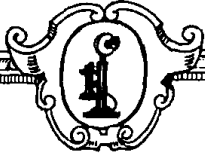


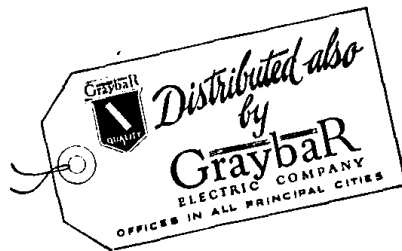
135-1, A Box at Oak Jc.



# Railway Train Dispatching Telephone Systems



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# *Western Electric*

## Railway Train Dispatching Telephone Systems

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A development of Bell Telephone Laboratories, Incorporated, The Research Laboratories of the American Telephone & Telegraph Company and the Western Electric Company



No. 60-AP Selector

### INTRODUCTION

**R**AILWAY Train Dispatching Telephone Equipment has proved indispensable for quick and reliable means of communication between the dispatcher and the various way station operators of a Train Dispatching System. The dispatcher can call selectively any one of a number of way stations on the same telephone line without producing a signal at any of the other stations.

The apparatus used in this equipment is the result of years of research and has back of it over one-half a century of telephone manufacturing experience. This equipment represents the highest standards of design, engineering and workmanship; having proved its efficiency and reliability under most severe operating conditions.

## RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEMS

### General Description

ON all railroads of today there is one man called a dispatcher who has control of all train movements on his division. A division may extend from 30 to 150 miles in length for the busy multiple track roads or from 100 to 250 miles for single track roads where the number of trains per day are few. There may be from 15 to 75 stations or signal towers with which the dispatcher will want to communicate. The dispatcher has a train sheet in front of him on which he keeps a record of the time of arrival and departure or passing at each station of all trains whether passenger, freight or extra. Also the train sheet shows the engine number, the make up of the train, and the names of the crew. Whenever there is any change from the regular schedule, it is necessary for him to issue a train order to the nearest station agents or signal men which in turn is given to the trainmen. The method of giving a train order by telephone is as follows: The dispatcher, as he gives the order over the telephone to the operator at the distant station, writes the order in a log book and at the same time the way station operator writes the order on duplicate forms for handing to the conductor and the engineer. As a check, the operator always reads the order back over the telephone to the dispatcher who underlines each word in the log book to indicate he has received the order back as originally given. Often the order is taken by three or more operators at the same time; if so, each reads it back in turn and the dispatcher underlines his original order each time. In giving an order, all important words and numbers are both pronounced and spelled out.

Although a train dispatching system is nothing more than a long and heavily loaded selective party line, there were many new problems that had to be considered that are not met with in the commercial telephone systems. It is necessary to operate a selective device at each of the twenty-five, fifty or seventy-five way stations over a pair of wires up to 300 miles in length without interfering in any way with the telephone transmission. Of course, each installation differs from every other one as to number of way stations and length of line. To operate under these varying conditions the selector must operate on very little energy but on the other hand to warrant its use for this class of service the selector must be very positive and reliable in its operation. If the line wires become open at any point, the dispatcher must be able to call stations up to the open point even under the most severe weather conditions.

The most modern selector, the No. 60 type, has become the standard on all railroads in the United States and is used in nearly all countries of Europe and in Japan, China, India, Africa, Australia, Canada and South American countries. This selector is a polarized device somewhat similar in magnetic structure to a ringer and so arranged that the armature on each + and — impulse advances a ratchet wheel one step. Although very sensitive, the selector is rugged and will withstand very rough handling.

## RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEMS

### Layout of System

#### GENERAL

A Railway Train Dispatching Telephone System consists of a Dispatcher's (sending) station and a number of Way (receiving) stations.

The Dispatcher's Station is equipped with telephone apparatus for receiving and transmitting messages and an apparatus case containing various parts required in the circuit for protection and operation. Also, a key case equipped with keys for each way station to be called. Each key has a different code setting which corresponds to the code setting of one of the way station selectors.

Each Way Station is equipped with telephone apparatus for receiving and transmitting messages; also, a selector set with its associated apparatus. The code setting of the selector in the set corresponds to the code setting of one of the keys at the dispatcher's station.

### Dispatcher's Station Equipment

#### GENERAL

The following selector and telephone apparatus is recommended for the dispatcher's station. The selection of the proper equipment depends upon the total number of way stations to be installed also the type of way station selector sets and whether telephone apparatus with or without loud speaking telephones is required.

