In. 8 In. 9 In.				7 In. 8 In. 9 In.				7 In. 8 In. 9 In.			
Length	Top	Top	Top	Length	Top	Top	Top	Length	Top	Top	Top	Length	Top	Top	Top
35 ft.	33 in.	36 in.	39 in.	65 ft. . .	45 in.	48 in.		50 ft.	...	41 in.	44 in.	80 ft. . .	...	50 in.	53 in.
40 "	34 "	37 "	40 "	70 " . . .	47 "	50 "		55 " . . .	...	42 "	45 "	85 " . . .	...	51 "	54 "
45 "	...	39 "	42 "	75 " . . .	48 "	51 "		60 " . . .	...	44 "	47 "	90 " . . .	...	52 "	55 "

TABLE NO. 3

Length of Pole, Ft.	Maximum Sweep Between Top and Ground Line, Ins.	Length of Pole, Ft.	Maximum Sweep Between Top and Ground Line, In.	Length of Pole, Ft.	Maximum Sweep Between Top and Ground Line, Ins.	Length of Pole, Ft.	Maximum Sweep Between Top and Ground Line, In.
20	3	60	9	40	5½	80	12
25	3	65	10	45	6	85	13
30	4	70	10½	50	7	90	14
35	5	75	11	55	8	..	..

MINIMUM CARLOADS

Minimum weights required to make carload lots of poles:

Cars loaded with 35 feet or shorter poles	40,000 lbs.
Cars loaded with 40 foot poles or 40 foot and shorter poles	50,000 lbs.
Loads containing any 45 foot or longer poles (double or overhand loads)	66,000 lbs.
Triple loads	99,000 lbs.

The above minimum weights will be used in all instances excepting as follows:

Sales covering shipments to be made from Eastern yards will be figured on minimum weights shown in tariffs under which the shipment moves.

Sizes, Ins.	Length, Ft.	Weight, Lbs.	Size, Ins.	Length, Ft.	Weight, Lbs.
4	20	100	7	40	675
5	20	135	8	40	800
6	20	190	9	40	1000
7	20	250	8	45	1000
8	20	325	9	45	1200
5	25	200	8	50	1200
6	25	250	9	50	1400
7	25	325	8	55	1400
8	25	400	9	55	1600
6	30	325	8	60	1600
7	30	400	9	60	1850
8	30	550	8	65	1850
6	35	450	9	65	2200
7	35	550	8	70	2200
8	35	650	9	70	2600
9	35	800	8	75	2600

Class	Length, Ft.	Weight, Lbs.	Class	Length, Ft.	Weight, Lbs.	Class	Length, Ft.	Weight, Lbs.
D	20	190	B	35	650	B	60	1600
C	20	250	A	35	800	A	60	1850
B	20	325	D	40	550	B	65	1850
A	20	400	C	40	675	A	65	2200
D	25	250	B	40	800	B	70	2200
C	25	325	A	40	1000	A	70	2600
B	25	400	C	45	800	B	75	2600
A	25	550	B	45	1000	A	75	3000
D	30	325	A	45	1200	B	80	3600
C	30	400	C	50	1000	A	80	4200
B	30	550	B	50	1200	B	85	4200
A	30	650	A	50	1400	A	85	4800
D	35	450	B	55	1400	B	90	4800
C	35	550	A	55	1600	..	..	....

NORTHERN WHITE CEDAR POLES

NORTHERN WHITE CEDAR ASSOCIATION SPECIFICATIONS

Diameter Top Inches	Length, Feet	Approx. Weight, Lbs.	—No. to Carload— From To		Diameter Top, Inches	Length, Feet	Approx. Weight, Lbs.	—No. to Carload— From To	
4	16	85	340	400	6	30	350	90	125
5	16	105	300	400	6 1/2	30	350	75	100
6	16	135	230	300	7	30	450	75	100
7	16	165	200	250	8	30	600	50	75
8	16	200	150	225	5	35	400	75	100
9	16	300	100	130	5 1/2	35	400	75	100
4	18	95	325	400	6	35	450	75	100
5	18	125	250	300	6 1/2	35	450	60	80
6	18	155	200	250	7	35	600	50	75
7	18	200	150	225	8	35	850	40	60
8	18	325	95	125	6	40	625	50	75
9	18	425	90	125	6 1/2	40	625	45	60
4	20	100	300	400	7	40	850	40	60
5	20	130	230	300	8	40	1100	30	45
5 1/2	20	130	230	300	Following sizes require two cars for shipping.				
6	20	190	150	225	6	45	900	60	80
7	20	250	125	150	7	45	1100	50	70
8	20	350	90	125	8	45	1350	45	60
9	20	450	75	100	6	50	1150	50	70
5	22	175	175	250	7	50	1350	45	60
4	25	150	200	250	8	50	1700	35	45
5	25	200	150	225	6	55	1400	40	50
5 1/2	25	200	135	190	7	55	1700	35	45
6	25	250	125	150	8	55	2200	25	35
6 1/2	25	250	100	130	7	60	2200	25	35
7	25	350	90	125	8	60	2500	22	30
8	25	425	90	125	7	65	2500	22	30
5	30	275	110	175	8	65	3000	18	25
5 1/2	30	275	100	130					

A. T. & T. CO., WESTERN UNION AND NATIONAL ELECTRIC LIGHT
ASSOCIATION SPECIFICATIONS

Class Poles

Class	Length, Feet	Circum. Top Inches	Circum. 6 Feet from Butt Inches	Approx. Weight, Lbs.	Class	Length, Feet	Circum. Top, Inches	Circum. 6 Feet from Butt, Inches	Approx. Weight, Lbs.
G	20	12 1/2	..	100	A	35	24	43	850
F	20	15 1/2	..	130	E	40	18 3/4	..	625
D	20	17 1/4	..	130	D	40	18 3/4	..	625
C	20	18 3/4	27	190	C	40	18 3/4	40	625
E	22	15 1/2	..	175	B	40	22	43	850
D	22	17 1/4	..	175	A	40	24	47	1100
C	22	18 3/4	28 1/2	250	Following sizes require two cars for shipping.				
B	22	22	30	275	E	45	22	..	1100
G	25	12 1/2	..	150	D	45	22	..	1100
F	25	15 1/2	..	200	C	45	18 3/4	43	900
E	25	17 1/4	..	200	B	45	22	47	1100
D	25	18 3/4	..	250	A	45	24	50	1350
C	25	18 3/4	30	250	D	50	22	..	1350
B	25	22	32	350	C	50	18 3/4	46	1150
A	25	24	36	425	B	50	22	50	1350
D	30	18 3/4	..	350	A	50	24	53	1700
C	30	18 3/4	33	350	B	55	22	53	1700
B	30	22	36	450	A	55	24	56	2200
A	30	24	40	600	B	60	22	56	2200
D	35	18 3/4	..	450	A	60	24	59	2500
C	35	18 3/4	36	450					
B	35	22	38	600					

CREOSOTED YELLOW PINE POLES

SPECIFICATIONS NO. 4227 FOR DEAD OIL OF COAL TAR OR COAL TAR CREOSOTE

GENERAL

The material desired under these specifications is that known as dead oil of coal tar or coal tar creosote. It shall consist wholly of distillates of gas tar produced by the destructive distillation of bituminous coal either in the manufacture of coal gas or in the manufacture of coke by the by-product process. It shall be without adulteration.

Information shall be furnished on request as to the origin of the oil and the names of the parties through whose hands it may have passed. A copy of any analysis of the oil that may have been made prior to its use shall also be furnished.

The right is reserved to take representative samples of the oil and test the same wherever desired.

REQUIREMENTS

All coal tar creosote furnished under these specifications shall conform to the following requirements:

- 1st. The oil shall have a specific gravity at thirty-eight degrees Centigrade (38°C.), as compared with water at 15.5°C., of not less than one and three hundredths (1.03).
- 2nd. The oil shall be thoroughly liquid at a temperature of 38°C.
- 3rd. When one hundred grams of the oil are distilled in accordance with the requirements of the specifications for the Analysis of Dead Oil of Coal Tar or Coal Tar Creosote hereinafter referred to:
 - (a) Not more than five (5) per cent. shall distill off up to 205° Centigrade.
 - (b) Not more than forty (40) per cent. shall distill off up to 235° Centigrade.
 - (c) Not more than eighty (80) per cent. shall distill off up to 315° Centigrade.
 - (d) Not less than sixty (60) per cent. shall distill off up to 360° Centigrade.
 - (e) The oil shall not contain more than two (2) per cent. of water.
 - (f) The quantity of tar acids present in the fractions distilling below 300° Centigrade shall not exceed ten (10) per cent. (measured by volume) of the total sample distilled.
 - (g) The sulphonation residue from the fraction distilling between 300° Centigrade and 360° Centigrade shall not exceed two (2) per cent. (measured by volume) of the said fraction.
- 4th. The constituents of the oil insoluble in benzol shall not exceed fifty one-hundredths (0.50) per cent. by weight.
- 5th. When oil is intended for use in the treatment of wood duct it shall be free from acids of the acetic series and their salts.

ANALYSIS

The oil shall be analyzed in accordance with the methods outlined in the specifications for the Analysis of Dead Oil of Coal Tar or Coal Tar Creosote hereinafter referred to.

SUBSIDIARY SPECIFICATIONS

The following specifications form a part of these specifications:

Specifications for the Analysis of Dead Oil of Coal Tar or Coal Tar Creosote.

CREOSOTED YELLOW PINE POLES



Creosoted Yellow Pine Poles Coming from Treating Tank

Wood conservation should be of primary interest to all peoples as a basic economic to national life.

Timber resources have been and are being very rapidly consumed.

Considerable can be accomplished through the prolongation of the life of timbers, subjected to exposure.

The most practical, serviceable and economical form is by creosoting.

Yellow pine timber is available in the southeastern sections of this country which when properly impregnated with a pure oil increases the life of this timber by an unlimited period of years—conserving these forests for future generations.

In the semi-tropical regions of this country the public utilities are familiar with the whole treated or creosoted yellow pine pole.

We find that wood treaters have educated some users to commercial creosote or creosote mixtures and the Engineering Departments of the public utilities in making comparisons on the basis life, are apt to give little or no consideration to the superior grade of oil which we are offering.

Therefore, it is suggested that our customers send us the specifications under which they are at present purchasing their requirements, both as to oil and to poles, together with individual comments as to the conditions.

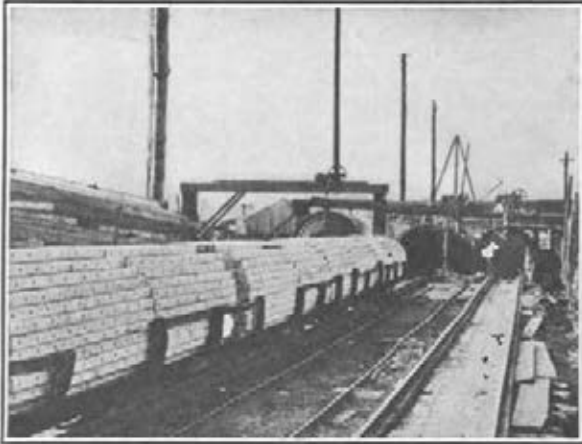
Our representative will then call on this customer personally.

MINIMUM DIMENSIONS OF POLES IN INCHES—CIRCUMFERENCE

Extract from A. T. & T. Specifications Adopted December, 1924

Length of Pole, Feet	Distance of Ground Line from Butt, Feet	Class AAA		Class AA		Class A		Class B	
		Top	6 Feet from Butt	Top	6 Feet from Butt	Top	6 Feet from Butt	Top	6 Feet from Butt
16	4	..	..	..	..	..	..	..	..
18	4	..	..	..	..	..	..	..	..
20	4	..	..	..	..	20	28	18½	26½
22	4½	..	..	..	..	20	29	18½	27
25	5	23	33½	21½	31	20	30	18½	28
30	5½	23	35	21½	33½	20	32	18½	30
35	6	23	37	21½	35	20	33½	18½	32
40	6	23	38½	21½	37	20	35	18½	33½
45	6½	24½	40	23	38½	21½	37	20	35
50	7	24½	41½	23	40	21½	38½	20	37
55	7½	24½	43	23	41½	21½	40	20	38½
60	8	24½	45	23	43	21½	41½	20	40
65	8½	24½	46½	23	45	21½	43	20	41½
70	9	24½	48	23	46½	21½	45	20	43
75	9½	24½	49½	23	48	21½	46½	20	45
80	10	24½	51	23	49½	21½	48	..	..
85	10½	24½	52½	23	51	21½	49½	..	..
90	11	24½	54	23	52	21½	51	..	..

Length of Pole, Feet	Distance of Ground Line from Butt, Feet	Class C		Class D		Class E		Class F		Class G	
		Top	6 Feet from Butt	Top	6 Feet from Butt	Top	6 Feet from Butt	Top	6 Feet from Butt	Top	6 Feet from Butt
16	4	..	..	16	20½	15	18½	14	No	12	No
18	4	17	23½	16	21½	15	19½	14	Butt	12	Butt
20	4	17	24½	16	22½	15	20½	14	Re-	12	Re-
22	4½	17	25½	16	23½	15	21½	14	quire-	12	quire-
25	5	17	26½	16	24½	15	22½	14	ment.	12	ment.
30	5½	17	28	16	26½	15	24½	14	..	..	..
35	6	17	30	16	28	15	26½	..	..	..	..
40	6	17	32	16	30	15	28	..	..	..	..
45	6½	18½	33½	17	32	..	..	..	..	..	..
50	7	18½	35	17	33½	..	..	..	..	..	..
55	7½	18½	37	..	..	..	..	..	..	..	..
60	8	18½	38½	..	..	..	..	..	..	..	..



A Load of Yellow Pine Arms Going into the Cylinder to be Creosoted

WOOD CROSSARMS

The prime requisites in a crossarm are lightness, strength and durability. Rainier Fir is the best for all sorts of uses and conditions; we are able to furnish long leaf yellow pine crossarms, and creosoted arms, in either fir or yellow pine.

This is the arm most widely used and most generally preferred.

Rainier fir crossarms do not require painting or the use of any preservative; are more than double the necessary strength with a large "factor of safety"; they live in actual service for many years.

Short-leaf yellow pine (and long-leaf sapwood) crossarms, should be creosoted (pressure treatment) before being put into service; this treatment prolongs the life of the arms for many years, but great care should be exercised that only pure distillate oil is used and the treatment given by a reliable creosoting company.

Creosoted yellow pine crossarms should be made from short-leaf yellow or long-leaf yellow pine; sapwood is no objection, as it has the necessary strength and takes oil readily. Only pure distillate creosote (dead oil of coal tar) should be used; this assures a clean surface, free from "goo"; the treatment consists, first of full seasoning by steam and vacuum; second, of impregnation with preservative under high pressure.

We maintain at each warehouse a liberal stock of the genuine Rainier fir arm, in order to give customers service when in need of arms quickly.

We have at Chicago, Minneapolis, Centralia, Wash., and New Haven, Conn., large stocks of blank arms, which can be cut to length and bored according to your special requirements. This is merely another link in the chain of Western Electric service on crossarms.

Treatment of Rainier Arms. In some localities it is occasionally found necessary to color crossarms, so as to distinguish them from arms used for other purposes. As previously stated, the genuine Rainier fir arm does not require any preservative treatment, and we recommend that if a color is necessary the arms be dipped in the proper stain, which our Pacific Coast mills are prepared to do.

We recommend, however, that a Rainier arm be dipped in a hot solution of pure distillate creosote oil, if that will answer the purpose of color. This treatment tends to prevent an arm from checking and to protect it from woodpeckers, and from the incursions of termites, etc. Unless color is demanded, this is a useless expense.

All arms bored for one $\frac{5}{8}$ inch center bolt and $\frac{3}{8}$ inch brace bolts unless otherwise specified, except as shown in "Standard" table.

Minimum Carload Weights. Fir from Pacific Coast Mills, 38,000 pounds. Small cars are scarce and weight of at least 50,000 pounds should be figured on. Cars to contain as high as 90,000 pounds can be had. Smaller cars are available in the Southern Yellow Pine Regions—minimum weight, 34,000 pounds.

Creosote Oil Dip Treatment. Hot dip treatment (immersion for five minutes in hot creosote oil). This treatment can be given only at Pacific Coast mills, Mississippi mills, Louisiana mills, Virginia mills, Chicago and Minneapolis warehouses.

If board measure of arm is wanted, add one-half inch to height and width of finished arm; if length runs into inches take next higher foot length, multiply height by width in inches; divide by twelve, and multiply by length in feet.

Specifications

Rainier Fir Crossarms:

Material. Sound, live, yellow Douglas fir, close-grained (at least eight rings per inch); straight grained (not out of parallel to edge of arm in central section more than five degrees).

Prohibited. Rot, decay, loose heart, loose or rotten knots, shakes and splits.

Allowed. Warp up to $\frac{1}{8}$ inch off-set per lineal foot; sound knots up to one inch diameter, but not at pin holes or in clusters; pitch pockets up to 8 inches in length; season checks up to one inch in depth; sapwood up to 25 per cent. of volume of arm.

Manufacture. Best commercial practice; kiln dried in sizes up to $3\frac{1}{2} \times 4\frac{3}{4}$ finished; planed on all four sides; pin holes accurately centered, smooth and not badly broken out by bits in boring; dimensions as shown, with commercial variations.

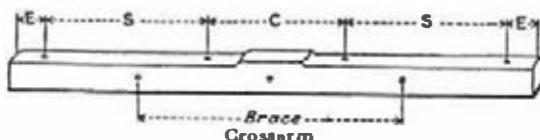
Select Fir. Sound lumber, well machined, free from loose or unsound knots, free from knots over one and one-half inch diameter, pitch pockets over twelve inches long, loose heart, rot or wormholes.

Long-leaf Yellow Pine. Genuine long-leaf yellow pine, guaranteed every arm at least—per cent. heart in volume, and free from knots (except small, sound knots, not over one inch in diameter), or other defects that would impair the strength of the arm.

Virginia Yellow Pine. Free from loose or unsound knots or other defects which would impair the strength of the arm.

Creosoted Crossarms and Conduit. Free from large, unsound or loose knots, or other defects which would impair strength, creosoted steam and vacuum treatment—dead oil of coal tar under pressure—either 12 lbs. per cubic foot (full cell) or 8 lbs. per cubic foot (empty cell) as ordered.

CONSTRUCTION MATERIAL



WOOD CROSSARMS

How to Describe a Crossarm (in Placing Your Order)

- State: A—Quantity wanted. B—Material and quality (or grade). C—Treatment (if any). D—Width, in inches (and fraction). E—Height, in inches (and fraction). F—Length, in feet and inches. G—Number pin holes. H—Size of pin holes. I—Spacing between pin holes (center-side-end). J—Size center bolt hole. K—Size brace bolt holes. L—Space between brace bolt holes.

For example, the standard Bell Telephone crossarm is described—"Rainier fir, unpainted, $3\frac{1}{4} \times 4\frac{1}{4}$ inch—10 ft., bored for ten $1\frac{1}{8}$ inch pin holes, spaced 16 inch center, 12 inch sides, 4 inch end, one $\frac{5}{8}$ inch center bolt hole, two $\frac{5}{8}$ inch brace bolt holes 42 inches apart."

Important. In ordering crossarms, be very careful to specify just what is wanted, and, if other than standard boring, send sketch or blue print with order. Arms specially made are of no use for general stock, and cannot be taken back if mistake is made in ordering.

ELECTRIC LIGHT ARMS

List No.	Size and Length	Pin Holes				Center Bolt Hole, Inches	Brace, Inches	Weight, Lbs. Per Arm, Fir	Weight, Lbs. Per Arm, Yellow Pine
		Center	Spacings, Ins. Sides	Ends	Size, Inches				
1	$3\frac{1}{4} \times 4\frac{1}{4}$ in.								
2	3 ft. 2 pin	28		4	$1\frac{1}{8}$	$\frac{5}{8}$	25	10.2	13.2
3	4 ft. 4 pin	16	12	4	$1\frac{1}{8}$	$\frac{5}{8}$	28	13.6	17.6
4	5 ft. 4 pin	18	17	4	$1\frac{1}{8}$	$\frac{5}{8}$	28	17	22
5	6 ft. 4 pin	22	21	4	$1\frac{1}{8}$	$\frac{5}{8}$	32	20.4	26.4
6	6 ft. 6 pin	16	12	4	$1\frac{1}{8}$	$\frac{5}{8}$	32	20.4	26.4
7	8 ft. 6 pin	18	$17\frac{1}{2}$	4	$1\frac{1}{8}$	$\frac{5}{8}$	32	27.2	35.2
8	8 ft. 8 pin	16	12	4	$1\frac{1}{8}$	$\frac{5}{8}$	32	27.2	35.2
9	$8\frac{1}{2}$ ft. 10 pin	16	$9\frac{3}{4}$	4	$1\frac{1}{8}$	$\frac{5}{8}$	32	28.9	37.4
10	10 ft. 8 pin	$17\frac{1}{2}$	$15\frac{3}{4}$	4	$1\frac{1}{8}$	$\frac{5}{8}$	42	34	44
11	10 ft. 10 pin	16	12	4	$1\frac{1}{8}$	$\frac{5}{8}$	42	34	44
	10 ft. 12 pin	16	$9\frac{5}{8}$	$3\frac{7}{8}$	$1\frac{1}{8}$	$\frac{5}{8}$	42	34	44

R. S. A. (RAILWAY SIGNAL ASSOCIATION) ARMS

21	$3 \times 4\frac{1}{4}$ in.								
22	6 ft. 4 pin	20	22	4	$1\frac{1}{8}$	$1\frac{1}{8}$	..	19.2	24.6
23	8 ft. 6 pin	19	$17\frac{1}{4}$	4	$1\frac{1}{8}$	$1\frac{1}{8}$	..	25.6	32.8
24	10 ft. 8 pin	19	$15\frac{1}{2}$	4	$1\frac{1}{8}$	$1\frac{1}{8}$	..	32	41
	10 ft. 10 pin	16	$12\frac{3}{8}$	$2\frac{1}{2}$	$1\frac{1}{8}$	$1\frac{1}{8}$	..	32	41

WESTERN UNION ARMS

25	$3 \times 4\frac{1}{4}$ in.								
26	6 ft. 6 pin	20	$11\frac{1}{2}$	3	$1\frac{1}{8}$	$1\frac{1}{8}$	..	19.2	24.6
27	8 ft. 8 pin	21	$11\frac{1}{2}$	3	$1\frac{1}{8}$	$1\frac{1}{8}$	..	25.6	32.8
	10 ft. 10 pin	22	$11\frac{1}{2}$	3	$1\frac{1}{8}$	$1\frac{1}{8}$	..	32	41

PONY TELEPHONE ARMS

31	$2\frac{3}{4} \times 3\frac{3}{4}$ in.								
32	24 in. 2 pin	17	...	$3\frac{1}{2}$	$1\frac{1}{8}$	$\frac{5}{8}$	..	5	6.5
33	30 in. 2 pin	23	...	$3\frac{1}{2}$	$1\frac{1}{8}$	$\frac{5}{8}$	..	6.25	8.125
34	36 in. 2 pin	29	...	$3\frac{1}{2}$	$1\frac{1}{8}$	$\frac{5}{8}$	25	7.5	9.75
35	42 in. 4 pin	16	$9\frac{1}{2}$	$3\frac{1}{2}$	$1\frac{1}{8}$	$\frac{5}{8}$	28	8.75	11.375
36	62 in. 6 pin	16	$9\frac{3}{4}$	$3\frac{1}{2}$	$1\frac{1}{8}$	$\frac{5}{8}$	28	13	16.8
37	82 in. 8 pin	16	$9\frac{3}{4}$	$3\frac{3}{4}$	$1\frac{1}{8}$	$\frac{5}{8}$	28	17	22.2
38	102 in. 10 pin	16	$9\frac{3}{4}$	4	$1\frac{1}{8}$	$\frac{5}{8}$	28	21.25	27.625
	120 in. 12 pin	16	$9\frac{3}{4}$	$3\frac{7}{8}$	$1\frac{1}{8}$	$\frac{5}{8}$	28	25	32.5

N. E. L. A. ARMS

41	$3\frac{1}{2} \times 4\frac{1}{2}$ in.								
42	3 ft. 2 in. 2 pin	30	...	4	$1\frac{1}{8}$	$1\frac{1}{8}$	28	$12\frac{3}{4}$	15.83
43	5 ft. 7 in. 4 pin	30	$14\frac{1}{2}$	4	$1\frac{1}{8}$	$1\frac{1}{8}$	38	$22\frac{1}{4}$	27.92
44	8 ft. 6 pin	30	$14\frac{1}{2}$	4	$1\frac{1}{8}$	$1\frac{1}{8}$	38	32	40
	9 ft. 2 in. 8 pin	30	12	4	$1\frac{1}{8}$	$1\frac{1}{8}$	38	$36\frac{3}{4}$	45.83

Weight creosoted crossarms—full cell—12 pounds treatment—add 15% to untreated weight.

Weight creosoted crossarms—empty cell—8 pounds—add 10% to untreated weight.

Any requirements from standard spacings, pin holes or bolt holes can be secured on order.

CONSTRUCTION MATERIAL

PINS, BRACKETS, POLE STEPS AND COBS

Material. Sound, reasonably straight grained, Oak, free from knots, checks, sap wood, etc., except as hereinafter specified. **Sap Wood.** Permitted up to 25 per cent. of volume of bracket.

Checks. Season checks not over $\frac{1}{8}$ inch deep are permitted provided they do not appear within two inches of the thread.

Knots. Brackets shall be free from loose or unsound knots; sound knots not exceeding $\frac{1}{2}$ inch in diameter permitted below the shoulder, but not in lower 3-inch section of bracket.

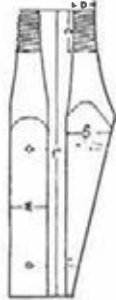
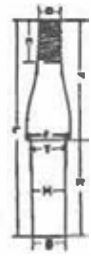
Dimensions. After seasoning, dimensions with allowable variations shall be as shown; Wane allowed in body of bracket not exceeding $\frac{1}{4}$ inch; irregularities in body of bracket not to exceed 10 per cent. of volume.

Threads. All brackets shall have four threads per inch; the thread shall be smooth and of uniform pitch; the thread shall taper $\frac{1}{8}$ inch in diameter to 1 inch in length.

Standard Package. Nos. 1, 3, 4 and 5, 25 per bundle. Nos. 2 and 6, 20 per bundle.

It is the practice to furnish oak pins and brackets "dipped in red paint," without extra charge; this treatment is of little or no protective value, and we earnestly recommend instead, a dipping in hot Creosote Oil, at a slight additional charge; not only does this make a clean bracket, but gives a preservative value, and a lasting effect.

	1 1/4 x 8	1 1/2 x 9	Allowable Pins, Pins, Variation Inches Inches Inches				Allowable Variation, Inches
L—Length Pin.....	8	9	1/4				
F—Length Top.....	4	5	1/4				
E—Length Tenon...	4	4	1/4				
D—Diam. Thread...	2 1/2	2 1/2	1/4				
C—Length Thread...	2 1/2	2 1/2	1/4				
Diameter:							
S—Shoulder.....	1 1/2	1 3/4	1/4				
T—Tenon on Top...	1 1/2	1 3/4	1/4				
M—Tenon at Middle	1 1/4	1 1/2	1/4				
B—Tenon at Bottom	1 1/4	1 1/2	1/4				
L—Lgth. Bracket As ordered							1/4
D—Diam. Thread							1/4
C—Lgth. Thread							1/4
W—Width.....							1/8
S—Hgt. Shoulder As ordered							1/8



Standard Pins



High Tension Pin



Bracket



Transposition Pin



Duplex Pin



Pole Step



Cob

STANDARD PINS

Dimensions			Locust, Weight, Lbs. per 1,000	Oak, Weight, Lbs. per 1,000	Dimensions			Locust, Weight, Lbs. per 1,000	Oak, Weight, Lbs. per 1,000
M	L	D			M	L	D		
1 1/4	8	1	325	300	1 1/2	9	1	450	400

TRANSPPOSITION PINS

1 1/4	9	1	400	350	1 1/2	10	1	500	450
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HIGH TENSION PINS

1 1/2	11	1 3/8	550	500	1 3/4	12	1 3/8	1300	1100
1 1/2	12	1	600	550	1 3/4	10 1/8	1	1000	850
1 1/2	12	1 3/8	650	600	1 3/4	10 1/8	1 3/8	1100	900
1 3/4	12	1	1200	1000	1 3/4	14	1 3/8	1400	1200

DUPLEX PINS

1 1/4	11 1/2	1	500	450	1 1/2	12	1	650	600
1 1/4	12	1	550	500	...	...	...	...	...

BRACKETS

No.	Dimensions				Wt., Lbs. per 1,000	Dimensions				Wt., Lbs. per 1,000	Dimensions				Wt., Lbs. per 1,000
	W	S	L	D		S	L	D	S		L	D			
4	1½	2	10	1	500										
1	1½	2	12	1	600	1½	2½	1	60	2½	5½	1¾	.....	
3	1½	2¾	12	1	700	1¾	4½	1	..	2½	6½	1¾	.....	
5 A. T. & T.	1⅝	2	12	1	700	2¼	5¼	1	..	2½	8	1¾	.....	
2	2	2¼	12	1	800	2¼	4½	1¾	..	2¾	9	1¾	.....	
6 W. U.	2	2⅝	12	1	850										

COBS

S	Dimensions			Wt., Lbs. per 1,000	S	Dimensions			Wt., Lbs. per 1,000
	L	D				L	D		
1 1/4	2 1/2	1		60	2 1/4	5 1/4	1 3/8	.....
1 3/8	4 1/2	1		..	2 1/4	6 1/2	1 3/8	.....
2 1/4	5 1/4	1		..	2 1/2	8	1 3/8	.....
2 3/4	4 1/2	1 3/8		..	2 3/4	9	1 3/8	.....

POLE STEPS

	W	S	L	D	
Standard	1 1/2	2	7	..	500
Standard	1 1/2	2 1/4	7	..	550
Western Union	1 3/4	2 3/4	7	..	700

Western Electric

BERMICO FIBRE CONDUIT



45° Bend. 36° Radius



45° Elbow



S Bend 20° Offset



BERMICO Socket Joint Type



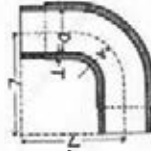
90° Elbow



BERMICO Sleeve Joint Type



90° Bend. 36° Radius



90° Bend. 18° Radius

BERMICO Fibre Conduit

Bermico conduit is made expertly by processes that save and develop the available strength of the pulp-stock used, and this product must not be confused with tubes of pulp less expertly made.

It is tougher and stronger, and gives better value for its cost, because it is made right in a long established pulp and paper plant that specializes on high grade products.

The fibre is converted into lengths of conduit in automatic machines which produce a higher degree of precision than any skilled operative could produce.

The conduit forming machines turn out automatically a succession of conduit lengths, highly standardized, more uniform in material, wall thickness, and density, than ever before.

Bermico material takes a good thread, and screw jointed sections show a remarkable degree of precision in the automatically cut threads.

Lengths, 8 feet, except 2 inch and 2½ inch size, which are 5 feet.

SOCKET JOINT TYPE

Inside Diam. Ins.	Maximum Gross Wt. (Approx.) Full Car (36 Ft.) in Lbs.	Maximum No. Ft. in 36 Ft. Car (Approx.)	Minimum 30,000 Lb. Car-load Approx. No. Ft.	Inside Diam. Ins.	Maximum Gross Wt. (Approx.) Full Car (36 Ft.) in Lbs.	Maximum No. Ft. in 36 Ft. Car (Approx.)	Minimum 30,000 Lb. Car-load Approx. No. Ft.
2	32500	35000	32000	3½	35000	21000	18000
2½	33300	30000	27000	4	30800	16500	16000
3	34000	25000	22000	4½	30000	13300	13200

BERMICO SLEEVE JOINT TYPE

One Coupling Supplied With Each Length

Inside Diam. Ins.	Maximum Gross Wt. (Approx.) Full Car (36 Ft.) in Lbs.	Maximum No. Ft. in 36 Ft. Car (Approx.)	Minimum 30,000 Lb. Car-load Approx. No. Ft.	Inside Diam. Ins.	Maximum Gross Wt. (Approx.) Full Car (36 Ft.) in Lbs.	Maximum No. Ft. in 36 Ft. Car (Approx.)	Minimum 30,000 Lb. Car-load Approx. No. Ft.
2	31600	33000	31300	3½	35300	20000	17000
2½	32700	27000	24700	4	31800	15500	14850
3	33700	23000	20500	4½	31000	12500	12100

BERMICO BENDS AND FITTINGS

SOCKET JOINT TYPE

*BERMICO SLEEVE JOINT TYPE

Inside Diam. Ins.	Radius of Standard 45 and 90 Degree Bends, Ins.	Radius of Standard "S" Bends, Ins.†	Inside Diam. Ins.	Radius of Standard 45 and 90 Degree Bends, Ins.	Radius of Standard "S" Bends, Ins.†
2	18, 24, 36	36	2	18, 24, 36	36
2½	24—36	36	2½	24, 36	36
3	36	36	3	36	36
3½	36	36	3½	36	36
4	36	36	4	36	36
4½	36	36	4½	36	36

*One coupling included with each bend or elbow.

†Standard "S" bend has 20 in. offset.

APPROXIMATE DIMENSIONS OF ELBOWS

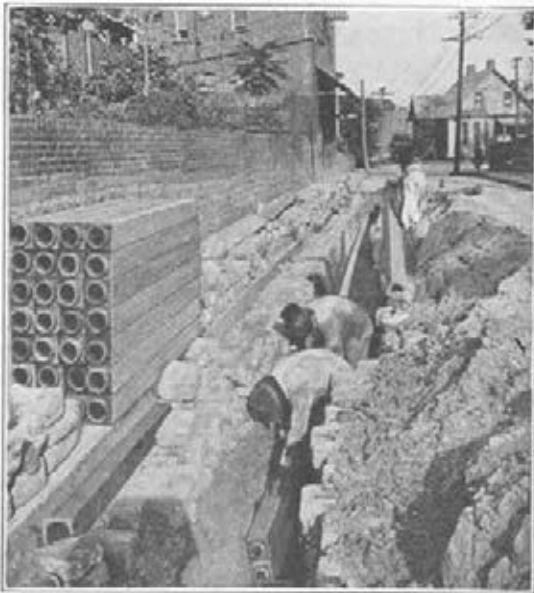
For Socket and BERMICO Sleeve Joint Types

For 90 Degree Elbows

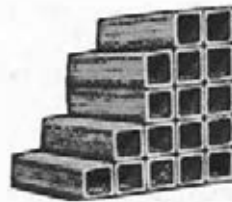
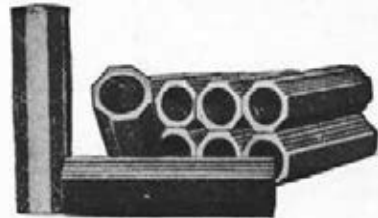
For 45 Degree Elbows

Diameter in Ins.	Radius	"L"	Wall Thickness	Diameter in Ins.	Radius	"L"	Wall Thickness
2	2½	6	¼	2	2½	8½	¼
2½	2½	6½	¼	2½	2½	9	¼
3	3	7	¼	3	3	9	¼
3½	3	7½	¼	3½	3	9½	¼
4	3½	7½	¼	4	3½	10½	¼
4½	4½	8	¼	4½	4½	12	¼

UNDERGROUND CONSTRUCTION MATERIAL



INSTALLING CREOSOTED WOOD CONDUIT

Square Duct, Single
Clay ConduitRound Duct, Single
Clay Conduit

CREOSOTED WOOD CONDUIT

This material is manufactured from yellow pine at plants at Norfolk, Virginia, and Atlanta, Georgia and from Douglas fir at plant at Tacoma, Washington; creosoted full vacuum treatment is the most economical and satisfactory conduit for the carrying of all forms of lead cable and wires. It is $4\frac{1}{2} \times 4\frac{1}{2}$ inches outside measurement and comes in random lengths. Has a three-inch hole in center, a mortise at one end and a tenon on the other. Its cost of laying is low compared with other conduits and when repairs to wires are necessary it is easily accessible.

It is in general use by the large telegraph companies and telephone companies all over the country and by many railroads.

Uses for which it is adapted:

Railroads. Trunking, underground signal wires, high tension transmission lines, yard drainage where clay conduit is easily broken through, and system is usually placed on the surface of the ground.

Telephone Companies. All underground work. **Telegraph Companies.** All underground work.

Police and Fire Alarm Systems. For carrying wires, either high or low tension under ground.

Central Stations. For distribution mains and services.

Specification Creosoted Conduit. Free from large, unsound or loose knots, or other defects which would impair strength. Creosoted steam and vacuum treatment, dead oil of coal tar under pressure either 12 pounds per cubic foot (full cell) or 8 pounds per cubic foot (empty cell) as ordered.

Any additional information regarding the practicability of installing this conduit will be furnished upon request.

VITRIFIED CLAY CONDUIT

The conduit clays are of peculiar character in being naturally compounded by having the proper fluxing materials associated in relatively correct proportions in a high-grade plastic fire clay which possesses certain necessary properties rarely found in other clays.

SINGLE DUCT CONDUIT

Style	Length of Piece Feet	Duct Feet in Piece	Approx. Wt. Lbs. per Duct Ft.	Diam. Duct Inches	Duct Feet in Min. Carload
Square duct, single.....	1.5	1.5	11	$3\frac{1}{2}$	5800
Square duct, single.....	1.5	1.5	15.3	$4\frac{1}{2}$	6700
Round duct, single.....	1.5	1.5	10	$3\frac{1}{4}$	5000
Round duct, single.....	1.5	1.5	12	$4\frac{1}{8}$	

TWO AND THREE DUCT MULTIPLE CONDUIT

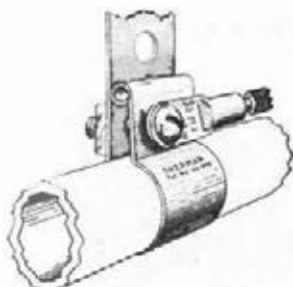
Two duct, multiple.....	2	4	10	$3\frac{1}{4}$	7500
Three duct, multiple.....	2	6	10	$3\frac{1}{4}$	8200

FOUR, SIX AND NINE-DUCT MULTIPLE CONDUIT

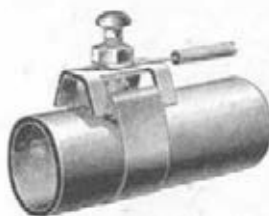
Telephone and Telegraph specifications ordinarily demand a larger percentage off our, six or nine duct than of the smaller forms. These designs are the more economical and permit of considerable saving in installation over the smaller forms.

Four duct, multiple.....	3	12	8	$3\frac{1}{4}$	9300
Six duct, multiple.....	3	18	8	$3\frac{1}{4}$	10000
Nine duct, multiple.....	3	27	10	$3\frac{1}{4}$	10400

CONSTRUCTION MATERIAL



Sherman Ground Clamp

New York Ground Clamp
Type 8

Bridle Ring

SHERMAN GROUND CLAMPS

An all copper, one-piece clamp which can be drawn up tight.

List No.	Size Pipe, Inches	Carton	Std. Pkg.	Approx. Wt. Lbs., Std. Pkg.	List No.	Size Pipe, Inches	Carton	Std. Pkg.	Approx. Wt. Lbs., Std. Pkg.
1	$\frac{3}{8}$ to 1	100	1000	110	3	$\frac{3}{8}$ to 3	50	500	100
2	$\frac{3}{8}$ to 2	100	1000	150	4	$\frac{3}{8}$ to 4	50	250	52

NEW YORK GROUND CLAMPS

These ground clamps are made in three types, A, B and D. Type A is for connecting telephone and telegraph ground wires to pipes or cables. Type B is for making ground connections for electric light wires without the use of solder. Type D for electric light and motor work.

Type	Size	Type	Size	Type	Size
A	1 in. pipe	B	1 in. pipe	D	1 in. pipe
A	2 in. pipe	B	2 in. pipe	D	2 in. pipe
A	3 in. pipe	B	3 in. pipe	D	3 in. pipe
		B	4 in. pipe	D	4 in. pipe

BRIDLE RINGS

Style	Eye	Size, Inches Opening	Shank	Style	Eye	Size, Inches Opening	Shank
A	$1\frac{1}{4}$	$\frac{1}{4}$	$1\frac{1}{4}$	E	$\frac{3}{8}$	$\frac{1}{4}$	$1\frac{1}{4}$
C	$1\frac{1}{2}$	$\frac{1}{4}$	$1\frac{1}{2}$	F	3	$\frac{1}{4}$	$1\frac{3}{4}$



Iron Conduit



Pipe Strap

IRON CONDUIT AND FITTINGS

We carry large stocks of both galvanized and enameled iron conduit and conduit fittings such as bushings, locknuts, etc. Consult our general supply catalog and write for market prices.

PIPE STRAPS—TINNED

These are very useful in supporting Inter-phone cable, conduit, etc.



Drive Ring

List No.	Size	Approx. Quantity per Lb.	Std. Pkg.
291	$\frac{3}{4}$ inch pipe strap	30	1000
292	$\frac{1}{2}$ inch pipe strap	25	1000
293	$\frac{3}{4}$ inch pipe strap	20	500
294	1 inch pipe strap	18	1000
295	$1\frac{1}{2}$ inch pipe strap	16	50
296	$1\frac{1}{2}$ inch pipe strap	10	25

DIAMOND DRIVE RINGS

These rings are designed to accomplish the same purpose as the screw bridle ring, with the added advantage of their use in stucco exterior walls and plaster interior walls over wood where it is difficult to secure wood screw bridle rings.

Diam. of Eye	Wire Gauge No. 11	Length Inches	Diam. of Eye	Wire Gauge No. 9	Length Inches
$\frac{1}{2}$		2	$1\frac{1}{4}$		3

CONSTRUCTION MATERIAL

Hub Guard
No. 7102

No. 7575



No. 7586



No. 7584



No. 7547



No. 7546

HUBBARD HUB GUARD

List No.	Dimensions, Ins.	Weight Lbs.
7100	14 x 18 x $\frac{1}{8}$	100 Pcs.
7101	16 x 18 x $\frac{1}{8}$	1050
7102	14 x 30 x $\frac{1}{8}$	1100
7103	16 x 30 x $\frac{1}{8}$	2400
		2600

HUBBARD STRAIN PLATE

List No.	Type	Dimensions, Ins.	Wt., Lbs.
7575	Standard	4 x 8 x 14	100 Pcs.
7576	Moulding	4 x 8 x 14	75
			75

HUBBARD GUY HOOKS

List No.	Size Steel	Length, Ins.	Diam. Holes	Wt., Lbs.
7584	1 $\frac{3}{4}$ x $\frac{3}{8}$	4	$\frac{1}{8}$	100 Pcs.
7585	1 $\frac{1}{2}$ x $\frac{3}{8}$	3 $\frac{1}{2}$	$\frac{1}{8}$	87
7586	1 $\frac{1}{2}$ x $\frac{3}{8}$	6	$\frac{1}{8}$	59
				88

HUBBARD ROCK GUY BOLT

List No.	Type	Wt., Lbs.
7546	Rock Guy Bolt, 1" round steel, 18" long, 2" inside diam.....	100 Pcs.
		1020

GROUND RODS WITH COPPER WIRE

No. 12 wire soldered to rod; free end five inches long.