#### DISPATCHER'S SELECTOR APPARATUS

| Quantity | Description                                                                                                                                                                                                                   |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| One—     | No. 60-A Selector Apparatus Case.                                                                                                                                                                                             |
| One—     | No. 60-A Selector Key Case (capacity 24 stations) or,<br>No. 60-B Selector Key Case (capacity 36 stations) or,<br>No. 60-C Selector Key Case (capacity 48 stations) or,<br>No. 60-D Selector Key Case (capacity 60 stations). |
| One—     | No. 60-A Selector Key installed in above key case, for each Nos. 160-AC or AR Selector Sets at any of the way stations.                                                                                                       |
| One—     | No. 60-B Selector Key installed in above key case for each Nos. 160-BC or BR Selector Set installed at the way stations.                                                                                                      |
|          | One of these keys also required for each way station extension bell installed.                                                                                                                                                |

#### DISPATCHER'S TELEPHONE APPARATUS—HEADSET OUTFIT

| Quantity | Description                                                                                                                                          |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| One—     | Nos. 502-B Desk Set Box (Sub. Set).                                                                                                                  |
| One—     | No. 345-A Jack Box.                                                                                                                                  |
| Three—   | Each of the following:<br>No. 386-W Transmitters, No. 189-W Receivers.<br>No. 565—6 ft. cords, No. 137 Plugs and<br>No. 3-B Transmitter attachments. |
| One—     | No. 1-B Foot Switch with                                                                                                                             |
| One—     | No. 1-A or No. 1-B Foot Switch attachment and                                                                                                        |
| One—     | No. 2-A Foot Switch attachment (conduit).                                                                                                            |



## RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEMS

### Layout of System

### Dispatcher's Station Equipment

(Continued)

#### DISPATCHER'S LOUD SPEAKING TELEPHONE APPARATUS

In addition to the telephone apparatus outlined above; with the exception of the No. 1-B Foot Switch, the following Loud Speaking Telephone Apparatus is recommended.

| Quantity | Description                                                                               |
|----------|-------------------------------------------------------------------------------------------|
| One—     | No. 12A Loud Speaking Telephone Outfit.                                                   |
| One—     | No. 6033-A Amplifier for 60 cycles, 110 volt or 6040-A Amplifier for 25 cycles, 110 volt. |
| One—     | No. 543-W Loud Speaking Telephone.                                                        |
| One—     | No. 34-G Resistance.                                                                      |
| One—     | No. 3-B Foot Switch.                                                                      |
| One—     | No. 6002-B Key.                                                                           |

#### DISPATCHER'S TIME SENDING APPARATUS

One— Time Sending Set D-14386.

#### DISPATCHER'S BATTERY REQUIREMENTS

One— No. 60-A Vacuum Tube Rectifier, or, Dry Cells, Storage Cells, or Motor Generator Set, as required, for main battery source.  
 Eight— Dry cells, for local relay battery.  
 One— No. 2-B Battery Box (for above dry cells).  
 Five— No. 252 Edison BSCO Cells for transmitter battery.

#### DISPATCHER'S HAND GENERATOR BOX

One— No. 299-F Hand Generator Box (for use in calling Magneto Portable or siding sets).

## Way Station Equipment

#### GENERAL

The following Selector and Telephone Apparatus is recommended for each way station. The selection of the proper equipment depends upon whether the selectors are to be used for regular line circuits or to be operated through a repeating coil with or without extension sets; also whether Loud Speaking Telephones are required.

#### WAY STATION SELECTOR APPARATUS

| Quantity | Description                                                                                                                                                                                                                                                  |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| One—     | No. 160-AC Selector Set for use without repeating coil or,<br>No. 160-AR Selector Set for use with the No. 70-A Repeating Coil.                                                                                                                              |
| One—     | No. 160-BC Selector Set where 2 to 4 party, way station extensions are required for regular line service or,<br>No. 160-BR Selector Set where 2 to 4 party, way station extensions are required and when the No. 70-A repeating coil is used in the circuit. |
| One—     | No. 127-J Extension Bell for each way station extension, and when using No. 160-BC and BR selector sets.                                                                                                                                                     |

#### WAY STATION TELEPHONE APPARATUS (Without Loud Speaking Telephone)

One— No. 501-A Desk Set Box (sub-set—equipped with key) or,  
 No. 501-B Desk Set Box (sub-set—arranged for foot switch).  
 One— No. 1142-AB Desk Stand or,  
 No. 1120-C Transmitter Arm or,  
 No. 1148-DA, DB, DC or DD Transmitter Arm, as required.  
 One— No. 3-C Foot Switch with (for No. 501-B Desk Set Box)  
 One— No. 1-A or B Foot Switch attachment, and  
 One— No. 2-A Foot Switch attachment (conduit).