List No.	Diam., Inches	Length, Feet	Wt. Lbs., 100 Pcs.
9505	$\frac{1}{2}$	5	340
9506	$\frac{1}{2}$	6	405
9516	$\frac{5}{8}$	6	615
9538	1	8	2200

GROUND RODS WITHOUT COPPER WIRE

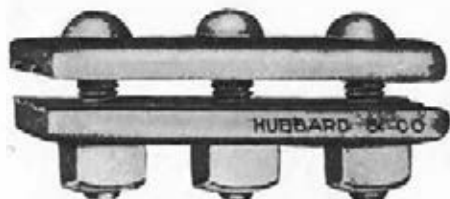
List No.	Diam., Inches	Length, Feet	Wt. Lbs., 100 Pcs.
9555	$\frac{3}{8}$	5	157
9556	$\frac{3}{8}$	6	196
9565	$\frac{1}{2}$	5	300
9566	$\frac{1}{2}$	6	360
9567	$\frac{1}{2}$	7	420
9576	$\frac{5}{8}$	6	600
9577	$\frac{5}{8}$	7	700
9578	$\frac{5}{8}$	8	800
9598	1	8	2167



No. 9506 No. 9566

CONSTRUCTION MATERIAL

Hot Galvanized



No. 7450



No. 7448



No. 7461

HUBBARD ROLLED STEEL GUY CLAMPS

List No.		Weight Lbs. 100 Pcs.
7448	Rolled steel, 2 bolt guy clamp, 3 ins. long (standard type)	135
7449	Rolled steel, 3 bolt guy clamp, 4 ins. long (standard type)	155
7450	Rolled steel, 3 bolt guy clamp, 6 ins. long (standard type)	216
7461	Rolled steel, 3 bolt guy clamp, 6 ins. long (heavy type)	263
7462	Rolled steel, 2 bolt guy clamp, 4 ins. long (heavy type)	174



No. 7125 Step for Wood Poles



No. 7235

HUBBARD POLE STEP FOR WOOD POLES

Hook Head				Button Head			
List No.	Diam., Inches	Length, Inches	Weight Lbs. 100 Pcs.	List No.	Diam., Inches	Length, Inches	Weight Lbs. 100 Pcs.
7123	$\frac{1}{8}$	9	70	7128	$\frac{5}{8}$	9	91
7124	$\frac{3}{8}$	9	87	7129	$\frac{5}{8}$	10	105
7125	$\frac{3}{8}$	10	95				

PEIRCE DETACHABLE POLE STEPS

List No.	Description	Extension from Pole	Weight Lbs. 100 Pcs.
7235	Lag and Plate		34
7236	Step	5 $\frac{1}{8}$ ins.	54



Guy Thimble



No. 7502

HUBBARD GUY THIMBLES

List No.	Size of Strand, Ins.	Size of Guy Rod, Ins.	Shpg. Wt. 100 Pcs.	List No.	Size of Strand, Ins.	Size of Guy Rod, Ins.	Shpg. Wt. 100 Pcs.
7593	$\frac{5}{8}$	1 $\frac{1}{2}$ & $\frac{3}{4}$	9 $\frac{1}{2}$	7595	$\frac{5}{8}$	1	75
7594	$\frac{1}{2}$	$\frac{3}{4}$ & $\frac{1}{2}$	22				

HUBBARD DROP FORGED EYE NUTS

List No.	Diam. Bolt	Dimensions in Inches	Weight Lbs. 100 Pcs.	List No.	Diam. Bolt	Dimensions in Inches	Weight Lbs. 100 Pcs.
7502	$\frac{5}{8}$	1 $\frac{1}{2}$ x 1 $\frac{1}{8}$ x $\frac{1}{2}$ x 3 $\frac{1}{8}$	60	7503	$\frac{3}{4}$	1 $\frac{1}{2}$ x 1 $\frac{1}{8}$ x $\frac{1}{2}$ x 3 $\frac{1}{8}$	56

CONSTRUCTION MATERIAL



Machine Bolts



Carriage Bolts

Hubbard Machine Bolts

SQUARE HEADS, SQUARE NUTS AND FINISHED POINTS

Hot Galvanized

 $\frac{3}{8}$ INCH BOLTS

List No.	Length, Inches	Length of Thread, Inches	Weight Lbs., 100 Pcs.
9601	1	1	7.3
9601 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	8.3
9601 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	9.3
9602	2	2	10.3
9602 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	11.7
9603	3	3	13.1

List No.	Length, Inches	Length of Thread, Inches	Weight Lbs., 100 Pcs.
9603 $\frac{1}{2}$	3 $\frac{1}{2}$	3	14.6
9604	4	3	16
9604 $\frac{1}{2}$	4 $\frac{1}{2}$	3	17.5
9605	5	3	18.9
9605 $\frac{1}{2}$	5 $\frac{1}{2}$	3	20.4
9606	6	3	21.8

 $\frac{1}{2}$ INCH BOLTS

List No.	Length, Inches	Length of Thread, Inches	Weight Lbs., 100 Pcs.
9701	1	1	16
9701 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	17.3
9701 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	18.5
9702	2	2	21
9702 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	23.6
9703	3	3	26.1
9703 $\frac{1}{2}$	3 $\frac{1}{2}$	3	28.7
9704	4	3	31.2
9704 $\frac{1}{2}$	4 $\frac{1}{2}$	3	33.8
9704 $\frac{3}{4}$	4 $\frac{3}{4}$	3	35

List No.	Length, Inches	Length of Thread, Inches	Weight Lbs., 100 Pcs.
9705	5	3	36.3
9706	6	3	41.4
9707	7	3	46.5
9708	8	4	51.6
9710	10	4	61.8
9712	12	4	72
9714	14	6	82.2
9716	16	6	92.4
9718	18	6	102.6
9720	20	6	112.8

 $\frac{5}{8}$ INCH BOLTS

List No.	Length, Inches	Length of Thread, Inches	Weight Lbs., 100 Pcs.
9801 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	32
9802	2	2	36
9802 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	40
9803	3	3	44
9803 $\frac{1}{2}$	3 $\frac{1}{2}$	3	48
9804	4	3	52
9805	5	3	59
9806	6	3	66
9807	7	3	74
9808	8	4	82

List No.	Length, Inches	Length of Thread, Inches	Weight Lbs., 100 Pcs.
9810	10	4	98
9812	12	4	114
9814	14	6	130
9816	16	6	146
9818	18	6	150
9820	20	6	164
9822	22	6	178
9824	24	6	192
9826	26	6	206
9828	28	6	220

 $\frac{3}{4}$ INCH BOLTS

List No.	Length, Inches	Length of Thread, Inches	Weight Lbs., 100 Pcs.
9901 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	49
9902	2	2	55
9902 $\frac{1}{2}$	2 $\frac{1}{2}$	2 $\frac{1}{2}$	60
9903	3	3	66
9903 $\frac{1}{2}$	3 $\frac{1}{2}$	3	71
9904	4	3	77
9905	5	3	88
9906	6	3	99
9907	7	3	106
9908	8	4	112

List No.	Length, Inches	Length of Thread, Inches	Weight Lbs., 100 Pcs.
9910	10	4	134
9912	12	4	156
9914	14	6	178
9916	16	6	200
9918	18	6	222
9920	20	6	244
9922	22	6	266
9924	24	6	288
9926	26	6	300
9928	28	6	322

HUBBARD CARRIAGE BOLTS

Hot Galvanized

Carriage bolts are used for attaching the braces to cross arms on most overhead lines, the standard N. E. L. A. bolt being $\frac{3}{8}$ x 4, $\frac{1}{2}$ x 4 and 5 inches and that of the A. T. & T. Company $\frac{3}{8}$ x 4 inches.

 $\frac{3}{8}$ INCH BOLTS

List No.	Length, Inches	Length of Thread, Inches	Weight Lbs., 100 Pcs.
9633	3	1 $\frac{1}{4}$	12.9
9633 $\frac{1}{2}$	3 $\frac{1}{2}$	1 $\frac{1}{4}$	14.3
9634	4	1 $\frac{1}{4}$	16.8
9634 $\frac{1}{2}$	4 $\frac{1}{2}$	1 $\frac{1}{4}$	17.2
9635	5	1 $\frac{1}{4}$	18.7
9635 $\frac{1}{2}$	5 $\frac{1}{2}$	1 $\frac{1}{4}$	20.1
9636	6	1 $\frac{1}{4}$	21.6

 $\frac{1}{2}$ INCH BOLTS

List No.	Length, Inches	Length of Thread, Inches	Weight Lbs., 100 Pcs.
9643	3	2 $\frac{1}{2}$	24.7
9643 $\frac{1}{2}$	3 $\frac{1}{2}$	3	27.3
9644	4	3	29.8
9644 $\frac{1}{2}$	4 $\frac{1}{2}$	3	32.4
9645	5	3	34.9
9645 $\frac{1}{2}$	5 $\frac{1}{2}$	3	37.5
9646	6	3	40

CONSTRUCTION MATERIAL

HOT GALVANIZED



Gimlet Point (Lag Screw)



Fetter Drive (Lag Screw)

Hubbard Lag Screws

Unless otherwise specified Fetter drive threads will be furnished on all orders, except for $\frac{1}{4}$ and $\frac{5}{16}$ inch lags, which are furnished with gimlet point only.

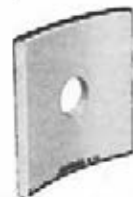
$\frac{1}{4}$ INCH			$\frac{3}{8}$ INCH		
List No.	Length, Inches	Weight Lbs., 100 Pcs.	List No.	Length, Inches	Weight Lbs., 100 Pcs.
9722	2	2.8	9742 $\frac{1}{4}$	2 $\frac{1}{4}$	7.8
9722 $\frac{1}{2}$	2 $\frac{1}{2}$	3.3	9742 $\frac{1}{2}$	2 $\frac{1}{2}$	8.3
			9743	3	9.6
			9743 $\frac{1}{2}$	3 $\frac{1}{2}$	10.9
9732	2	4.7	9744	4	12.2
9732 $\frac{1}{2}$	2 $\frac{1}{2}$	5.6	9744 $\frac{1}{2}$	4 $\frac{1}{2}$	13.5
9733	3	6.5	9745	5	14.8
9733 $\frac{1}{2}$	3 $\frac{1}{2}$	7.4	9746	6	17.4
$\frac{1}{2}$ INCH			$\frac{5}{8}$ INCH		
9752 $\frac{1}{2}$	2 $\frac{1}{2}$	16.7	.....	.....	.....
9753	3	19	.....	.....	.....
9753 $\frac{1}{2}$	3 $\frac{1}{2}$	21.3	.....	.....	.....
9754	4	23.6	9764	4	35.1
9754 $\frac{1}{2}$	4 $\frac{1}{2}$	25.9	9764 $\frac{1}{2}$	4 $\frac{1}{2}$	38.9
9755	5	28.2	9765	5	42.7
9755 $\frac{1}{2}$	5 $\frac{1}{2}$	30.5	9765 $\frac{1}{2}$	5 $\frac{1}{2}$	46.5
9756	6	32.8	9766	6	50.3
9756 $\frac{1}{2}$	6 $\frac{1}{2}$	35.1	.....	.....	.....
9757	7	37.4	.....	.....	.....



Round Washer



Square Washer



Stubbing Washer

Hubbard Round Washers

List No.	Dimensions in Inches				Thickness Gauge	Weight Lbs. per 1000
	Outside Diameter	Diameter Hole	Size Bolt Machine	Size Bolt Carriage		
7801	1		$\frac{3}{8}$	$\frac{3}{8}$	14	16
7802	1 $\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{8}$	14	30
7803	1 $\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{8}$	12	42
7805	1 $\frac{3}{4}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{1}{2}$	10	75
7806	2	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{5}{8}$	9	112

Hubbard Square Washers

List No.	Dimensions in Inches			Size, Bolt or Rods	Weight Lbs. per 1000
	Size Washer	Diameter Hole			
7812	2 x 2 x $\frac{1}{8}$		$\frac{1}{2}$	$\frac{1}{2}$ or $\frac{3}{8}$	145
7814	2 $\frac{1}{4}$ x 2 $\frac{1}{4}$ x $\frac{1}{8}$		$\frac{1}{2}$	$\frac{3}{8}$ or $\frac{3}{4}$	240
7816	3 x 3 x $\frac{1}{8}$		$\frac{1}{2}$	$\frac{3}{8}$ or $\frac{3}{4}$	435
7817	3 x 3 x $\frac{1}{4}$		$\frac{1}{2}$	$\frac{5}{8}$ or $\frac{3}{4}$	585
7818	4 x 4 x $\frac{1}{8}$		$\frac{1}{2}$	$\frac{5}{8}$ or $\frac{3}{4}$	830
7819	4 x 4 x $\frac{1}{4}$		$\frac{1}{2}$	$\frac{5}{8}$ or $\frac{3}{4}$	1170
7820	4 x 4 x $\frac{1}{2}$		$\frac{1}{2}$	1	2150

Hubbard Stubbing Washer

The stubbing washer is used in securing a pole, rotted off at the butt, to a new stub.

List No.	Dimensions in Inches			Size Bolt	Weight Lbs., 100 Pcs.
	Size Washer	Diameter Hole			
7825	3 $\frac{1}{4}$ x 3 $\frac{1}{4}$ x $\frac{1}{4}$	$\frac{3}{4}$		$\frac{5}{8}$	75

CONSTRUCTION MATERIAL



Hubbard Anchor Rods

HOT GALVANIZED

The eyes are drop-forged. Rods, $\frac{3}{4}$ inch diameter and under, have $3\frac{1}{2}$ inches of rolled threads. The 1 and $1\frac{1}{4}$ inch rods have $3\frac{1}{2}$ inches of cut threads. Rods with two eyes furnished at the same prices. All prices include square nut, but no washers. Rods with welded eyes supplied at same prices.

List No.	Diameter, Inches	Length, Feet	Size Eye, Inches		Weight Lbs., 100 Pcs.
			Width	Length	
7405	$\frac{1}{2}$	5	$\frac{3}{4}$	1	320
7406	$\frac{1}{2}$	6	$\frac{3}{4}$	1	375
7407	$\frac{1}{2}$	7	$\frac{3}{4}$	1	430
7415	$\frac{5}{8}$	5	$1\frac{1}{2}$	2	540
7416	$\frac{5}{8}$	6	$1\frac{1}{2}$	2	640
7417	$\frac{5}{8}$	7	$1\frac{1}{2}$	2	740
7418	$\frac{5}{8}$	8	$1\frac{1}{2}$	2	840
7426	$\frac{3}{4}$	6	$1\frac{1}{2}$	2	910
7427	$\frac{3}{4}$	7	$1\frac{1}{2}$	2	1060
7428	$\frac{3}{4}$	8	$1\frac{1}{2}$	2	1210
7429	$\frac{3}{4}$	9	$1\frac{1}{2}$	2	1360
7438	1	8	$1\frac{1}{2}$	2	2230
7440	1	10	$1\frac{1}{2}$	2	2760
7444	$1\frac{1}{4}$	10	$1\frac{3}{4}$	$2\frac{1}{4}$	4400



Hubbard Double Arming Bolts

HOT GALVANIZED

The double arming bolt, used with four square washers, represents a much more economical means of tying two crossarms together than the old method of a wooden block with a hole through it and a long machine bolt.

List No.	Dimensions, Inches		Weight Lbs., 100 Pcs.	List No.	Dimensions, Inches		Weight Lbs., 100 Pcs.
	Diameter	Length			Diameter	Length	
9842	$\frac{1}{2}$	12	76	9870	$\frac{5}{8}$	20	198
9844	$\frac{1}{2}$	14	85	9872	$\frac{5}{8}$	22	218
9846	$\frac{1}{2}$	16	93	9874	$\frac{5}{8}$	24	238
9848	$\frac{1}{2}$	18	102	9882	$\frac{3}{4}$	12	188
9850	$\frac{1}{2}$	20	110	9884	$\frac{3}{4}$	14	212
9852	$\frac{1}{2}$	22	120	9886	$\frac{3}{4}$	16	236
9854	$\frac{1}{2}$	24	128	9888	$\frac{3}{4}$	18	260
9862	$\frac{5}{8}$	12	128	9890	$\frac{3}{4}$	20	284
9864	$\frac{5}{8}$	14	143	9892	$\frac{3}{4}$	22	308
9866	$\frac{5}{8}$	16	158	9894	$\frac{3}{4}$	24	332
9868	$\frac{5}{8}$	18	178				



Hubbard Drop Forged Eye Bolts

HOT GALVANIZED

Hubbard Eye Bolts are made with the drop forged oval eyes. All bolts are rolled threaded 6 inches. Eye bolts are measured from the center of the eye to the end of the bolt. Prices include one square nut.

List No.	Dimensions, Inches		Weight Lbs., 100 Pcs.	List No.	Dimensions, Inches		Weight Lbs., 100 Pcs.
	Diameter	Length			Diameter	Length	
9936	$\frac{1}{2}$	6	55	9964	$\frac{5}{8}$	14	148
9938	$\frac{1}{2}$	8	65	9966	$\frac{5}{8}$	16	164
9940	$\frac{1}{2}$	10	75	9968	$\frac{5}{8}$	18	180
9942	$\frac{1}{2}$	12	85	9970	$\frac{5}{8}$	20	196
9944	$\frac{1}{2}$	14	95	9976	$\frac{3}{4}$	6	116
9946	$\frac{1}{2}$	16	105	9978	$\frac{3}{4}$	8	140
9948	$\frac{1}{2}$	18	110	9980	$\frac{3}{4}$	10	164
9950	$\frac{1}{2}$	20	120	9982	$\frac{3}{4}$	12	188
9956	$\frac{5}{8}$	6	84	9984	$\frac{3}{4}$	14	212
9958	$\frac{5}{8}$	8	100	9986	$\frac{3}{4}$	16	236
9960	$\frac{5}{8}$	10	116	9988	$\frac{3}{4}$	18	260
9962	$\frac{5}{8}$	12	132	9990	$\frac{3}{4}$	20	284

Western Electric

CONSTRUCTION MATERIAL

Flat Cross Arm Braces, Hot Galvanized No. 8128

Hubbard Flat Cross Arm Braces

Hubbard Cross Arm Braces are made only from new open hearth steel.

1½ INCH X ½ INCH BRACES

List No.	Length Overall	Weight Lbs., 100 Pcs.
8020	20	142
8022	22	156
8024	24	170
8026	26	184
8028	28	198
8030	30	212
8032	32	226

1¼ INCH X ¼ INCH BRACES

List No.	Length Overall	Weight Lbs., 100 Pcs.
8120	20	167
8122	22	183
8124	24	200
8126	26	216
8128	28	233
8130	30	250
8132	32	266

Diagonal Brace No. 8050

Back Brace 8052

Vertical Brace No. 8054

Hubbard Extension Fixtures HOT GALVANIZED

All braces are made of heavy open hearth steel angles. The diagonal braces being 2 x 2 x ¼ inch and the other braces 2 x 2 x ¼ inch angle.

List No.	Description	Length Overall Inches	Size of Angle, Inches	Weight Lbs., 100 Pcs.
8050	Diagonal	83	2 x 2 x ¼	1750
8051	Back	54½	2 x 2 x ¼	1350
8052	Back	66½	2 x 2 x ¼	1665
8054	Vertical	30½	1½ x 1¼ x ¼	745

No. 7966

No. 7969. Angle Steel Back Braces

Hubbard Cross Arm Back Braces

List No.	Size Steel, Inches	Length	Weight, Lbs., 100 Pcs.	List No.	Size Steel, Inches	Length	Weight Lbs., 100 Pcs.
7964	1½ x 1½ x ¼	4 ft.	500	7967	1½ x 1½ x ¼	7 ft. 10 in.	1300
7965	1½ x 1½ x ¼	5 ft.	750	7969	1½ x 1½ x ¼	9 ft. 1 in.	1740
7966	1½ x 1½ x ¼	6 ft.	1000				

Hubbard Steel Cable Cross Arms

Angle steel cross-arms for telephone cables are furnished complete with A. T. & T. Co. one-bolt messenger clamps and clamp bolts, but without braces or brace bolts. No. 8938 is the standard A. T. & T. Co. arm.

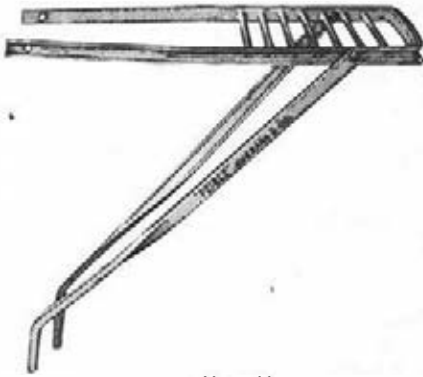


Steel Cable Cross Arm

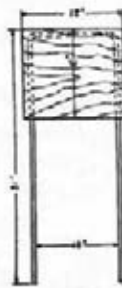
List No.	No. of Cables	Length, Inches	Spacing Between Cables, Ins.— Poles Side	Size Angle, Inches	Wt., Lbs.
8923	4	36	20	3 x 3 x ¼	22
8924	6	48	20	3 x 3 x ¼	30
8933	4	36	20	5 x 3 x ¼	32
8934	6	48	20	5 x 3 x ¼	44
8938	4	48	16	5 x 3 x ¼	65

CONSTRUCTION MATERIAL

Hot Galvanized



No. 755



No. 751
Wood Seat



No. 755



Pole Balcony No. 9035

Peirce Pole Seats

The frames and braces of all styles are of 1 x 1/2 inch channel steel. The wood seats are 1 1/4 inch cypress, boiled in creosote.

List No.	Size of Seat, Inches	Style of Seat	Wt. Lbs., 100 Pcs.	List No.	Size of Seat, Inches	Style of Seat	Wt. Lbs., 100 Pcs.
751	11 x 12	Wood, creosoted	1260	755	12 x 13 3/4	Steel, galvanized	1400
753	11 x 20	Wood, creosoted	1400	757	12 x 11	Steel, galvanized	1260

Hubbard Pole Balcony

Upright angles are made of 1 1/2 x 1 1/2 x 1/4 inch steel, the platform angles of 1 3/4 x 1 3/4 x 1/4 inch, and the guard rail of 1/4 x 1 1/4 inch flat steel.

List No.	Size of Seat	Style of Seat	Wt., Lbs., each
9035	14 x 29 3/4	Wood Painted	65



No. 8901



No. 8903



No. 8905



No. 8906



No. 8907



No. 8911



No. 8915

Hubbard Cable Suspension Clamps

List No.	Type	Length, Ins.	Size Strand, Ins.	Wt. Lbs., 100 Pcs.	List No.	Type	Length, Ins.	Size Strand, Ins.	Wt. Lbs., 100 Pcs.
8901	One-bolt	2 1/2	1/4 to 1/2	74	8903	Three-bolt	5 3/4	1/4 to 1/2	220

Hubbard Reinforcing and Safety Straps For Suspension Clamps

List No.	Straps	Size Steel, Inches	Wt. Lbs., 100 Pcs.	List No.	Strap	Size Steel, Inches	Wt. Lbs., 100 Pcs.
8905	Reinforcing	1 1/2 x 1/2	36	8907	Combination	1 3/4 x 1/2	116
8906	Safety	1 1/2 x 3/8	76				

Hubbard Universal Messenger Hangers

List No.	Dimensions, Inches	Length, Inches	Legs, Inches	Wt. Lbs., 100 Pcs.	List No.	Dimensions, Inches	Length, Inches	Legs, Inches	Wt. Lbs., 100 Pcs.
8911	2 x 1 1/2		5 x 3 1/4	300	8912	1 1/4 x 3/8		5 x 3 1/4	230

Hubbard Non-breakable Messenger Hangers

List No.	Size Cable, Inches	Wt. Lbs., 100 Pcs.	List No.	Size Cable, Inches	Wt. Lbs., 100 Pcs.
8914	1/4 and smaller	150	8915	3/8 and larger	150

CONSTRUCTION MATERIAL



No. 8930



No. 8929



No. 8925



No. 8927



No. 9017



No. 9145

Hubbard Crossover Clamps

HOT GALVANIZED

Used for joining two cable messengers when they cross each other at right angles.

List No.	Description	Size of Sides, Inches	Weight Lbs., 100 Pcs.
8930	Drop Forged	$1\frac{1}{2} \times 3\frac{3}{4} \times \frac{1}{2}$	160

Hubbard Reinforcing Link

HOT GALVANIZED

These links are used on each side of the cable suspension clamp to relieve side strains at corners in the line.

List No.	Length	Dimensions in Inches	Weight Lbs., 100 Pcs.
8929	$8\frac{3}{8}$	Size of Steel $\frac{1}{2}$	116

Hubbard Conduit Straps

Conduit Straps are used for attaching standard 2 or 3 inch vertical conduit to wood poles.

The straps are made of $\frac{1}{4} \times 1\frac{1}{4}$ inch steel and have holes for $\frac{1}{2}$ inch lag screws.

List No.	Nominal Size Conduit, Inches	Type	Wt. Lbs., 100 Pcs.	List No.	Nominal Size Conduit, Inches	Type	Wt. Lbs., 100 Pcs.
8925	2	Single	78	8927	2	Double	106
8926	3	Single	100	8928	3	Double	150

Hubbard Telegraph & Telephone Pothead Supports

HOT GALVANIZED

Screwed into pole under terminal box and clamped around cable.

No.	Length	Dimensions, Inches	Diameter	Wood Screw Thread, In.	Wt. Lbs., 100 Pcs.
9017	$12\frac{3}{4}$		$\frac{5}{8}$	5	138

Hubbard Dowell Pins for Clay Conduit

HOT GALVANIZED

List No.	Size, Inches	Weight Lbs., 100 Pcs.
9145	$\frac{5}{16} \times 3$	8

Hubbard Cable Duct Shields

HOT GALVANIZED

Cable Duct Shields are used to protect cable sheaths at the entrances to ducts.



No. 9140

List No.	Diameter	Length	Weight Lbs., 100 Pcs.
9140	3	6	61
9142	$2\frac{5}{8}$	9	170

Hubbard Manhole Ladders

HOT GALVANIZED

The rungs pass through the sides and are riveted over on the outside. Rungs are spaced 15 inches apart. The bottom rung is 15 inches from the bottom of the ladder.

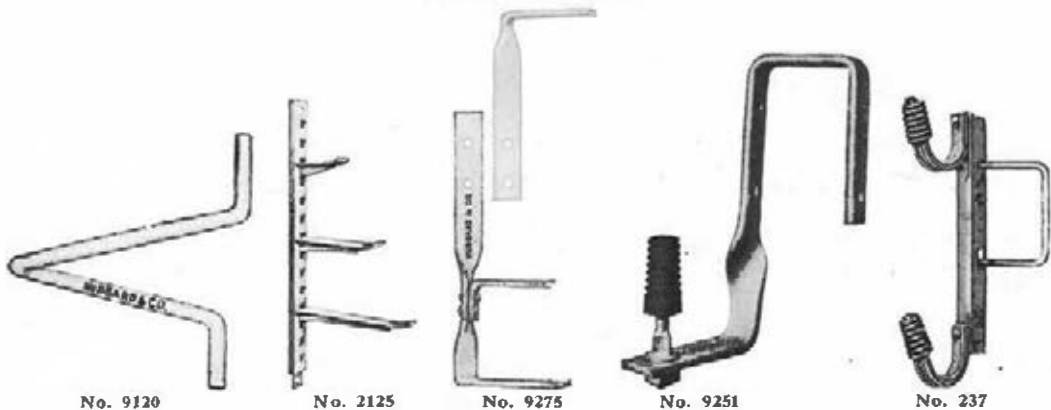


No. 9112

List No.	No. of Rungs	Length, Ft.	Rung Spacing	Width Inside, Inches	Wt. Lbs., Each.
9110	4	6	15	12	23
9111	5	$6\frac{1}{2}$	15	12	$24\frac{1}{2}$
9112	6	8	15	12	30
9113	7	10	15	12	38
9114	8	11	15	12	42
9115	9	12	15	12	46
9116	10	13	15	12	49
9117	11	14	15	12	53

CONSTRUCTION MATERIAL

HOT GALVANIZED



Hubbard Pulling-in Irons for Manholes

List No.	Size Steel, Inch	From Wall, Inches	Wt. Lbs., per 100 Pcs.
9120	$\frac{3}{8}$	8	600

Peirce Presteel Cable Racks

RACK SECTIONS

List No.	No. of Holes	Dimensions, Inches			Wt. Lbs., 100 Pcs.	List No.	No. of Holes	Dimensions, Inches			Wt. Lbs., 100 Pcs.
		Hole Spacing	Length Overall	Bolt Hole Spacing				Hole Spacing	Length Overall	Bolt Hole Spacing	
2124	8	$1\frac{1}{4}$	15	$13\frac{5}{8}$	120	2126	18	$1\frac{1}{2}$	30	$28\frac{1}{2}$	310
2125	14	$1\frac{1}{2}$	24	$22\frac{1}{2}$	260						

HOOKS

List No.	Dimensions, Inches		Wt. Lbs., 100 Pcs.	List No.	Dimensions, Inches		Wt. Lbs., 100 Pcs.
	Extensions from Face of Rack	Size of Steel			Extensions from Face of Rack	Size of Steel	
2131	4	$1\frac{1}{2} \times 1\frac{1}{8} \times \frac{3}{8}$	40	2133	10	$1\frac{1}{2} \times 1\frac{1}{8} \times \frac{3}{8}$	112
2132	$7\frac{1}{2}$	$1\frac{1}{2} \times 1\frac{1}{8} \times \frac{3}{8}$	86				

Hubbard Transposition Brackets

The A. T. & T. Co. Standard Transposition Bracket for 4 wire transpositions.

List No.	Dimensions, Inches		Wt. Lbs., 100 Pcs.
	Steel	Cross-arm	
9275	$1\frac{1}{2} \times \frac{3}{8}$	$3\frac{1}{4} \times 4\frac{1}{4}$	693

Hubbard Standard Transposition Brackets

Nos. 9250 and 9252 are similar to No. 9251, except that the Western Union Standard bracket No. 9250 does not have the $\frac{3}{8}$ -inch round hole for lagging the bracket to the arm. No. 9251 is the A. T. & T. Co. standard for one wire and No. 9252 for two wires on transposition insulators. The A. T. & T. Co. brackets use $\frac{3}{8} \times 4\frac{1}{2}$ -inch carriage bolts.

List No.	Size of Steel, Inches	For Cross-arms		Wt. Lbs., 100 Pcs.	List No.	Size of Steel, Inches	For Cross-arms		Wt. Lbs., 100 Pcs.
		Size, Inches					Size, Inches		
9250	$1\frac{1}{4} \times \frac{1}{8}$	3 x 4		230	9252	$1\frac{1}{2} \times \frac{3}{8}$	$3\frac{1}{4} \times 4\frac{1}{4}$		368
9251	$1\frac{1}{4} \times \frac{1}{8}$	$3\frac{1}{4} \times 4\frac{1}{4}$		242					

Peirce Multipoint Transposition Brackets

No. 437 is used for transposing the four wires of two toll circuits on which a phantom circuit is connected, and No. 237 for 2-wire transposition.

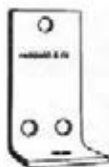
List No.	Size Back, Inches	Std. Pkg.	Wt. Lbs., 100 Pcs.
237	Two-point.....	$1 \times 1 \times \frac{1}{8}$	20
437	Four-point.....	$1\frac{1}{4} \times 1\frac{1}{4} \times 1\frac{1}{8}$	10

SINGLE POINT UNDERHANG TRANSPOSITION BRACKETS

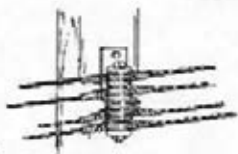


List No.	Dimensions, Inches		Std. Pkg.	Wt. Lbs., 100 Pcs.
	Channel	U-bolt		
110	$\frac{3}{4}$	$\frac{3}{8}$	25	88
111	1	$\frac{3}{8}$	25	144
114	1	$\frac{3}{8}$	25	160
115	1	..	25	144

CONSTRUCTION MATERIAL



No. 9200



No. 9202



No. 9204

Hubbard Telephone Distributing Brackets

HOT GALVANIZED

No. 9202 for running twisted telephone wires on poles.

No. 9200 is the standard house bracket of the A. T. & T. Co. for dead ending twisted telephone wires on buildings.

List No.	Style Bracket	Size Steel, Inches	Length, Legs, Inches	Wt. Lbs., 100 Pcs.
9200	L House	1 3/4 x 1 1/2	2 1/8 x 3 1/8	51
9202	L Pole	2 x 1 1/2	3 x 4	87

Hubbard Corner House Brackets

The corner bracket is used where the lead from the pole comes to the building at an angle.

List No.	Corner Bracket	Size of Steel, Inches	Lengths of Legs, Inches	Wt. Lbs., 100 Pcs.
9204	Corner	1 1/2 x 1 1/2	4 x 5	65
9205	Corner	1 1/2 x 1 1/2	2 7/8 x 10 3/8	90



No. 9225



No. 9226



No. 2920



No. 2922



No. 2924

PORCELAIN KNOBS FOR TELEPHONE BRACKETS

List No.	Type	Diameter Hole, Inches	Height, Inches	Wt. Lbs., 100 Pcs.
9225	Two groove	3/4	1 1/2	18
9226	Four groove	1/2	2 1/4	33

BOLTS FOR TELEPHONE BRACKETS

List No.	Type	Size of Bolt, Inches	Wt. Lbs., 100 Pcs.
9232	Stove	1 1/2	6
9603	Machine	3/8	13.1
9605 1/2	Machine	7/8	18.9

Peirce Single Knob Fixtures

These small fixtures are for either telephone or lighting wires, but for the latter they should only be used in localities not visited by snow and sleet.

No. 2920 is a new design of the Peirce Knob Screw in which the shank is lengthened to 2 1/2 inches.

No. 2922 fixture can be fastened to wood buildings with a screw in the center hole and to brick buildings with a Peirce Expansion Bolt, making a strong fastening and one which is especially adapted to duplex service wires.

No. 2924 is a fixture used for telephone wires, in which the knob is strapped to the wall.

List No.	Type	Size of Screw Holes, Inches	Wt. Lbs., 100 Pcs.
2920	Knob Screw	1 1/8 x 2 1/2	44
2922	Knob Swinging	1 1/8	77
2924	Knob Strap	1 1/8	55

Peirce Distributing Knob Racks

HOT GALVANIZED FOR TELEPHONE WIRES

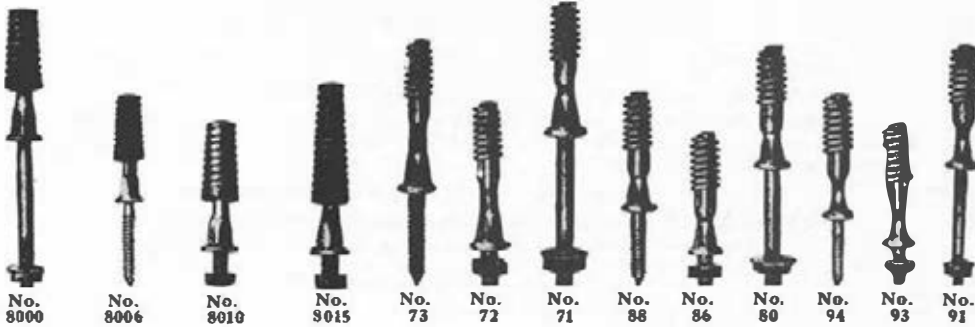
These racks are used for running twisted pair telephone wires along poles and for taking up service drops. They are made up of two stamped steel eyes securely riveted to a 1 3/4 x 5/8 inch channel.

List No.	No. of Knobs	Length Overall, Ins.	Size Channel, Ins.	Extension from Pole, Ins.	Wt. Lbs., 100 Pcs.
2900	4	10 3/8	1 3/4 x 5/8	2 3/8	348
2901	6	13 3/4	1 3/4 x 5/8	2 3/8	460
2902	8	16 1/2	1 3/4 x 5/8	2 3/8	545



No. 2902

CONSTRUCTION MATERIAL



Hubbard Standard Western Union Steel Pins

HOT GALVANIZED

These pins are made of stiff, high carbon steel with clean threads, square nuts and clipped, round washers, and are for use with standard insulators having 1 inch pin holes.

LONG SHANK PINS
For Wood Cross Arms

List No.	Diameter, Inches	Length, Inches		Wt. Lbs., 100 Pcs.	List No.	Diameter, Inches	Length, Inches		Wt. Lbs., 100 Pcs.
		Above Shoulder	Below Shoulder				Above Shoulder	Below Shoulder	
8000	$\frac{1}{2}$	$4\frac{1}{4}$	5	74	8005	$\frac{5}{8}$	$4\frac{1}{4}$	5	106

LAG SCREW PINS
For Wood Arms and Poles

8006	$\frac{1}{2}$	$4\frac{1}{4}$	3	63	8007	$\frac{5}{8}$	$4\frac{1}{4}$	3	90
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SHORT SHANK PINS

For Steel Cross Arms and Transposition Brackets

8010	$\frac{1}{2}$	4	1	53	8015	$\frac{5}{8}$	4	1	74
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SHORT SHANK PINS

With Long Cob for Transposition Insulators

8011	$\frac{1}{2}$	5	1	59	8016	$\frac{5}{8}$	5	1	77
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Peirce Forged Steel Pins

FOR LOW VOLTAGE INSULATORS

HOT GALVANIZED

For electric light, telephone and telegraph lines, on which insulators with 1 inch pin holes are used.

LONG SHANK TYPE
For Wood Cross Arms

List No.	Diameter, Inches	Length, Inches		Overall	Wt. Lbs., 100 Pcs.	List No.	Diameter, Inches	Length, Inches		Overall	Wt. Lbs., 100 Pcs.
		Above Shoulder	Below Shoulder					Above Shoulder	Below Shoulder		
71	$\frac{1}{2}$	$4\frac{3}{4}$	$4\frac{3}{4}$	$9\frac{1}{2}$	81	84	$\frac{5}{8}$	6	$5\frac{1}{2}$	$11\frac{1}{2}$	132
74	$\frac{1}{2}$	$4\frac{3}{4}$	$5\frac{1}{2}$	$10\frac{1}{4}$	86	83	$\frac{5}{8}$	6	$6\frac{1}{2}$	$12\frac{1}{2}$	140
80	$\frac{5}{8}$	$4\frac{3}{4}$	$4\frac{3}{4}$	$9\frac{1}{2}$	115	90A	$\frac{1}{2}$	$4\frac{3}{4}$	$5\frac{1}{2}$	$10\frac{1}{2}$	177
81	$\frac{5}{8}$	$4\frac{3}{4}$	$5\frac{1}{2}$	$10\frac{1}{4}$	122	90	$\frac{5}{8}$	6	$5\frac{3}{4}$	$11\frac{3}{4}$	192
81A	$\frac{5}{8}$	$4\frac{3}{4}$	$6\frac{1}{2}$	$11\frac{1}{4}$	129	91	$\frac{3}{4}$	6	$6\frac{1}{4}$	$12\frac{3}{4}$	205
82	$\frac{5}{8}$	6	$4\frac{3}{4}$	$10\frac{3}{4}$	126						

SHORT SHANK TYPE
For Steel Cross Arms and Brackets

72	$\frac{1}{2}$	$4\frac{3}{4}$	$1\frac{1}{4}$	6	67	93A	$\frac{3}{4}$	$4\frac{3}{4}$	$1\frac{1}{2}$	$6\frac{1}{4}$	107
86	$\frac{5}{8}$	$4\frac{3}{4}$	$1\frac{1}{4}$	6	85	93	$\frac{3}{4}$	6	$1\frac{1}{2}$	$7\frac{1}{2}$	123
87	$\frac{5}{8}$	6	$1\frac{1}{4}$	$7\frac{1}{4}$	96						

LAG SCREW TYPE
For Poles and Transformer Wiring

The Nos. 73, 88 and 94 Pins with lag screw shanks are being largely used wherever attachments of vertical runs of wires down pole are necessary as in feeders to arc, signal wires, etc.

73	$\frac{1}{2}$	$4\frac{3}{4}$	3	$7\frac{3}{4}$	65	89	$\frac{5}{8}$	$7\frac{1}{2}$	4	$11\frac{1}{2}$	120
75	$\frac{1}{2}$	6	3	9	76	94	$\frac{5}{8}$	6	4	10	130
88	$\frac{5}{8}$	$4\frac{3}{4}$	3	$7\frac{3}{4}$	88						

CONSTRUCTION MATERIAL

Peirce Forged Steel Pins

WITH LEAD THREADS FOR LOW VOLTAGE INSULATORS

HOT GALVANIZED

From a careful study of the action of lead thread pins in actual service during the past ten years, we have found that a lead thread pin must possess the following characteristics in order to stand up properly under actual working conditions.

Threads Must Be Uniform in Size and Shape

To properly fit the insulator pin hole the threads must be uniform in size and shape.

The Peirce method of casting threads on pins guarantees a thread accurate in size and shape and entirely free from fins.

Lead Must Adhere to Pin

There must be a perfect bond between the lead and zinc coating on the pin to positively prevent removal of the lead.

Peirce pins in addition to being scored and notched are so prepared that when the lead thread is cast, it actually becomes a part of the pin.

Lead Must Be of Proper Hardness

The lead used must be of sufficient hardness to prevent flowing under the pressure of the insulator and yet not hard enough to be brittle.



No. 980



No. 986



No. 988



No. 1081

LONG SHANK TYPE

For Wood Cross Arms

List No.	Diameter, Inches	Length, Inches			Wt. Lbs., 100 Pcs.
		Above Shoulder	Below Shoulder	Total	
971	1/2	4 3/4	4 3/4	9 1/2	108
974	1/2	4 3/4	5 1/2	10 1/4	113
980	5/8	4 3/4	4 3/4	9 1/2	135
981	5/8	4 3/4	5 1/2	10 1/4	142
981A	5/8	4 3/4	6 1/2	11 1/4	149
982	5/8	6	4 3/4	10 3/4	146
984	5/8	6	5 1/2	11 1/2	152
983	5/8	6	6 1/2	12 1/2	160
990A	3/4	4 3/4	5 3/4	10 1/2	190
990	3/4	6	5 3/4	11 3/4	205
991	3/4	6	6 3/4	12 3/4	218

SHORT SHANK TYPE

For Steel Cross Arms and Brackets

List No.	Diameter, Inches	Above Shoulder	Below Shoulder	Total	Wt. Lbs., 100 Pcs.
972	1/2	4 3/4	1 1/4	6	94
986	5/8	4 3/4	1 1/4	6	105
987	5/8	6	1 1/4	7 1/4	116
993A	3/4	4 3/4	1 1/2	6 1/4	120
993	3/4	6	1 1/2	7 1/2	136

LAG SCREW TYPE

For Pole and Transformer Wiring

List No.	Diameter, Inches	Above Shoulder	Below Shoulder	Total	Wt. Lbs., 100 Pcs.
973	1/2	4 3/4	3	7 3/4	92
975	1/2	6	3	9	103
988	5/8	4 3/4	3	7 3/4	108
989	5/8	7 1/2	4	11 1/2	140
994	3/4	6	4	10	143

Peirce Broad Base Forged Steel Pins

HOT GALVANIZED

Peirce Broad Base Pins are designed for supporting heavy primary and secondary lines on wood cross arms.

The base is 2 1/2 inches wide and is made in two styles, for flat top arms and for roofed arms.

The shank, 5/8 inch in diameter, is furnished in two lengths, 5 1/2 and 6 1/2 inches, and is provided with 2 1/2 inches of cut thread.

SPRING THREAD FOR 1 INCH PIN HOLE

List No.	Flat Base	Curved Base	Dimensions in Inches		Wt. Lbs., 100 Pcs.
			Height Above Arm	Length of Shank	
1081		1080	4 1/2	5 1/2	148
1083		1082	4 1/2	6 1/2	159

LEAD THREAD FOR 1 INCH PIN HOLE

List No.	Flat Base	Curved Base	Height Above Arm	Length of Shank	Wt. Lbs., 100 Pcs.
1091		1090	4 1/2	5 1/2	207
1093		1092	4 1/2	6 1/2	218

CONSTRUCTION MATERIAL



Peirce Hammer Drill No. 50

Peirce Hammer Drill

This tool offers the one quick means of drilling holes easily in brick, stone or concrete. It consists of a tool steel rod with a chuck for holding drill points, on one end and a hollow tamping tool for expanding the lead sleeve of the bolt on the other end.

List No.	Description	Wt. Lbs. each
50	For tamping $\frac{1}{4}$ inch bolt.....	7.5
53	For tamping $\frac{3}{8}$ inch bolt.....	8.0



Peirce Drill Point No. 60



Peirce Tamping Tool No. 67

Peirce Drill Points

The length of the drill depending on the length of the bolt used.

List No.	Dimensions in Inches		Wt. Lbs., 100 Pcs.	List No.	Dimensions in Inches		Wt. Lbs., 100 Pcs.
	Size	Length			Size	Length	
56	$\frac{3}{8}$	4	20	61	$\frac{3}{8}$	12	79
57	$\frac{1}{2}$	4	23	62	$\frac{3}{4}$	6	47
58	$\frac{1}{2}$	6	33	63	$\frac{3}{4}$	12	107
59	$\frac{1}{2}$	12	65	64	$\frac{1}{2}$	6	57
60	$\frac{5}{8}$	6	38	65	$\frac{1}{2}$	12	137

The following table shows the size of drills to use for the various size bolts.