#### WAY STATION TELEPHONE APPARATUS (With Loud Speaking Telephone)

One— No. 501-B Desk Set Box (sub-set).  
 One— No. 1142-AB Desk Stand or 1148 Type Transmitter Arm.  
 One— No. 6033-A Amplifier (60 cycles, 110 volt) or 6040-A Amplifier (25 cycles, 110 volt).  
 One— No. 543-W Loud Speaking Telephone.  
 One— No. 34-A Resistance.  
 One— No. 3-D Foot Switch with  
 One— No. 1-A or B Foot Switch attachment, and  
 One— No. 2-A Foot Switch attachment.

**RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEMS**  
**Layout of System****Way Station Equipment***(Continued)***WAY STATION EXTENSION BELL**

One— No. 127-J Extension Bell, for each way station extension.

**WAY STATION BATTERY REQUIREMENTS**

Three—Dry Cells.

One— No. 1-A Battery Box (for three dry cells).

**WAY STATION PROTECTORS**

As required—No. 58-BP Protector for each way station.

**Miscellaneous Equipment****GENERAL**

Apparatus for miscellaneous purposes on Railway Train Dispatching Systems is described more fully in the following pages. The most important of this type of equipment is as follows:

**REPEATING COIL**

Circuits equipped with 60 Type Selectors may be operated through 70-A Repeating Coils to allow:

1. A low simplex resistance in the simplex telegraph circuit.
2. One or more selector circuits to be operated from a main selector circuit without any metallic connection to it.
3. Two or more simplex selector circuits terminating at one point to be operated from a common main current supply.
4. Two selector circuits to be used as side circuits for obtaining a composited or simplex phantom with the physical and phantom telephone and the telegraph circuits terminated at the same or different points. Figure 4 (page 21) shows a general way of obtaining these conditions.

**SIDING TELEPHONE SETS**

| Quantity | Description                                                                                            |
|----------|--------------------------------------------------------------------------------------------------------|
| One—     | No. 1293-BC Telephone Set or,<br>No. 1317-BU or DU Telephone Set or,<br>No. 1336-F or H Telephone Set. |

**PORTABLE TELEPHONE SETS**

One— No. 1330-E or F Telephone Set or,  
No. 1331-E or F Telephone Set or,  
No. 1332-A or E Telephone Set.

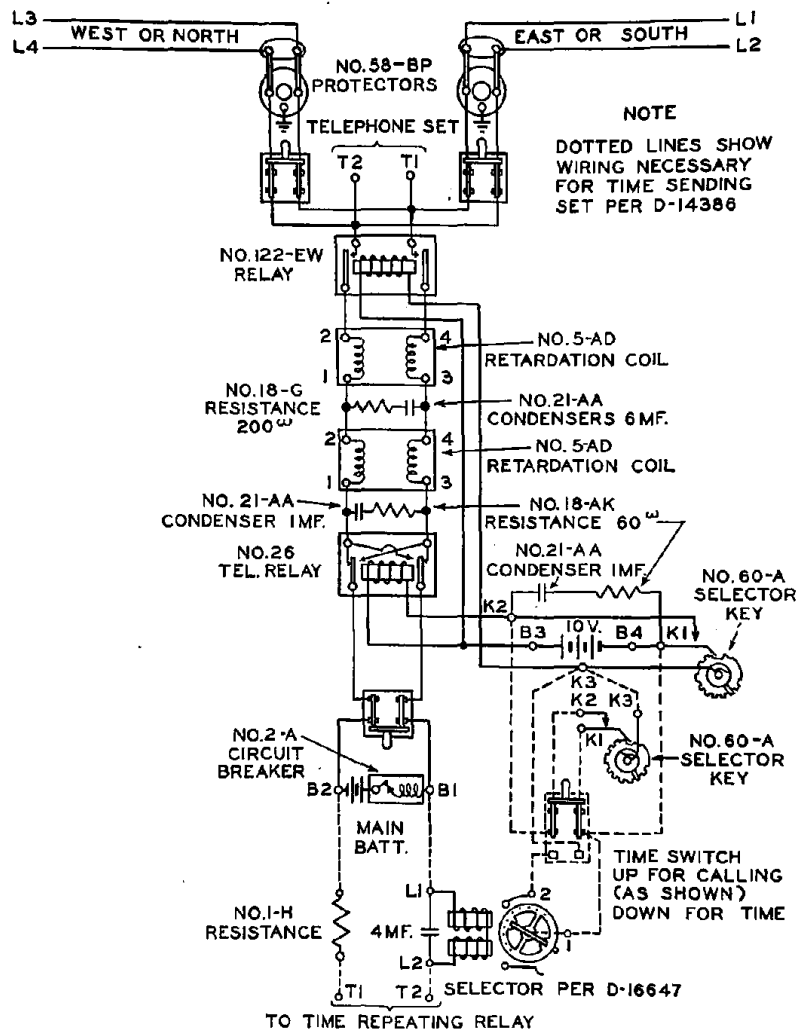
One— No. 3 or No. 5 Line Pole.