Bolt Size, Inches	Drill Size, Inches	Bolt Size, Inches	Drill Size, Inches
$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{3}{8}$
$\frac{3}{8}$	$\frac{1}{8}$		

Peirce Tamping Tool

List No.	Diameter Bolt, Inches	Shpg. Wt., Lbs., Each	List No.	Diameter Bolt, Inches	Shpg. Wt., Lbs., Each
67	$\frac{1}{4}$	3.4	69	$\frac{1}{2}$	10.2
68	$\frac{3}{8}$	4.9			



Expansion Bolt No. 3



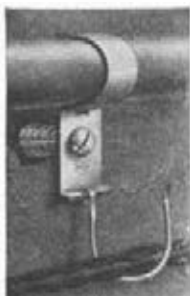
Expansion Shield No. 30

Peirce Lead Sleeve Expansion Bolts

List No.	Dimensions in Inches		Wt. Lbs., 100 Pcs.	List No.	Dimensions in Inches		Wt. Lbs., 100 Pcs.
	Size	Length			Size	Length	
1	$\frac{1}{4}$	1 $\frac{3}{4}$	7.1	9	$\frac{3}{8}$	5	19.9
2	$\frac{1}{4}$	2	7.5	10	$\frac{3}{8}$	5 $\frac{1}{2}$	21.0
3	$\frac{1}{4}$	2 $\frac{1}{2}$	8.3	11	$\frac{1}{2}$	2 $\frac{1}{2}$	41.2
4	$\frac{1}{4}$	3 $\frac{1}{4}$	9.5	12	$\frac{1}{2}$	3 $\frac{1}{2}$	47.2
4A	$\frac{1}{4}$	4	10.7	13	$\frac{1}{2}$	4	50.2
4B	$\frac{1}{4}$	5	12.3	14	$\frac{1}{2}$	4 $\frac{1}{2}$	53.0
5	$\frac{3}{8}$	2 $\frac{1}{2}$	14.9	15	$\frac{1}{2}$	5	56.0
6	$\frac{3}{8}$	3	15.9	16	$\frac{1}{2}$	5 $\frac{1}{2}$	59.0
7	$\frac{3}{8}$	3 $\frac{1}{2}$	16.9	17	$\frac{1}{2}$	6 $\frac{1}{2}$	62.0
8	$\frac{3}{8}$	4 $\frac{1}{2}$	18.9	18	$\frac{1}{2}$	8	73.0

Peirce Expansion Shields

List No.	Diameter, Inches	Length, Inches	Wt. Lbs., 100 Pcs.
30	$\frac{1}{2}$	2 $\frac{1}{4}$	9.5



Combination Cable Clamp

CONSTRUCTION MATERIAL

Ajax Insulator
Type A with Lag Screw ThreadAjax Insulator
Type A Lag Screw Expansion Shield

DIAMOND COMBINATION CABLE CLAMPS

Nos.	Cable Diameter, Inches	Conduit or Pipe Diameter, Inches	Diam. Wood Screw and Length, Inches	Size of Screw Anchor, Inches
OA	$\frac{1}{8}$	$\frac{1}{4}$	$14 \times 1\frac{1}{4}$	$\frac{1}{4} \times 1$
O	$\frac{1}{8}$	$\frac{3}{8}$	$14 \times 1\frac{1}{4}$	$\frac{1}{4} \times 1$
1	$\frac{1}{8}$	$\frac{1}{2}$	$14 \times 1\frac{1}{4}$	$\frac{1}{4} \times 1$
2A	1	$\frac{3}{4}$	$14 \times 1\frac{1}{4}$	$\frac{1}{4} \times 1$
2	$1\frac{1}{8}$	...	$14 \times 1\frac{1}{4}$	$\frac{1}{4} \times 1$
3A	$1\frac{1}{4}$	1	$14 \times 1\frac{3}{4}$	$\frac{1}{4} \times 1\frac{1}{2}$
3	$1\frac{1}{2}$	$1\frac{1}{4}$	$14 \times 1\frac{3}{4}$	$\frac{1}{4} \times 1\frac{1}{2}$
4A	$1\frac{3}{4}$	$1\frac{1}{2}$	$14 \times 1\frac{3}{4}$	$\frac{1}{4} \times 1\frac{1}{2}$
4	$2\frac{1}{8}$	2	$14 \times 1\frac{3}{4}$	$\frac{1}{4} \times 1\frac{1}{2}$
5	$2\frac{3}{8}$	$2\frac{1}{2}$	$14 \times 1\frac{3}{4}$	$\frac{1}{4} \times 1\frac{1}{2}$

One size of ring fits all sizes of clamps. Clamps are without bridle rings or screw anchors.

Type

AJAX INSULATOR BRACKETS

A Galvanized without expansion shield, diameter screw, $\frac{1}{2} \times \frac{5}{8}$ inch.

A Galvanized complete with Diamond N. Y. lag screw expansion shields, diameter screw $\frac{1}{2} \times \frac{5}{8}$ inch.



Universal Single Eye Cable Grip



Universal Double Split Eye Cable Grips

UNIVERSAL SINGLE EYE CABLE GRIPS

List No.	Size Diam., Ins.	For Cable Diam., Ins.	List No.	Size Diam., Ins.	For Cable Diam., Ins.
191701	$\frac{1}{2} \times 24$	$\frac{1}{2}$ to $\frac{5}{8}$	191709	$\frac{1}{2} \times 36$	$\frac{1}{2}$ to $\frac{5}{8}$
191702	$\frac{3}{4} \times 24$	$\frac{3}{4}$ to $\frac{1}{2}$	191710	$\frac{3}{4} \times 36$	$\frac{3}{4}$ to $\frac{1}{2}$
191703	1 x 24	1 to $1\frac{1}{8}$	191711	1 x 36	1 to $1\frac{1}{8}$
191704	$1\frac{1}{2} \times 24$	$1\frac{1}{2}$ to $1\frac{1}{8}$	191712	$1\frac{1}{2} \times 36$	$1\frac{1}{2}$ to $1\frac{1}{8}$
191705	2 x 24	2 to $2\frac{1}{8}$	191713	2 x 36	2 to $2\frac{1}{8}$
191706	$2\frac{1}{2} \times 24$	$2\frac{1}{2}$ to $2\frac{1}{8}$	191714	$2\frac{1}{2} \times 36$	$2\frac{1}{2}$ to $2\frac{1}{8}$
191707	3 x 24	3 to $3\frac{1}{8}$	191715	3 x 36	3 to $3\frac{1}{8}$
191708	$3\frac{1}{2} \times 24$	$3\frac{1}{2}$ to $3\frac{1}{8}$	191716	$3\frac{1}{2} \times 36$	$3\frac{1}{2}$ to $3\frac{1}{8}$

UNIVERSAL DOUBLE EYE PLAIN CABLE GRIPS

List No.	Size Diam., Ins.	For Cable Diam., Ins.	List No.	Size Diam., Ins.	For Cable Diam., Ins.
191733	$\frac{3}{4} \times 18$	$\frac{3}{4}$ to $\frac{7}{8}$	191740	$\frac{3}{4} \times 24$	$\frac{3}{4}$ to $\frac{7}{8}$
191734	1 x 18	1 to $1\frac{1}{8}$	191741	1 x 24	1 to $1\frac{1}{8}$
191735	$1\frac{1}{2} \times 18$	$1\frac{1}{2}$ to $1\frac{1}{8}$	191742	$1\frac{1}{2} \times 24$	$1\frac{1}{2}$ to $1\frac{1}{8}$
191736	2 x 18	2 to $2\frac{1}{8}$	191743	2 x 24	2 to $2\frac{1}{8}$
191737	$2\frac{1}{2} \times 18$	$2\frac{1}{2}$ to $2\frac{1}{8}$	191744	$2\frac{1}{2} \times 24$	$2\frac{1}{2}$ to $2\frac{1}{8}$
191738	3 x 18	3 to $3\frac{1}{8}$	191745	3 x 24	3 to $3\frac{1}{8}$
191739	$3\frac{1}{2} \times 18$	$3\frac{1}{2}$ to $3\frac{1}{8}$	191746	$3\frac{1}{2} \times 24$	$3\frac{1}{2}$ to $3\frac{1}{8}$

UNIVERSAL DOUBLE SPLIT EYE CABLE GRIPS

List No.	Size Diam., Ins.	For Cable Diam., Ins.	List No.	Size Diam., Ins.	For Cable Diam., Ins.
191754	$\frac{3}{4} \times 18$	$\frac{3}{4}$ to $\frac{7}{8}$	191761	$\frac{3}{4} \times 24$	$\frac{3}{4}$ to $\frac{7}{8}$
191755	1 x 18	1 to $1\frac{1}{8}$	191762	1 x 24	1 to $1\frac{1}{8}$
191756	$1\frac{1}{2} \times 18$	$1\frac{1}{2}$ to $1\frac{1}{8}$	191763	$1\frac{1}{2} \times 24$	$1\frac{1}{2}$ to $1\frac{1}{8}$
191757	2 x 18	2 to $2\frac{1}{8}$	191764	2 x 24	2 to $2\frac{1}{8}$
191758	$2\frac{1}{2} \times 18$	$2\frac{1}{2}$ to $2\frac{1}{8}$	191765	$2\frac{1}{2} \times 24$	$2\frac{1}{2}$ to $2\frac{1}{8}$
191759	3 x 18	3 to $3\frac{1}{8}$	191766	3 x 24	3 to $3\frac{1}{8}$
191760	$3\frac{1}{2} \times 18$	$3\frac{1}{2}$ to $3\frac{1}{8}$	191767	$3\frac{1}{2} \times 24$	$3\frac{1}{2}$ to $3\frac{1}{8}$

CONSTRUCTION TOOLS



Tel. and Tel.
Crooked Handle
Round Point Shovel
Short Strap



Tel. and Tel.
Eastern Pattern
Post Hole Spade
Long Strap



Tel. and Tel.
Western Pattern
Flat or Post Hole
Spoon, Short Straps



Standard
Earth Auger

SHOVELS AND SPOONS

The Telephone and Telegraph Shovels are from 6 to 8 feet in length with round point and crooked handles have strap regularly 9 inches. Up to 30 inch strap can be supplied at slight increase in price.

	Point	Length Handle
Tel. and Tel. shovel, with short strap, 9 inches long	Round	6 feet
Tel. and Tel. shovel, with short strap, 9 inches long	Round	7 feet
Tel. and Tel. shovel, with short strap, 9 inches long	Round	8 feet
Tel. and Tel. shovel, with long strap, 18 inches long	Round	6 feet
Tel. and Tel. shovel, with long strap, 18 inches long	Round	7 feet
Tel. and Tel. shovel, with long strap, 18 inches long	Round	8 feet

The Tel. and Tel. spoons are made from 6 to 8 feet long with regular round point and crooked handle. Up to 30 inch strap can be supplied at slight increase in price.

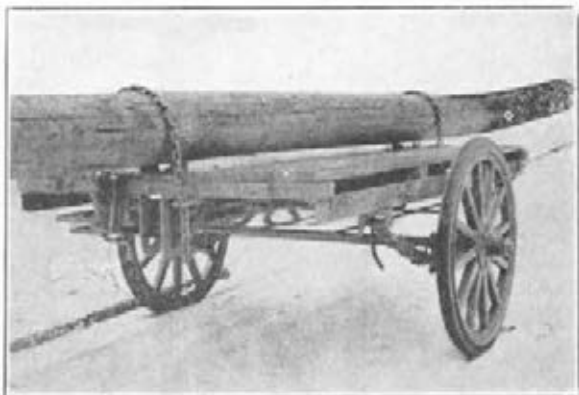
Tel. and Tel. spoons, Eastern pattern, with short strap, 9 inches long	Round	6 feet
Tel. and Tel. spoons, Eastern pattern, with short strap, 9 inches long	Round	7 feet
Tel. and Tel. spoons, Eastern pattern, with short strap, 9 inches long	Round	8 feet
Tel. and Tel. spoons, Eastern pattern, with long strap, 18 inches long	Round	6 feet
Tel. and Tel. spoons, Eastern pattern, with long strap, 18 inches long	Round	7 feet
Tel. and Tel. spoons, Eastern pattern, with long strap, 18 inches long	Round	8 feet
Tel. and Tel. spoons, Western pattern, with short strap, 9 inches long	Round	6 feet
Tel. and Tel. spoons, Western pattern, with short strap, 9 inches long	Round	7 feet
Tel. and Tel. spoons, Western pattern, with short strap, 9 inches long	Round	8 feet
Tel. and Tel. spoons, Western pattern, long strap, 18 inches long	Round	6 feet
Tel. and Tel. spoons, Western pattern, long strap, 18 inches long	Round	7 feet
Tel. and Tel. spoons, Western pattern, long strap, 18 inches long	Round	8 feet

List
No.

STANDARD EARTH AUGERS

- 5 Standard earth auger will bore 5, 6, 7, 8 in. holes 3½ ft. deep.
- 8 Standard earth auger will bore 8, 9, 10, 11, 12, 13, 14 in. holes 3½ ft. deep.
- 10 Standard earth auger will bore 8, 9, 10, 11, 12, 13, 14 or 16 in. holes 8 ft. deep.
- 14 Standard earth auger will bore 8, 9, 10, 11, 12, 13 or 14 in. holes 8 ft. deep.
- 15 Standard earth auger will bore 5, 6, 7, 8 in. holes 8 ft. deep.

Western Electric CONSTRUCTION MATERIAL



Model B-2 Pole Trailer



Rack Body

MODEL B-2 POLE TRAILER

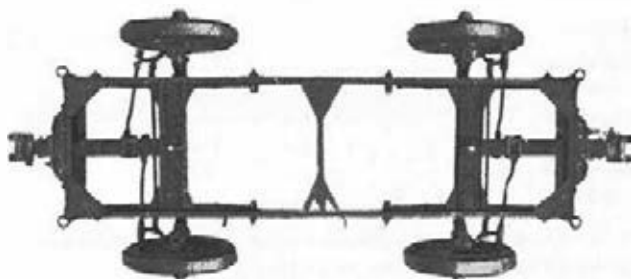
The Model B-2 Pole Trailer is especially adapted for small Telephone, Telegraph, Electric Light and Power Companies. It is adaptable for Fords and Chevrolets. The hitch is applied to the chasses or spring instead of to the rear axle. The body sills are made of 3 inch channel iron. Any small truck or automobile conveying workmen to the job can easily pull a B-2 Trailer loaded with one or more poles at very little additional cost.

INSTRUCTIONS FOR OPERATING POLE TRAILER

1. Remove tongue from trailer and attach the pulling unit.
2. Balance first pole on trailer.
3. Bind pole to trailer with chain tightener.
4. Bind end of pole to end of tongue with chain tightener.
5. Load remainder of poles on trailer.
6. After poles are loaded, apply binding chains and fasten with eccentric pole binder.

Rack Body

Removable Rack Body making B-2 Trailer available for tree trimming and other type of hauling



Reversible Trailer Chassis



Draw-bar



Drop Forged Link



Equalizer

HIGHWAY FOUR-WHEEL TRAILER

Note. Unusual strength of frame construction and simplicity of design. Frame is reinforced throughout with one-quarter inch gusset plate and rigidly reinforced in center.

Drop Forged Drawbar. Drop forged drawbar with double acting coil spring absorbs jars of sudden starting and stopping. The only trailer construction using the freight car principles.

Link. Drop forged link connects trailer to pintle hook. This attached to drawbar with automatic lock pin.

Equalizer. Pivots directly under spring drawbar. This device takes up side sway and holds wheels of trailers in perfect alignment with motor truck wheels at high speed.



Pintle Hook



Drawbar Lock

Pintle Hook. Military type drop forged Pintle Hook with cushion spring and patented positive lock. This hitch is fastened to rear of motor truck.

Drawbar Lock. Automatic drawbar lock eliminates necessity of centering drawbar before lock. It is very strong and durable.

MATTHEWS SCRULIX ANCHORS

Matthews Scrulix Anchors are screwed into solid ground. They have no moving parts to adjust or that might be carelessly buried unadjusted. Nothing to assemble.

The use of No. 300 Matthews Auger in hard grounds such as adobe, hardpan, gumbo, sunba ed clay, or disintegrated rock easily prepares the way for the quick installation of the Nos. 612R, 658R, 758R and 858R Matthews Scrulix Anchors.

The No. 375 Matthews Auger should be used before attempting to screw down the Nos. 858R, 800, 1000 and 1200 Matthews Scrulix Anchors. It will pay to use it in all but very soft or sandy ground before installing any of these anchors.

The Nos. 612R, 658R, 758R and 858R Matthews Scrulix Anchors will be furnished with galvanized rods. The Nos. 612R, 658R and 758R are packed in bundles of four each. All the rest are shipped singly. There has been no change in the wrench except to make it stronger. Nos. 800, 1000 and 1200 anchors are guaranteed to outlast galvanized steel round rods with a diameter of $1\frac{1}{2}$, $1\frac{1}{4}$ or $1\frac{1}{2}$ inches. The fact that the rods of these anchors are square gives them a greater cross section and makes it possible to use mild steel rods instead of high carbon steel rods. Mild steel rods resist rust very much better than high carbon steel. A No. 567 wrench must be used with all anchors smaller than No. 800. No wrench is needed for the Nos. 800, 1000 or 1200 anchors.

ROUND					SQUARE				
List No.	Diam. Anchor, Inches	Size Rod, Inches	Length, Feet	Wt. Lbs. per 100	List No.	Diam. Anchor, Inches	Size Rod, Inches	Length, Feet	Wt. Lbs. per 100
612R	6	$1\frac{1}{2}$	6	750	800	8	$1\frac{1}{2}$	6	3700
658R	6	$1\frac{1}{4}$	6	1050	1000	10	$1\frac{1}{4}$	6	5700
758R	7	$1\frac{1}{2}$	6	1200	1200	12	$1\frac{1}{2}$	6	7900
858R	8	$1\frac{1}{2}$	6	1500					

MATTHEWS AUGERS

List No.	Diam. of Anchor, Inches	Length, Feet	Wt. Lbs. per 100	List No.	Diam. of Anchor, Inches	Length, Feet	Wt. Lbs. per 100
300	3	$6\frac{1}{4}$	1900	375	$3\frac{1}{4}$	$6\frac{1}{4}$	2000

Parts for Augers

List No.	Description	Length Overall, Inches
301H	Heads for 3-inch auger	$6\frac{1}{2}$
303C	Auger blades for 3-inch auger	10
376H	Heads for $3\frac{1}{4}$ -inch auger	$6\frac{1}{2}$
378C	Auger blades for $3\frac{1}{4}$ -inch auger	10
3375	Blackburn telescopic handle	2 ft. 2 in.
567	Anchor Wrench	5 ft. 4 in.

Scrulix Anchor

Scrulix Anchor

No. 329 POLE PULLING AND POLE STRAIGHTENING JACKS,

Automatic Lowering

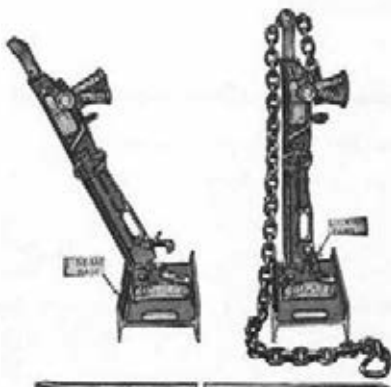
No. 329 Simplex Pole Pulling Jack was designed especially for pulling and straightening telephone, telegraph, electric light and trolley poles. Poles can be pulled or straightened regardless of size or depth in ground without digging around them. One or two men can pull or straighten poles—pull butts—or move loaded poles without interrupting service.

Endorsed, adopted and standardized by the Bell Telephone Companies, Western Union, Postal Telegraph, Governments and innumerable telephone and electric railway and power companies. It saves money and manpower every day.

Single acting, automatic in raising and lowering—cannot be tripped. Equipped with 8 foot chain, 5 foot pinch bar and I beam base.

Specifications

Capacity, 15 tons; height, 38 inches; lift, 24 inches; weight without equipment, 96 lbs.



No. 329 Pole Pulling Jack

CONSTRUCTION MATERIAL



Crow and Digging Bars



Tamping and Digging Bars

CROW, TAMPING, PLAIN DIGGING BARS AND DIGGING SPUDS

List No.	Style Bar	Size	Wt. Lbs., Each
1061	Crow, octagon.	1 in. x 7 ft.	20
1064	Crow, octagon.	1½ in. x 7 ft.	26
1065	Crow, octagon.	1½ in. x 8 ft.	30
1071	Tamping and digging.	1 in. x 7 ft.	20
1074	Tamping and digging.	1½ in. x 7 ft.	26
1075	Tamping and digging.	1½ in. x 8 ft.	30



Plain and Digging Bars



Digging Spuds with Tamper

List No.			Wt. Lbs., Each
1081	Plain Digging.	1 in. x 7 ft.	10
1085	Plain digging.	1½ in. x 8 ft.	28
852	Digging spud with tamper, 9 ft. long, steel tube handle.	*****	20



Loy or Slicks No. 853



Tamping Bars

LOY OR SLICK AND TAMPING BARS

List No.		Wt. Lbs., Each
853	Loy or slick, 8 ft. long, blade, tool steel, 4 x ½ in.	18
854	Tamping bar, with 7 foot wood handle.	13
855	Tamping bar, with 8 foot wood handle.	15



Tamping Bar



No. 1044 Electric Tamping Bar

TAMPING BARS

List No.		Wt. Lbs., Each
1054	Tamping bar with 7 ft. handle and with extra heavy iron shoe.	14
1055	Tamping bar with 8 ft. handle and with extra heavy iron shoe.	15
1056	Tamping bar with 9 ft. handle and with extra heavy iron shoe.	17
1044	Electric tamping bar, 8 feet long.	***

CONSTRUCTION MATERIAL



Standard Deadman Wood Pole Support

STANDARD DEADMAN WOOD POLE SUPPORTS

Made of oak with heavy wrought steel fork and pike, for extra heavy work.

List No.	Length Feet	Size of Support, Ins.	Wt., Lbs. Each
848	8	4 x 2	29



Mule Pattern Wood Pole Support

MULE PATTERN WOOD POLE SUPPORTS

Washington fir, tapering slightly at both ends. Forged fork and pick.

List No.	Length Feet	Size of Support, Ins.	Wt. Lbs., Each
845	6	3½	23
846	7	4½	26
847	8	4½	29



Guarded Pike Poles

GUARDED PIKE POLES

Handles made of select Washington fir. The forks are malleable iron with the fork and socket cast in one piece.

List No.	Length, Feet	Diameter Handle, Ins.	Wt. Lbs., per Doz.	List No.	Length, Feet	Diameter Handle, Ins.	Wt. Lbs., per Doz.
832	10	2	100	797	14	2½	180
833	12	2	120	835	16	2½	195
834	14	2	140	836	18	2½	210
795	16	2	160	837	20	2½	235
796	12	2½	165				



Plain Pike Poles

PLAIN PIKE POLES

Standard Small Size

Handle is 2 inches even diameter.

List No.	Length, Feet	Wt. Lbs., per Doz.	List No.	Length, Feet	Wt. Lbs., per Doz.
805	10	75	807	14	115
806	12	95	808	16	135

Western Electric Pattern

Handle is 2½ inches in diameter in the middle and is tapered to two inches at each end. Pike is of ⅝ inch square crucible steel, projecting four inches and has 2 inch taper.

818	12	150	821	18	215
819	14	165	822	20	240
820	16	185			

CONSTRUCTION MATERIAL



MALLEABLE SOLID SOCKET PEAVIES

Regular Maple Handles			Select Hickory Handles		
List No.	Size	Wt. Lbs., per Doz.	List No.	Size	Wt. Lbs., per Doz.
121	2 1/4 ins. x 4 ft.	85	134	2 1/4 ins. x 4 ft.	91
122	2 1/4 ins. x 4 1/2 ins.	89	135	2 1/4 ins. x 4 1/2 ft.	96
123	2 1/4 ins. x 5 ft.	94	136	2 1/4 ins. x 5 ft.	102
124	2 1/2 ins. x 4 ft.	104	137	2 1/2 ins. x 4 ft.	113
125	2 1/2 ins. x 4 1/2 ft.	110	138	2 1/2 ins. x 4 1/2 ft.	117



MALLEABLE CLASP CANT HOOKS

List No.	Description	Size	Wt. Lbs., per Doz.
188	Select maple handles.....	2 1/2 ins. x 4 ft.	95
189	Select maple handles.....	2 1/2 ins. x 4 1/2 ft.	100
199A	Select hickory handles.....	2 1/4 ins. x 4 ft.	80
200A	Select hickory handles.....	2 1/4 ins. x 4 1/2 ft.	90
199	Select hickory handles.....	2 1/2 ins. x 4 ft.	95
200	Select hickory handles.....	2 1/2 ins. x 4 1/2 ft.	100
210	Second growth maple handles.....	2 1/2 ins. x 4 ft.	95
211	Second growth maple handles.....	2 1/2 ins. x 4 1/2 ft.	100



Nos. 295-300 CARRYING OR LUG HOOKS

Regular Pattern

List No.	Length, Feet	Diam. of Handle, Ins.	Wt. Lbs., per Doz.	List No.	Length, Feet	Diam. of Handle, Ins.	Wt. Lbs., per Doz.
295	4	2 1/2	85	297	5	2 1/2	95
296	4 1/2	2 1/2	90				

Extra Heavy, with Steel Swivels

For timbers up to 23 inches in diameter.

298	5	3	145	300	7	3	165
299	6	3	155				

BARROW REELS

List No.	Description	Wt. Lbs., Each	List No.	Description	Wt. Lbs., Each
899	Light, for telephone.....	79	901	Guard pins, per set of four....	2
900	Heavy Western Union pattern.	80		For reels with tension, add to price....	

Pay-out Reel

List No.	Description	Wt. Lbs., Each
902	Pay-out Reel.....	40

CONSTRUCTION MATERIAL



No. 201-6 Side Cutting Plier



No. 202-5 Oblique Cutting Plier



No. 301-5 Long Nose Plier



No. 203-5 Long Nose Side Cutting Plier

KLEIN'S SIDE CUTTING PLIERS

"Diamond Special" for use on bare and insulated wire. For linemen, electricians and mechanics.

List No.	Size, Ins.	Wt. Lbs., per Doz.	List No.	Size, Ins.	Wt. Lbs., per Doz.
201-6	6	5	201-8	8	12
201-7	7	7½	201-9	9	12½

KLEIN'S OBLIQUE CUTTING PLIERS

For electricians, telephone men and switchboard builders. The plier is of the lap joint type.

202-5	5	4	202-6	6	4¼
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KLEIN'S LONG NOSE PLIER, WITHOUT CUTTERS

Especially adapted for switchboard, telegraph and telephone work, armature winding, etc. Its special features are its adaptability to stripping the ends of insulated wire and for getting into difficult places.

301-5	5	2¾	301-6	6	3
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KLEIN'S LONG NOSE, SIDE CUTTING PLIER

Has the same feature as the No. 301 with the addition of cutting knives.

203-5	5	2¾	203-6	6	3
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No. 105-17 Splicing Clamp



No. 132-15 Combination Wire and Sleeve Clamp

KLEIN'S SPLICING CLAMPS

This clamp has five sets of chambers for twisting sleeves. Intended for telephone, telegraph and power line work. The chambers are arranged to fit the sleeve snugly so that sleeves are not injured in twisting.

For copper sleeves Nos. 6, 8, 10, 12, 14, 17 B. & S.

For iron sleeves Nos. 8, 10, 12, 14, 16, 19 B. W. G.

List No.	Size, Ins.	Wt. Lbs., per Doz.
105-17	10¾	15

KLEIN'S COMBINATION WIRE AND SLEEVE CLAMPS

Hammer forged from high grade crucible tool steel. Spring tempered. Polished heads and black handles.

Designed for general telephone and telegraph work where a large range of wires is used.

This clamp has five round holes for twisting bare wire:

Copper wire, Nos. 4, 6, 8, 10, 12, B. & S.

Iron wire, Nos. 6, 8, 10, 12, 14, B. W. G.

The reverse side has five double chambers for twisting sleeves:

Copper sleeves, Nos. 6, 8, 10, 12, 14, 17, B. & S.

Iron sleeves, Nos. 8, 10, 12, 14, 16, 19, B. W. G.

Strand opening, .467 x .624 inch.

List No.	Size, Ins.	Wt. Lbs., per Doz.
132-15	11¼	15½

CONSTRUCTION TOOLS



Buffalo Grip Without Pulley



Buffalo Grip With Pulley

BUFFALO GRIPS

The jaws may be clamped open at any width, the grip held in one hand and wire inserted, no matter what lineman's position may be. The harder they pull the firmer they grip without injury to wire or insulation.

List No.	Opening, Inches	Size of Wire Will Hold	List No.	Opening, Inches	Size of Wire Will Hold
1	22	Smallest to No. 6, incl.	4	52	Weatherproof No. 6 to No. 1 Incl.
2	35	Smallest to No. 0, incl.	5	68	Weatherproof No. 6 to No. 0000 Incl.
3	48	All from smallest to No. 000, Inc.	6	29	Weatherproof No. 14 to No. 18 Incl.



No. 1613-30 Chicago Grip for Bare Wire



No. 1604-10 Haven Steel Grip

KLEIN'S "CHICAGO" GRIPS FOR BARE WIRE

Main body piece and lever are forged steel. Drawn parts are of wrought iron. Once the grip seizes the wire it holds on.

List No.	Size Wire	Maximum Opening, Ins.	Weight Each, Lbs.	Size No.
1613-30	For No. 6 wire and smaller	1 1/2	1 1/2	1
1613-40	For No. 0 wire and smaller	2 5/8	2 5/8	2
1613-50	For No. 0000 wire and smaller	7 1/2	7 1/2	3

KLEIN'S HAVEN STEEL GRIP

Almost automatic in action. A shake of the rope on the tackle disengages the rope.

List No.	Size Wire	Wt., Lbs., per Doz.
1604-10	No. 8 wire and finer	12
1604-20	1/2 inch wire and finer	30



No. 1802-30 Self-Locking Block Tackle



No. 3109-2 Lag Screw Wrench

SELF-LOCKING BLOCK TACKLE

Consists of light steel shell blocks, galvanized, fitted with a snubbing hook to lock load, in any position. To lock the load, simply pull the luff rope under the hook. To release, simply pull the rope.

List No.	Wt., Lbs.
1802-30	2 1/2

KLEIN'S COMBINATION STEEL LAG SCREW WRENCH

This wrench is forged from select bar steel. The slot is formed in a cross shape and will fit machine bolts, nuts or lag screws from 1/8 inch to 1/2 inch. The round hole allows the end of a bolt to come through as the nut runs off.

List No.	Length, Ins.	Wt. Lbs., per Doz.
3109-20	13 1/2	20

CONSTRUCTION MATERIAL



Tree Trimmer

No. 1901
Eastern ClimberNo. 5301-1
Straps

No. 1014 Safety Strap



No. 1030 Safety Belt

OSHKOSH TREE TRIMMER

This is an exceptionally light tool weighing only 7½ lbs. complete with rope and handle. It is furnished complete with a 14-foot clear, straight grained Washington fir handle and a pull rope.

KLEIN'S EASTERN CLIMBERS AND STRAPS

List No.		Length, Ins.	Wt.
1901	Eastern, without straps, punched strap loops.....	15 to 18	3½ lbs. per pair
5301-1	Eastern straps for Eastern climbers, drop forged buckles.....	.....	15 lbs. per set

SAFETY STRAPS AND BELTS

List No.	
1014	Safety strap, of genuine steer hide harness leather; 6 feet long by 1¾ inches wide equipped with Anchorde rustproof swivel roller snap.
1030	Belt with ring, of genuine steer hide harness leather; main belt 3½ inches wide.



No. 250 Bag



Tarbox Metal Block



Tarbox Metal Block



Snatch Block

BURHKE LEATHER TRIMMED CANVAS BAG

No. 250 bag is made of one piece No. 6 (24 ounce) white duck, reinforced with bag leather 3½ inches on bottom and sides.

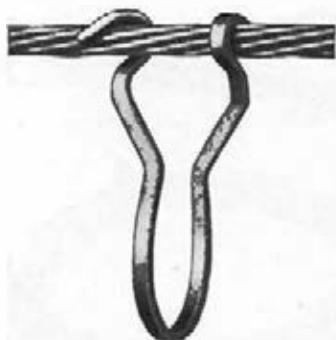
Bottom, leather, binder board and duck, stitched all around and supplied with heavy steel studs.

TARBOX METAL BLOCKS

For Manila Rope

Malleable iron shell. Edges are nicely rounded to prevent wear of rope. Hooks and straps are made of steel. Can be furnished for wire rope, if desired, in either iron bushed or graphite-bronze bushed self-lubricating.

CONSTRUCTION MATERIAL



National Aerial Cable Ring



Bonita Aerial Cable Ring



Marline Cable Hanger

NATIONAL AERIAL CABLE RINGS

This ring is made of spring steel wire galvanized by hot dip process after being formed. It is attached without use of a tool and will stay in position on the strand.

Specify size of strand when ordering. Packed in b lap sacks.

Size, Inches	Size Strand, Inches	Weight per 1000	Std. Pkg.	Size, Inches	Size Strand, Inches	Weight per 1000	Std. Pkg.
1½	1½	55	2000	2½	2½	90	1000
2	2	62	1000	3	3	105	500
2 Heavy	2½	75	1000	3½	3½	115	500

BONITA AERIAL CABLE RINGS

In ordering Bonita rings the size of strand on which they are to be used should be stated and it is advisable to allow about ¼ inch larger ring size than the diameter of cable to be installed.

Bonita rings are made in five sizes and packed in standard packages as follows:

Size Inside Diam., Ins.	Std. Pkg.	Shipping Wt., Lb.	Size Inside Diam., Ins.	Std. Pkg.	Shipping Wt., Lbs.
2	1000	90	3	500	60
2½	500	55	3½	500	65

MARLINE CABLE HANGERS

No. 3 A. T. & T. Specifications

The hooks are made of No. 9 spring steel wire and are regalvanized by hot dip process after they are formed. The loop is three-ply houseline in the length indicated.

Length of Loop, Ins	Size of Cable, Pair	Wt. Lb., per 1000	Length of Loop, Ins.	Size of Cable, Pair	Wt. Lbs., per 1000
9	25	35	14	100	40
11	50	37	15	150	42
12	75	38	16	200	45

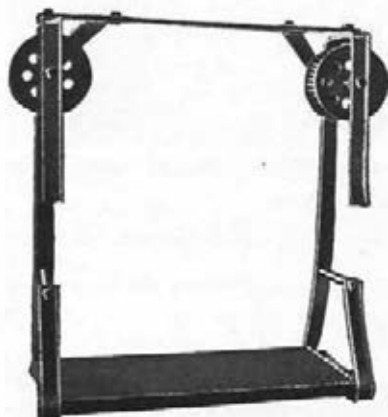


Bierce Cable Roller

BIERCE CABLE ROLLER

The Bierce Cable Roller is practically unbreakable, the frame being made of forged steel and the roller of cast iron, and protected on both sides by pressed steel disks, insuring the cable from injury and preventing it from catching when pulled over roller.

The frame is so constructed that it will hang safely from the wire before the clamp is tightened. Adaptable to all sizes of cables up to 2 inch diameter.



Davis Lineman's Safety Chair

DAVIS LINEMAN'S SAFETY CHAIRS

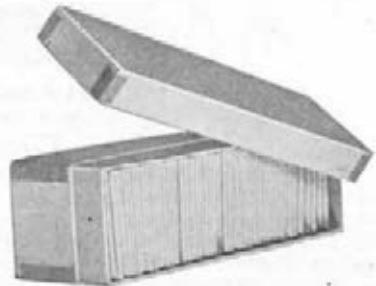
The large corrugations on carrier wheel negotiate with ease, cable hangers, clamps and thimbles.

Users of this chair claim that they can apply more rings in a given time and with more ease than can be done with other types of chairs.

MISCELLANEOUS SUPPLIES



Lineman's Gloves



Paper Sleeves

HI-VOLTAGE ELECTRIC LINEMEN'S GLOVES

Made from the finest pure para rubber combined with the proper chemicals to give maximum durability and non-conducting properties.

These gloves have the most uniform thickness of any glove made, with positively no thin spots at finger tips or crotches. On actual breakdown tests in the laboratory they show an average breakdown figure of 25,000 volts. All gloves undergo extremely rigid inspection, and it is worthy of note that the tested gloves are thoroughly aged before testing and then tested for five minutes instead of the customary two.

IMPROVED PAPER SLEEVES

Made of best grade of manilla paper, carefully selected and put up in cartons of 1000 each, sealed ready for shipment.

Style	Dimen., Ins.	Style	Dimen., Ins.
2 1/2 A	1/8 x 2 3/4	18A	1/8 x 18
3B	1/8 x 3	18B	1/8 x 18
3C	1/8 x 3	18C	1/8 x 18



Style A



Style B



Style C



Style D



Style No. 1



Style No. 2



Style No. 2A

FIBER CLEATS

These cleats are neat, durable, easy to install and good insulators

In ordering be sure to mention color preferred: red, gray or black; otherwise red will be furnished.



No. 22
Milonite
Nail

Style		Length, Ins.	Width, Ins.	Groove, Ins.
A	Single groove cleat.	3/4	1 1/2	1/4 x 1/8
B	Double groove cleat.	3/4	1 1/2	1/4 x 1/8
C	Corner cleat.	1 1/2	1 1/2	1/4 x 1/8
D	Three-wire cleat.	1 1/2	1 1/2	1/8 x 1/8
1	Single groove. . . . .	....	....	....
2	Double groove. . . . .	....	....	....
2A	Double groove. . . . .	....	....	....

MILONITE NAILS

"Milonite" perfection insulated nails.

Diameter of head in four sizes. Length of nail to suit. Prevent short circuiting. Color matches wire or wall. Wire can be taken down without cutting or injuring insulation.

BLAKE INSULATED STAPLES

Designed for use on all low voltage circuits of interior wiring, such as telephone, telegraph, messenger call, annunciator and bell work.



No. 1
Blake
Insulated
Staple

List No.	
1	For hardwood, for single and twisted pair wire.
3	For general use, for single and twisted pair wire.
5	For hardwood, for twisted 3 wire and extra heavy pair wire.
6	For general use, for twisted 3 wire and extra heavy pair wire.
7	For soft wood, for twisted 3 wire and extra heavy pair wire.

Western Electric

WIRES AND CABLES



INDIANA GALVANIZED STEEL STRAND GUY WIRE Composed of Seven Wires Twisted Together

New Galvanizing Process Developed

The Indiana Steel & Wire Company's process of galvanizing (Crapo Patents) overcomes the inherent defects in certain grades of galvanized wire, more especially those which approach pure iron. The use of the process results in a perfect mechanical bond between the zinc coating and the iron base metal, thus insuring a protective coating which will not crack or peel even if the wire is bent or twisted abruptly, as when wrapped around its own diameter.

Aside from the introduction of a molten salt treating bath which in no way adversely affects the finished product, the process follows closely the old standard hot-dip method of applying a zinc coating. The molten salt bath is of such composition as to prepare the surface of the iron base metal so that after being made chemically clean, fluxed, and dipped in the molten zinc, the resulting galvanizing is thick, non-peeling, and contains the maximum amount of pure zinc which means the best possible protection against corrosion.

STANDARD STEEL STRAND Single and Double Galvanized

Diam., Inches	Size of Wires	Weight per 1000 Ft., Lbs.	Strength in Lbs.
1/2	8	517	7400
3/8	9 1/2	399	5700
5/8	11	296	4250
7/8	12	205	3200
1 1/4	14	121	1900
1 3/4	16	72.9	1150
2	17	51.3	870

HIGH STRENGTH STRAND Double Galvanized

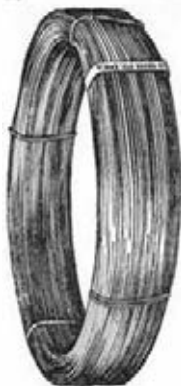
Diam., Inches	Size of Wires	Weight per 1000 Ft., Lbs.	Strength in Lbs.
1/2	8	517	18800
3/8	9 1/2	399	14500
5/8	11	296	10800
7/8	12	205	8000
1 1/4	14	121	4750
1 3/4	16	72.9	2850

SIEMENS-MARTIN STRAND Double Galvanized

Diam., Inches	Size of Wires	Weight per 1000 Ft., Lbs.	Strength in Lbs.
1/2	8	517	12100
3/8	9 1/2	399	9350
5/8	11	296	6950
7/8	12	205	5350
1 1/4	13	164	4250
1 3/4	14	121	3150
2	16	72.9	1900

EXTRA HIGH STRENGTH STRAND Double Galvanized

Diam., Inches	Size of Wires	Weight per 1000 Ft., Lbs.	Strength in Lbs.
1/2	8	517	26900
3/8	9 1/2	399	20800
5/8	11	296	15400
7/8	12	205	11200
1 1/4	14	121	6650
1 3/4	16	72.9	3990



INDIANA TELEPHONE AND TELEGRAPH WIRE

Indiana "Extra Best Best" (E. B. B.) is highest in electrical conductivity, having a range of electrical resistance of 4700 to 5000 mile ohms.

Indiana "Best Best" (B. B.). Slightly higher in resistance than E. B. B., but combines conductivity with tensile strength to make a very popular grade, having a maximum electrical resistance of 5600 mile ohms.

Indiana "Steel." This grade is designed for short-line service where electrical conductivity can be sacrificed for tensile strength. Maximum resistance 6500 mile ohms.

All above grades are galvanized under the same improved process.

INDIANA DOUBLE GALVANIZED TELEPHONE AND TELEGRAPH WIRE "Crapo Patents"

The following table gives the weight in pounds per mile, together with the breaking strain and resistance of Indiana Telephone and Telegraph Wire.

No.	Diameter in Inches	Wt. in Lbs. per Mile	Put Up in Bundles of	—Approx. Breaking Strain in Lbs.—			—Average Resistance in Ohms at 68°F.—		
				E.B.B.	B.B.	Steel	E.B.B.	B.B.	Steel
4	.238	811	1/4 mile	2,028	2,271	2,433	5.98	7.15	8.32
6	.203	590	1/4 mile	1,475	1,652	1,770	8.22	9.83	11.44
8	.165	390	1/2 mile	975	1,092	1,170	12.43	14.87	17.31
9	.148	314	1/2 mile	785	879	942	15.44	18.47	21.50
10	.134	258	1/2 mile	645	722	774	18.79	22.48	26.16
11	.120	206	1/2 mile	515	577	618	23.54	28.16	32.77
12	.109	170	1/2 mile	425	476	510	28.52	34.12	39.71
14	.083	99	1/2 mile	247	277	297	48.98	58.59	68.18

WIRES AND CONNECTORS



Pot Head Wire

POT HEAD WIRES

The standard wire for pot head work is either 19, 20 or 22 B.&S. gauge in single or twisted conductor. The insulation of this wire is of high quality, suitable to withstand the effects of the hot sealing compound and outside exposure without a protecting braid. As a distinguishing marker one conductor of the twisted pair has a double ridge on the insulation. Make sure in ordering this wire that it has the double ridge, as this insures you a "quality product."

Gauge 19, 20 or 22 B.&S. Pot-head wire. Weight per 1000 feet (twisted pair), 19 lbs. Coil Lengths, 200-1500 feet.

IRON OUTSIDE DROP WIRE

A special drop wire which is stronger and lighter than copper and quite as flexible. The conductor is a high-grade non-rusting iron. It is insulated with good grade rubber compound, cotton braided and weatherproofed. The sizes most generally used are as follows:

Gauge	Description
19 BWG (18 B.&S.), $\frac{7}{16}$ inch diameter, insulation twisted pair outside wire.	
18 BWG (16 B.&S.), $\frac{5}{16}$ inch diameter, insulation twisted pair outside wire.	
16 BWG (14 B.&S.), $\frac{3}{8}$ inch diameter, insulation twisted pair outside wire.	
14 BWG (12 B.&S.), $\frac{1}{2}$ inch diameter, insulation twisted pair outside wire.	

WIRE

The following table may be of assistance in deciding just what kind of wire should be ordered for any given service:

Lines:	1. Rural lines.	Galvanized iron, copper clad steel, or hard drawn copper.
	2. Town lines (open wires).	Galvanized iron, copper clad steel, or hard drawn copper.
	3. Toll or other long lines where the best transmission is very important.	Hard drawn copper.
	4. Lines running through trees where it is impracticable to trim.	Weatherproof iron or copper to correspond with other wire used on the line.
Subscribers' Wiring:	1. Drops or loops (pole to protector).	No. 17 twisted pair copper clad steel wire, No. 14 B. & S. twisted pair copper or No. 18 B.W.G. twisted pair ironite.
	2. Interior (protector to instrument).	Interior copper telephone wire (twisted pair or triple).
	3. Ground (protector to ground rod or other ground connection).	Ground wire.
Miscellaneous:	1. Pot heads (for making lead cable pot heads).	Pothead wire.
	2. Switchboard and telephone wiring.	Switchboard wire.
	3. Cross connecting on distributing frames.	Flameproof jumper or cross connecting wire.



NATIONAL DOUBLE TUBE COPPER SLEEVES

These sleeves are manufactured accurately to size from the best grade of pure copper. Each detail of operation has been carefully planned, and a rigid factory inspection weeds out any possible defective material.

When twisted, National Sleeves are drawn so tightly around the conductors as to form practically a welded joint.

B. & S.	B.W.G.	N.B.S.	Length, Inches	Wt. per 1000	B. & S.	B.W.G.	N.B.S.	Length, Inches	Wt. per 1000
10	12	12	4 $\frac{3}{4}$	30	16	..	..	4	18
12	12	14	4 $\frac{1}{2}$	23	17	..	..	4	15
14	16	..	4	20	18	..	..	4	15

NATIONAL DOUBLE TUBE TINNED STEEL SLEEVES

Wire Gauge	Length, Inches	Wt. per 1000	Wire Gauge	Length, Inches	Wt. per 1000
B.W.G.			B.W.G.		
8	6 $\frac{3}{4}$	90	12	4 $\frac{3}{4}$	35
9	5 $\frac{3}{4}$	60	14	4 $\frac{1}{2}$	30
10	5 $\frac{1}{4}$	55	16	4	25

Western Electric

WIRES AND CABLES



Solid Weatherproof Triple Braided



Weatherproof Hard Drawn Copper

WEATHERPROOF COPPER WIRE

These wires have three closely woven braids of cotton, all thoroughly saturated with a black weatherproof compound. The outer braid is smoothly polished.

Triple Braid—Solid Conductor

Size B. & S. Gauge	Approximate Weight in Pounds		Approximate Diameter Over Insulation, Ins.	Standard Packages					Coils Approx. Wt. Pounds
	Per 1000 Ft.	Per Mile		Reels			Cases Containing		
				Diameter Reels Ins.	Approx. Length Ft.	Approx. Wt., Lbs.	Approx. Coils	200 lbs., Wt.	
10	53	280	¼	....	....	....	8	25	...
12	35	185	⅜	....	....	....	8	25	...
14	25	130	½	....	....	....	8	25	...
16	14	75	⅝	....	....	....	12	17	...
18	11	58	¾	....	....	....	12	17	...

WEATHERPROOF HARD-DRAWN COPPER WIRE—Triple Braided

These wires are insulated especially for the telephone and telegraph trade and railway signal work, combining the highest conductivity with the greatest tensile strength. Unless specially ordered otherwise, these wires are put up in coils as shown, thoroughly burlapped.

Size B. & S. Gauge	Capacity Circular Mils.	Triple Braided Approximate Lbs. per Mile	Length of Coils, Miles	Size B. & S. Gauge	Capacity Circular Mils.	Triple Braided Approximate Lbs. per Mile	Length of Coils, Miles
12	6530	185	$\frac{1}{2}$	14	4107	130	$\frac{1}{2}$

Double braid will be furnished on request.

WEATHERPROOF IRON WIRE—Double and Triple Braided

These wires are extensively used in telephone and telegraph work, and have the same insulation as regular weatherproof line wires. They are finished with the same smooth polish as all other wires, and are put up for shipment in coils only, thoroughly wrapped in burlap.

No. 10 double braided is made up on special order only.

Size Iron Wire Birming- ham Gge.	Double Braided Approximate Lbs. per Mile	Triple Braided Approximate Lbs. per Mile	Length of Coils, Miles	Size Iron Wire Birming- ham Gge.	Double Braided Approximate Lbs. per Mile	Triple Braided Approximate Lbs. per Mile	Length of Coils, Miles
12	350	400	$\frac{1}{2}$	14	145	175	$\frac{1}{2}$
10	230	260	$\frac{1}{2}$				



Flameproof Wire



Single Ground Wire

FLAMEPROOF TELEPHONE WIRE

16 B. & S.	Single, twisted or triple conductor, standard color, slate and red.	38	200-1500
20 B. & S.	Single, twisted or triple conductor, standard color, slate and red.	19	200-1500
22 B. & S.	Single, twisted or triple conductor, standard color, slate and red.	16	200-1500

SINGLE GROUND WIRE

18 B. & S.	Single ground wire or sub-station wires.	14	200-1500
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Also furnished in size No. 14 B. & S.

TWISTED TELEPHONE WIRES

Twisted telephone wires consist of two solid copper conducting wires, thoroughly tinned, as a protection against the corrosion of copper. The wires are then insulated with a rubber compound, which is made in three grades or qualities, i.e., for no immersion test, for 100 megohms test and for over 100 megohms test. Over the rubber is placed a black or colored braid, and the two wires are twisted together. For special work, three or more wires are often employed.

WIRE AND INSULATORS



Outside Telephone Wire



Inside Telephone Wire



Bridle Wire

OUTSIDE TELEPHONE WIRE

Furnished in coils. Single and triple conductor, when specified.

Gauge B. & S.	Description	Wt., per 1000 Ft.	Coil Lengths, Ft.
17	Weatherproof, copper steel wire.....	36	200-1500
14	Weather roof, copper wire.....	65	200-1500
17	Weather roof twisted pair, bronze wire.....	39	200-1500
17	Weatherproof, parallel bronze wire.....	**	*****

INSIDE TELEPHONE WIRE

Packed in coils in burlap bags; each coil specially wrapped in heavy craft paper. Furnished in single or triple conductors when specified. A tracer thread is used in all conductors.

19	Twisted pair, olive green finished.....	22	200-1500
20	Twisted pair, inside olive green finished.....	19	200-1500

BRIDLE TELEPHONE WIRE

Furnished i coils. Single conductor, when specified.

18	Twisted pair, weatherproof braid.....	33	200-1500
16	Twisted pair, weatherproof braid.....	42	200-1500



No. 9



No. 12



No. 16



No. 42

No. 9 HEMINGRAY GLASS INSULATORS

Pony

Height overall, $3\frac{3}{4}$ inches. Diameter overall, $2\frac{1}{4}$ inches. Groove, $\frac{3}{8}$ inch.

List No.	Std. Pkg.	Wt. Lbs., per Bbl.
9	400	270

No. 12 HEMINGRAY GLASS INSULATORS

Double Groove Pony

Height overall, $3\frac{5}{8}$ inches. Diameter over all, $2\frac{3}{8}$ inches. Top groove, $\frac{3}{8}$ inch; bottom groove, $\frac{1}{4}$ inch.

List No.	Std. Pkg.	Wt. Lbs., per Bbl.
12	400	310

No. 16 HEMINGRAY GLASS INSULATORS

Long Distance

Height overall, 4 inches. Diameter overall, $2\frac{5}{8}$ inches.

List No.	Diameter Groove, Inches	Std. Pkg.	Wt. Lbs., per BBL.
16	$\frac{3}{8}$	275	285

No. 42 HEMINGRAY GLASS INSULATORS

Double Petticoat

Height overall, $4\frac{1}{8}$ inches. Diameter overall, $3\frac{3}{4}$ inches.

List No.	Diameter Groove, Inches	Std. Pkg.	Wt. Lbs., per Bbl.
42	$\frac{1}{4}$	175	306

PORCELAIN TUBES, INSULATORS AND CLEATS

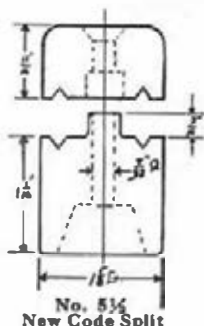


PORCELAIN TUBES

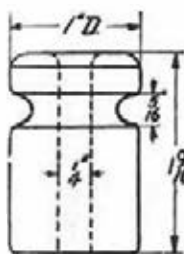
Length
Under Head
1 to 18 Ins.

Diameter
Outside, Ins.
 $\frac{1}{4}$ to $\frac{1}{2}$

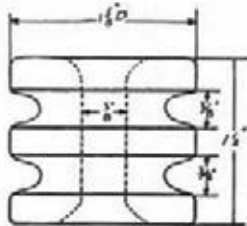
Diameter
Inside, Ins.
 $\frac{1}{8}$ to $\frac{1}{4}$



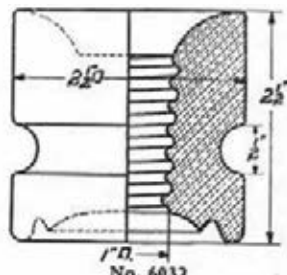
No. 5 1/4
New Code Split



No. 5 1/4 New Code



No. 4961 Telephone Knob



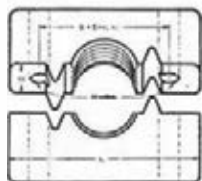
No. 6032

PORCELAIN KNOBS

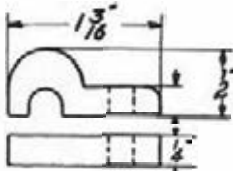
List No.	Height, Ins.	Diam., Ins.	Size Wire	Hole, Ins.	Quantity per Bbl.	Wt. Lbs. per Bbl.	Gross Wt. Lbs. per 1000
5 1/4 New Code Split	1 1/4	1 1/4	12 and 14	1/4	3000	415	140
5 1/4 New Solid	1 1/4	1 1/4	Groove, 1/4 ins.	1/4	3500	410	120
6061 2-Groove	1 1/4	1 1/4	Groove, 3/8 ins.	1/4	2000	465	240
6062 4-Groove	2 1/4	1 1/4	Groove, 1/4 ins.	1/4	1000	375	380

DUPLIX TELEPHONE INSULATORS

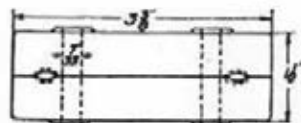
List No.	Height, Ins.	Diam., Ins.	Groove, Ins.	Pin Hole	Quantity per Bbl.	Net Wt. Lbs. per 100
6032	2 1/4	2 1/4	1/4	1 in. std.	400	75
6053	3 1/4	2 1/4	1/4	1 in. std.	300	100



H. & D. Cleats



Top No. 333
Bottom No. 333 1/2



No. 334
Length 3 1/4 in. Width 1/4 in.
Groove 1/4 in.

SINGLE WIRE CLEATS

Catalog No.					Dimensions in Inches		No. in Barrel	Gross Wt. per Barrel	Catalog No.					Dimensions in Inches		No. in Barrel	Gross Wt. per Barrel
New	Old	L.	W.	Gr.					New	Old	L.	W.	Gr.				
110	1 Reg.	1 1/4	1 3/8	1	2000	420	120	1B	1 1/4	1 3/8	1	1 3/8	1	1400	420		
111	1 1/4 R	2 1/4	1	1	1800	465	121	1 1/4 B	2 1/4	1	1	1	1	1050	440		
112	2 Reg.	2 1/4	1 1/4	1 1/4	1250	420	122	2B	2 1/4	1 1/4	1 1/4	1 1/4	1 1/4	800	420		
113	2 1/4 R	3	1 1/4	1 1/4	700	430	123	2 1/4 B	3	1 1/4	1 1/4	1 1/4	1 1/4	600	425		
114	3 Reg.	3 1/4	1 1/4	1 1/4	500	430	124	3B	3 1/4	1 1/4	1 1/4	1 1/4	1 1/4	400	430		
115	1A	1 1/4	1 1/4	1 1/4	1600	410	125	3 1/4 B	3 1/4	1 1/4	1 1/4	1 1/4	1 1/4	350	440		
116	1 1/4 A	2 1/4	1	1	1250	460	126	3 1/4 B	4 1/4	1 1/4	1 1/4	1 1/4	1 1/4	250	440		
117	2A	2 1/4	1 1/4	1 1/4	1000	430	127	4B	4 1/4	1 1/4	1 1/4	1 1/4	1 1/4	200	475		
118	2 1/4 A	3	1 1/4	1 1/4	650	425	128	4 1/4 B	5 1/4	2	2	2	2	140	475		
119	3A	3 1/4	1 1/4	1 1/4	450	435	129	4 1/4 B	6	2 1/4	2 1/4	2 1/4	2 1/4	100	490		

TWO AND THREE WIRE CLEATS

List No.	Description	No. per Bbl.	Wt. Lbs. per Bbl.	Gross Wt. Lbs. per 1000
334U-2	Un glazed, 2 wire	1850	385	210
334G-2	Glazed, 2 wire	1850	395	220
334U-3	Un glazed, 3 wire	1850	385	210
334G-3	Glazed, 3 wire	1850	395	220
350U-2	Un glazed, 2 wire	1250	395	324
350G-2	Glazed, 2 wire	1250	395	324
350U-3	Un glazed, 3 wire	1250	395	324
350G-3	Glazed, 3 wire	1250	395	324

No. 334. Length 3 1/4 in. Width 1/4 in. Groove 1/4 in. No. 350. Length 3 1/4 in. Width 1/4 in. Groove 1/4 in.

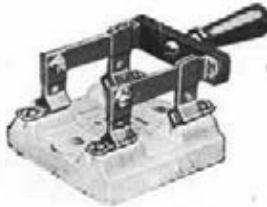
SINGLE WIRE CLEATS

List No.	Description	No. per Bbl.	Shpg. Wt. Lbs. per Bbl.	Gross Wt. Lbs. per 1000
333	Top, glazed 1 1/4 in. length, 1/4 in. wide. Groove 1/4 in.	21500	465 lbs.	24
333 1/2	Bottom, glazed	22000	475 lbs.	24

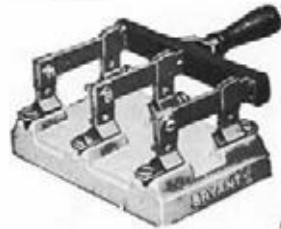
SWITCHES, LOCKNUTS AND BUSHINGS



List No. 1436



List No. 1438



List No. 1440

Bryant Baby Knife Switches
PORCELAIN BASE—125 VOLTS
Single Pole—Mounted

List No.	Description
1436	15 ampere, S. P., S. T.
1437	30 ampere, S. P., S. T.
1454	15 ampere, S. P., D. T.
1455	30 ampere, S. P., D. T.

Double Pole—Mounted

1438	15 ampere, D. P., S. T.
1439	30 ampere, D. P., S. T.
1456	15 ampere, D. P., D. T.
1457	30 ampere, D. P., D. T.

Triple Pole—Mounted

1440	15 ampere, T. P., S. T.
1441	30 ampere, T. P., S. T.

Carton Quantity	Std. Pkg.	Pkg. Wt., Lbs.
10	100	40
10	100	45
10	50	25
10	50	27

Schedule "H"

10	100	65
10	100	70
5	50	55
5	50	58

Schedule "H"

5	25	30
5	25	32



No. 1695



No. 62965



Locknut



Bushing

Bryant Entrance Switches
DOUBLE POLE, 30 AMPERES, 125 VOLTS

List No.	Description
1695	Fuses at the top

Carton Quantity	Std. Pkg.	Pkg. Wt., Lbs.
1	100	170

Schedule "J-2"

CUT-OUTS FOR GROUNDED CIRCUITS

These cut-outs will be supplied when specified to omit the fuse from the grounded wire without extra charge. Of the dimensions, the one first given is that parallel to the main.

List No.	Description	Dimensions, In.	Carton Quantity	Std. Pkg.	Pkg. Wt., Lbs.
62965	Double pole main.	2½ 2½	10	150	100

BUSHINGS

Size	Unit Pkg.	Std. Pkg.	Wt. per Std. Pkg. Lbs.
½ in.	100	1000	45
¾ in.	100	1000	60
1 in.	100	1000	90
1¼ in.	...	500	60
1½ in.	...	200	30
2 in.	...	100	20
2½ in.	...	100	30
3 in.	...	100	40
3½ in.	...	25	14

LOCKNUTS

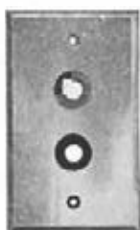
Size	Unit Pkg.	Std. Pkg.	Wt. per Std. Pkg. Lbs.
½ in.	100	5000	70
¾ in.	100	5000	128
1 in.	100	1000	40
1¼ in.	...	500	40
1½ in.	...	250	30
2 in.	...	100	16
2½ in.	...	100	20
3 in.	...	100	30
3½ in.	...	25	9

FISH WIRE

This wire will be furnished in any length up to 500 ft. in coils but can be furnished in any length desired.

List No.	Description	List No.	Description
1000	Fish wire ½ x .060 in. (standard size)	1003	Fish wire ½ x .030 in. (standard size)
1001	Fish wire ¾ x .060 in. (standard size)	1004	Fish wire ¾ x .030 in. (standard size)
1002	Fish wire 1 x .060 in. (standard size)	1005	Fish wire 1 x .030 in. (standard size)

MISCELLANEOUS WIRING SUPPLIES



No. 3618



No. 1999

No. 66341
Mica CapFixture Connector
Complete Connection Before Taping

TELEPHONE PLATES

Telephone Plates with One Bushing. When ordering "Combination Plates" specify "G" sections for telephone plates with one bushing.

List No.	Std. Pkg.	Schedule	Description	Schedule "H-3"	
				Pkg. Wt., Lbs.	Car- ton
3649	†	Single plate, solid, brass.....	45	10
3606	†	Single plate, struck-up, $\frac{1}{16}$ inch, brass.....	40	10
3616	†	Single plate, struck-up, .040 inch, brass.....	35	10
3617	†	Single plate, struck-up, .040 inch, steel.....	34	10

Holes for supporting screws are spaced $3\frac{3}{4}$ inches on centers.

Dimensions are the same as push button plates listed elsewhere.

Telephone Plates with two bushings. When ordering "Combination Plates" specify "H" sections for telephone plates with two bushings.

List No.	Std. Pkg.	Schedule	Description	Schedule "H-3"	
				Pkg. Wt., Lbs.	Car- ton
3651	†	Single plate, solid, brass.....	45	10
3618	†	Single plate, struck-up, $\frac{1}{16}$ inch, brass.....	40	10
3619	†	Single plate, struck-up, .040 inch, brass.....	45	10
3620	†	Single plate, struck-up, .040 inch, steel.....	34	10

Holes for supporting screws are spaced $3\frac{3}{4}$ inches on centers. Dimensions same as push button plates listed elsewhere.

BELL PLATES

Bell Plates. The button (which is included in the price of the plate) is of the standard midget type, fitting a $\frac{1}{2}$ inch hole. If any other type of button is specified, an extra charge will be made.

When ordering "Combination Plates" specify "T" sections for bell plates.

List No.	Std. Pkg.	Schedule	Description	Schedule "H-3"	
				Pkg. Wt., Lbs.	Car- ton
3668	†	Single plate, solid, brass.....	24	10
3669	†	Single plate, struck-up, $\frac{1}{16}$ inch, brass.....	21	10
3670	†	Single plate, struck-up, .040 inch, brass.....	18	10
3671	†	Single plate, struck-up, .040 inch, steel.....	17	10

Holes for supporting screws are spaced $3\frac{3}{4}$ inches on centers. Dimensions same as push button plates listed elsewhere.

†A standard package of telephone plates consists of 100, assorted from all those listed.

†A standard package of bell plates consists of 50, assorted from all those listed.

ONE-PIECE ROSETTE
"Junior" Fuseless—660 Watts, 250 Volts

List No.	Description	Pkg. Wt., Lbs.	Schedule "H-2"	
			Car- ton	Std. Pkg.
1999	Cleat and concealed combined.....	135	10	500

Main diameter is $2\frac{1}{4}$ inches. Diameter over lugs $2\frac{3}{4}$ inches. Height $1\frac{1}{2}$ inches.

Holes for supporting screws are spaced $1\frac{1}{4}$ inches on centers.

BRYANT "PYROTITE" FUSE PLUGS

List No.	Pkg.	Wt., Lbs.	Schedule "I"
			Pkg. Wt., Lbs.
66331	10	100	500
66337	20	100	500

Carton quantity for fuse plugs is 100.

The above fuses can also be furnished with solid brass caps on special order.

Add

SHERMAN FIXTURE CONNECTORS
Suitable for All Small Connections

Sherman fixture connectors will connect all wires up to No. 12 with a maximum of two No. 12 solid or three No. 14 in either end.

Fixture connectors.....	Carton	Std. Pkg.	Pkg. Wt., Lbs.
	100	500	12

MISCELLANEOUS WIRING SUPPLIES



S-19 50 Watts



For Regular Socket



For Porcelain Socket

Matthews Holdfast Lamp Guards



Holdfast Portable With Reflector

MAZDA B LAMPS FOR GENERAL LIGHTING SERVICE

110, 115 and 120 Volts

These lamps are fitted with medium screw bases

Watts	Approx. Lumens	Bulb	Max. Overall Length, Ins.	Stand. Pack. Quantity	Watts	Approx. Lumens	Bulb	Max. Overall Length, Ins.	Stand. Pack. Quantity
REGULAR TYPE MAZDA LAMPS									
10	78	S-17	4 3/8	120	40	400	S-19	5 1/2	120
15	125				50	500			
25	230				60	600			
							S-21	5 1/2	120

MATTHEWS HOLDFAST LAMP GUARDS

List *Nos.	Size of Wire	List **Nos.	Size of Wire
114B	14 B.W.G.	514B	14 B.W.G.
114WP	14 B.W.G.	514WP	14 B.W.G.
112B	12 B.W.G.		
112WP	12 B.W.G.		

*Guards for protecting 6, 8, 10, 16 and 32 C.P. carbon and 15, 25, 40, 50 and 60 watt Mazda lamps.

**Guards for protecting 50 C.P. carbon and 75 and 100 watt Type C pear shape Mazda lamps.

Guards for brass sockets are shown by the letter "B" after the trade numbers and for weatherproof socket by the letters "WP"; collars for "B" are 1 1/2 inches; for "WP" 1 1/2 inches inside diameter. Guards may be included with orders for Matthews Holdfast Adjustables, and Matthews Holdfast Shades, to obtain the maximum quantity prices on each specialty.

MATTHEWS HOLDFAST PORTABLES

No. 4112 includes lamp guard, socket and handle only.

No. 4112-S same as above with Matthews Holdfast Shade.



No. 21A Battery Clip



No. 2521



No. 2534



No. 2533



No. 2535

List No.

UNIVERSAL BATTERY CLIPS

- 24A 15 ampere, screw connection, spread of jaws, 1 in., weight 1 oz.
 21A 35 ampere, screw connection, spread of jaws, 1 1/2 in., weight 4 oz.
 33A 200 ampere, lug connection, spread of jaws, 2 in.

FRANKEL'S TEST CLIPS

- 2521 The standard test clip
 2533 The helpful test clip

- 2534 The reliable test clip
 2535 The efficient test clip

TORCHES, FIRE POTS AND VOLTAMMETERS

THE No. 91 FIRE POT (Steel Tank)



No. 91 Fire Pot

The powerful burner of the No. 91 fire pot has great generating power and burns perfectly either high or low test gasoline, quickly heating a pair of 12 lb. soldering coppers and a pot of lead or solder can be melted at the same time. Heavy gauge drawn steel tank is tinned inside and out which prevents rust, and is strongly reinforced and fitted at the base with patented cushion band which protects it from injury. The No. 91 is a popular fire pot for tinnerns, plumbers and general utility use. Of one gallon capacity, Improved Single Needle Burner for Gasoline.

The No. 32 TORCH FOR GASOLINE



No. 32 Torch

The No. 32 Torch is desirable where intense heat is wanted. Burner is made of special generator metal that holds the heat longer, having a chamber that super heats the gas before it is burned. The intensely hot blue flame burns perfectly indoors or outside under extreme conditions of wind and cold weather. Hook removable. Tank fitted with improved patented brass pump.

Capacity one quart. Weight $4\frac{3}{4}$ lbs.

STERLING POCKET VOLTAMMETERS



No. 44

The voltammeter is invaluable for those who work with both dry and storage batteries and for work around similar electric circuits.

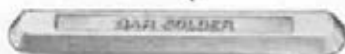
Standard package contains 10. Shipping carton contains 10 standard packages, shipping weight, 25 lbs.

No. (Symbol 431).....	44	44A	45
Scale, amperes.....	0-35	0-35	0-35
Scale, volts.....	0-10	0-16	0-50
Ampere division.....	1	1	1
Volt division.....	1/5	1/2	1

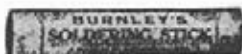
SOLDERING ACCESSORIES



Resin Core Solder



Bar Solder



Soldering Stick



Solder Kits

RESIN CORE FLUX SOLDER

This solder is provided with a core of resin which melts on the application of heat and prevents the formation of oxides, thus permitting the making of a strong bond between the metals.

Furnished in $\frac{1}{2}$ -lb. boxes, also in 1-lb., 2-lb., 5-lb. and 10-lb. spools.

BAR SOLDER

An alloy of tin and lead, made up in the form of bars for convenience in handling, for making soldered joints in metals, such as lead piping systems, for cable splices and other heavy work.

SOLDERING STICKS

Rub the stick on the heated joint, then apply solder and heat. Every stick is wrapped in tin foil and put up in separate box 6 inches long by 1 inch in diameter.

SOLDER KITS

A complete and practical soldering outfit for the home, motorist, mechanic and farmer.



Pony Soldering Copper



Standard Soldering Copper

PONY SOLDERING COPPERS

Specially adapted for electrical work. Made of pure copper, tinned. Fitted with Black Lacquered Handles.

	Wt., Lbs.		Wt., Lbs.
Copper, length of handle, $8\frac{1}{2}$ inches.....	2	Copper, length of handle, $11\frac{1}{2}$ inches.....	$1\frac{1}{2}$
Copper, length of handle, 9 inches.....	$1\frac{1}{2}$	Copper, length of handle, 12 inches.....	2
Copper, length of handle, $10\frac{1}{2}$ inches....	$1\frac{3}{4}$		

STANDARD SOLDERING COPPERS

3 lbs. to pair and heavier, without handles		$1\frac{1}{2}$ lbs. to pair, without handles.....	
$2\frac{1}{2}$ lbs. to pair, without handles.....		1 lb. to pair, without handles.....	
2 lbs. to pair, without handles.....			

Pointed soldering coppers with handles 7 inches long by $\frac{1}{8}$ and $\frac{3}{8}$ -inch diameter, weighing 2 lbs. to 6 lbs. to pair, inclusive, can also be furnished.



Pouring Ladle



Melting Pot.

DOUBLE LIP POURING LADLES

Used to pour lead or solder in making wiped or soldered joints in lead covered cables, large stranded cables, and other electrical construction.

Size, $2\frac{1}{2}$ -inch, 3-inch.

CAST IRON MELTING POTS

Designed for melting lead and solder. Used by electricians in soldering heavy splices, trimming large cables and busbar joints, wiping joints on lead cover cables, etc.

Sizes 5-inch, 6-inch, 8-inch, pots.

INSULATING MATERIALS



Amazon Tape



Victor Tape



Sticka Tape



Rubber Amazon Tape



Rubber Victor Tape

AMAZON BLACK FRICTION TAPE

This is a good quality tape and will pass the majority of specifications in use.

Standard rolls contain $\frac{1}{2}$ pound of $\frac{3}{4}$ inch tape, which is 84 feet in length.

VICTOR BLACK FRICTION TAPE

Protects the splicing compound on wire joints from abrasion. Suitable for ordinary commercial work.

Roll contains $\frac{1}{2}$ pound of $\frac{3}{4}$ inch tape, about 72 feet in length.

STICKA BLACK FRICTION TAPE

For all ordinary commercial work. Used to protect the splicing compound on a wire joint from abrasion.

Roll contains $\frac{1}{2}$ pound of $\frac{3}{4}$ inch tape, length about 56 feet.

OKONITE TAPES

$\frac{3}{4}$ inch, $\frac{1}{2}$ pound rolls.

Description

- Manson Black Friction.
- Manson White Friction.
- Okonite Rubber Tape.

AMAZON GRAY RUBBER SPLICING TAPE

A compound partially vulcanized which increases dielectric and tensile strength. The adjacent layers adhere readily on a joint and after a few minutes become a solid, homogeneous mass. Passes majority of specifications on splicing compounds.

Measures 24 feet per $\frac{1}{2}$ pound roll.

VICTOR BLACK RUBBER SPLICING TAPE

A commercial grade, unvulcanized compound. Will fuse into a homogeneous mass at average air temperature under heat of the fingers. Half-pound roll, .030 inch thick, contains approximately 22 feet. Packed in 50 pound cartons.

GRIMSHAW TAPES

$\frac{3}{4}$ inch, $\frac{1}{2}$ pound rolls.

Description

- Black Friction.
- White Friction.
- Rubber Tape.

COMPETITION FRICTION TAPE

$\frac{3}{4}$ inch, $\frac{1}{2}$ pound rolls.

- Black Friction.
- White Friction.

COMPETITION RUBBER TAPE

$\frac{3}{4}$ inch, $\frac{1}{2}$ pound rolls.

Competition Rubber.



Soldering Paste



Soldering Salts



Superior Compound

SOLDERING PASTE

It may be applied with a rag, a stick or even with the fingers.

2 oz. tin cans
4 oz. tin cans

$\frac{1}{2}$ lb. tin cans
1 lb. tin cans

5 lb. tin cans

NOTE. Other makes of soldering salts, paste, sticks, etc., can be furnished on application.

SOLDERING SALTS

This soldering salt combines in soluble crystal form the most efficient soldering agents known to chemists. It dissolves readily in water and does not give off any obnoxious odors or gases. Directions for dissolving in water to make a soldering agent of proper strength are included with each package. Put up in $\frac{1}{2}$ lb. and 1 lb. and 5 lb. cans.

SUPERIOR COMPOUND

5 lb. cartons and 10 lb. cartons.

MISCELLANEOUS SUPPLIES



No. 2694 Flashlight
Industrial Type



Pyrene
Fire Extinguisher



Guardene
Fire Extinguisher



Pyrene Liquid

No. 2694 INDUSTRIAL FLASHLIGHT

There has always been a real need for a flashlight made especially for men of industry—Linemen, Night Repairmen, Factory Workers, Out-of-Door Mechanics, Meter-Readers—these and others in a thousand occupations that demand the use of both hands for the work to be accomplished have never had a proper portable light to work with. Here it is—the new Eveready No. 2694—and here are some of the features:

1. A strong steel hook or clip permits the flash light to be fastened to the worker's belt or clothing, thus leaving both hands free.
2. The lens is on the side, at right angles to the case; the beam of light is automatically directed on the job the workman faces.

List No.	Finish	Size, Inches	Unit Cell	Battery
2694	Nickel	7 x 1½	1 No. 950	2 No. 790

PYRENE FIRE EXTINGUISHER

Made in two sizes, 1 quart and 1½ quart. Labeled by the Underwriters' laboratories. Compact, light, non-freezing; the liquid does not deteriorate. Especially suitable for homes, automobiles, motor boats, railway cars, power houses, etc.

GUARDENE FIRE EXTINGUISHER

Polished copper. Capacity 2½ gallons. Labeled by the Underwriters' Laboratories. This is the standard soda-and-acid extinguisher which is universally used for the protection of industrial plants and public buildings.

PHOMENE EXTINGUISHER

Foam type. 2½ gallon capacity. Polished copper. Labeled by Underwriters' Laboratories. Especially effective in oil, naphtha, gasoline, lacquer or paint fires, and any material of a highly inflammable nature.

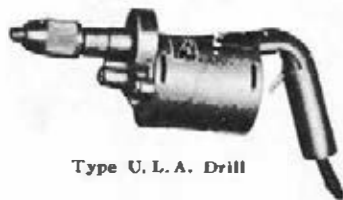
PYRENE LIQUID

Sold in 1 quart cans, 20 to a case; 1½ quart cans, 10 to a case; gallon cans, 6 to a case, and 50 gallon drums. This liquid is especially compounded for fire-extinguisher use, and meets specifications of the Underwriters' Laboratories. Only Pyrene Liquid should be used in the Pyrene Extinguisher; other liquids are liable to corrode the mechanism and ruin the extinguisher. Pyrene Liquid is non-corrosive, a non-conductor of electricity, and will not freeze at 50 degrees below zero.

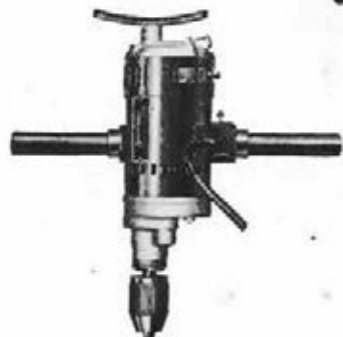
SPEED WAY ELECTRIC DRILLS—HAMMERS AND GRINDERS



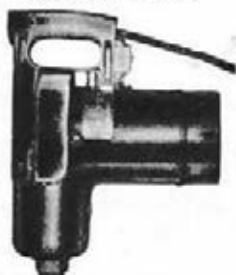
Type U. L. B. Drill



Type U. L. A. Drill



Type U. L. D. Drill



Type D-4 and U-6 Hammer

Type W. A. G. Type W. D. G.
Bench Grinder

In ordering grinders, voltage must be specified, and in case of bench grinder W. A. G. for A. C. and W. D. G. for D. C., current must be specified.

DRILL PRESSES FOR DRILLS SHOWN

Where the work can be carried to the bench these drill presses shown on right will perform quicker and easier.

Type L. A. for U. L. A., weight 9 pounds.....

Type L. D. for U. L. D., weight 40 pounds.....

TYPE U. L. B. DRILL $\frac{1}{8}$ INCH CAPACITY

Weight 6 pounds. Gear reduction 8 to 1.
Housing all aluminum giving strength and light weight.
Gears alloy steel, heat treated and ground.
Load speed 750 R.P.M. Chuck three-jaw self-tightening.
This tool combines strength and power with a minimum of weight.
Only one pound heavier than the U.L.A. drill, it has much greater torque, slower speed and 25% greater drilling capacity.

TYPE U. L. A. DRILL $\frac{1}{4}$ INCH CAPACITY

Weight, 5 pounds. Motor $\frac{1}{8}$ h.p. Gear ratio, 4 to 1.
Housing drawn steel giving compactness.
Gears, spindle of Cramps gear bronze, pinion of steel.
Load speed, 1,200 R.P.M.
Universal motors operating on A.C. and D.C.
Ball type thrust and sleeve type motor bearings.
Square brushes. Chuck, three-jaw self-tightening.
All capacities shown are for steel. 40% over for wood.

TYPE U. L. D. DRILL $\frac{1}{2}$ INCH CAPACITY

Weight, 12 pounds. Motor, $\frac{1}{4}$ h.p. Gear ratio, 17 to 1.
Diameter, 4 inches. An exceptionally compact drill.
Motor housing, seamless steel tubing, semi-steel gear case.
Gears, alloy steel heat treated and ground.
(No. 1 morris taper instead of chuck, if specified.)
Load speed, 400 R.P.M.
Universal motors, operating on A.C. and D.C.
Brushes all square, impregnated pigtail carbon.
All capacities are shown for steel. Add 40% for wood.

TYPE U-6 AND D-4 HAMMERS

The popular type hammer for the contracting, installation trade, and maintenance men. With a drilling speed of 1 inch per minute in depth in the hardest concrete, and the ability to keep it up. We do not hesitate to go on record to state that this hammer will do the work of ten men each day it is worked. It will operate on A.C. or D.C. (the U-6) and a 110 volt tool can be used on 220 volt, provided proper resistance is used. A simple magnetic cushion is superimposed between the hammer element and motor, eliminating back lash on motor, vibration and breakage.

Type U-6 A.C. and D.C., 1 inch capacity, 26 pounds, 1,800 blows.
Type D-4 D.C. only, 1 inch capacity, 25 pounds, 1,800 blows.

TYPE W. A. G. AND W. D. G. BENCH GRINDER

The grinder shaft is driven from motor behind, which has done away with bearing troubles. Because of the belt drive, an overload on the motor is practically impossible, as belt will slip if grinder is crowded too fast. Grinding shaft has split bearings which can be taken up when any wear develops in these bearings. Bearings are bronze backed babbit.

A.C. or D.C. must be specified on this grinder. Voltage must be specified.

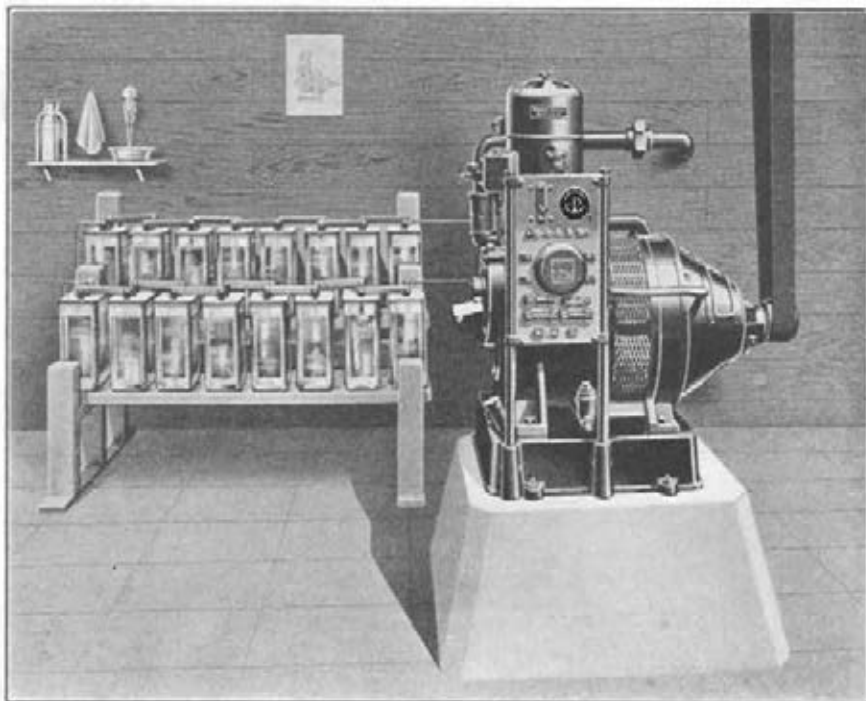
Weight, 40 pounds. Motor rating, $\frac{1}{4}$ h.p. Speed, 3,600 R.P.M.

Guards, adjustable rests, and two $4\frac{1}{2}$ inch x $\frac{1}{2}$ inch wheels furnished.



Drill Press

32-VOLT 15 D. C. TYPE POWER AND LIGHT OUTFIT



32-Volt 15 D. C. Type Power and Light Outfit

These Power and Light Outfits are time and labor savers. They make it practical for anyone, no matter how remote from central service, to use electricity.

By simply pressing a button you can have electric power and electric light any time and anywhere you want it—electric power to run all the machines you now turn by hand.

Besides, it will automatically pump water for practically any purpose including main buildings, the barn, the dairy, the garage and the garden. Running water where and when you want it saves countless steps and gives the conveniences of a modern bathroom.

Electric light and power are economically and dependably produced without any care whatever.

It eliminates the disagreeable task of filling and trimming kerosene lamps and lanterns. Electric lights are safe on the farm.

Electric light has many uses. In the hen houses it increases egg production. Tests made by agricultural stations have proved this time and time again. It is just as advantageous in the telephone industry—with slight changes it is adaptable for charging telephone batteries as well as other features referred to herein.

The 15-D. C. outfit runs on kerosene—very often less than was used to keep oil lamps burning. The kerosene is poured into a tank in the base of the outfit. The capacity of this tank is such that it does not need to be filled during charging period.

It is easy to operate. A slight pressure on the lever starts it; it stops itself when the battery is charged.

It gives the tapering charge which makes the battery last longer.

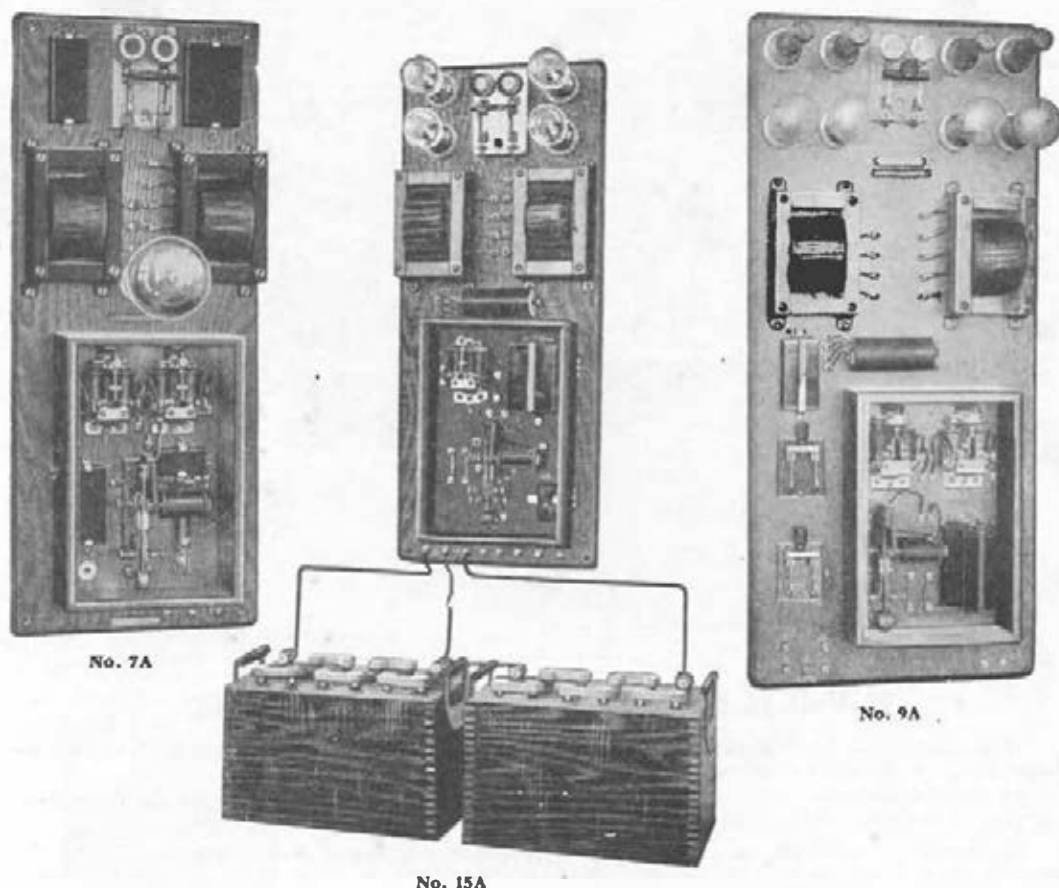
It can be furnished equipped with magneto for portable uses on construction work and for lighting and power wherever plant can be started when power is needed.

It has a circulating splash system of lubrication. Simply pour oil into the crank case and the engine does the rest. It runs in a steady stream over the crank pin bearing and keeps every moving part in a bath of oil.

Every part of the outfit is easy to get at. By taking off four nuts, the crank case cover can easily be removed, making easy access to every part and assembly simple.

The engine is air cooled and the outfit is equipped with a throttle governor so that, irrespective of load carried, the speed is always the same.

Three sizes of batteries are furnished as standard equipment—125, 185 and 250 ampere hour. Types 15DC 125, 15DC 185 and 15DC 250. The 15DC is also furnished in a magneto type without batteries.

LEICH RINGING 'MACHINES**To Operate off A.C. or D.C. Lighting Circuit****General Description**

These Leich converters are designed to operate off a 60 cycle, 110 volt alternating current, or 110 volt direct current, delivering a 20 cycle alternating ringing current at 90 to 110 volts.

The Leich combined charging and ringing machine operates on 110 volt alternating current of any frequency from 25 to 60 cycles. The principle of the machine is the continued use of lighting current taken directly from the mains to charge two sets of self-contained storage batteries.

The batteries will automatically carry the ringing load for 48 hours or more.

To operate off alternating current lighting circuit.

Code No.	Description
7A	Frequency converter. Furnishes 20 cycle alternating current for straight line ringing. Operates off 110 volts, 60 cycle lighting circuit.

To operate off 110 volt direct current lighting circuit.

Code No.	Description
9A	Ringling converter. Furnishes 20 cycle alternating current for straight line ringing. Operates off 110 volt direct current lighting circuit.

To operate on intermittent alternating current lighting service.

Code No.	Description
15A	Combined charging and ringing converter to operate off 110 volts 60 cycle alternating current for straight line ringing. Requires two 12 volt storage batteries which must be ordered separately.

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