**TESTING APPARATUS**

One— No. 2-A Test Board (for two metallic circuits) or,  
No. 2-B Test Board (for four metallic circuits) or,  
No. 3-A Test Board (for six metallic circuits).

# RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEM

## Layout of System



Schematic Wiring of No. 60-A Selector Apparatus Case

## RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEMS

## Description, Adjustments and Operation of Sets

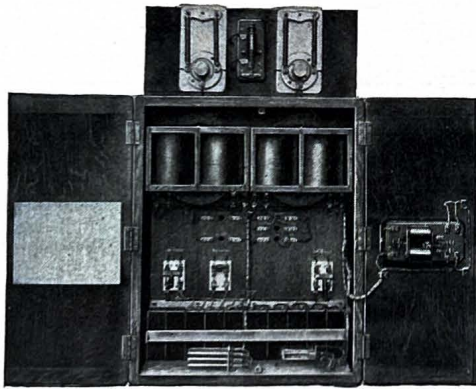
## GENERAL SEQUENCE OF OPERATIONS

Refer to page 6, which shows the sending circuit arrangement.

The sequence of operation of the various parts of the system when a call is made is as follows: a key in the key case at the dispatcher's office, corresponding to the selector at the way station to be called, is operated by winding it up a quarter turn. Upon releasing the key, contact K1-K3 (see diagram, page 6), is closed continuously and the No. 122-EW relay is operated, connecting the main battery through the contacts of the No. 26-A Relay and the two No. 5-AD Retardation Coils to the line wires L1 and L2; also, the key contact K1-K2 is closed intermittently, operating the pole changer relay (No. 26-A) in such a manner as to send a sequence of reverse impulses to the line corresponding to the unmasked teeth on the impulse wheel of the key operated. This sequence of impulses will operate the selector at the station called so as to close its bell circuit. The bell at that station will ring for about two seconds and the dispatcher will hear a tone or answer-back signal in his receiver indicating the operation of the bell. Another impulse from the key releases the selector and opens the bell circuit, returning the circuit to normal.

## Description of Dispatcher's Selector Equipment

## SELECTOR APPARATUS CASE



No. 60-A Selector Apparatus Case—Open

The No. 60-A Selector Apparatus Case contains all of the calling apparatus at the dispatcher's station except the keys and the telephone set in ordinary installations. It is an oak cabinet approximately 32" high by 16" wide by 12" deep, arranged for wall mounting. It is completely wired and provided with terminals for connecting the battery, lines, key case, and telephone set wires.

The following is a list and description of the main apparatus used in the cabinet:

- 1—No. 2-A Circuit Breaker.
- 1—No. 122-EW Relay.
- 1—No. 26-A Telegraph Relay.
- 2—No. 5-AD Retardation Coils and 6 No. 21-AA Condensers.
- 2—No. 58-BP Protector.
- 1—No. 18-G Resistance.

The No. 2-A Circuit Breaker is to open the main current supply lead if an excessive amount of current flows from the source, such as caused by a short on the line or in any part of the sending circuit.

The resistance of the circuit breaker is 2 ohms and it is normally adjusted to operate on .6 ampere and non-operate on .4 ampere. These values can be increased or decreased by adjustment, depending upon the local installation conditions.

The No. 122-EW Relay is to connect the sending circuit to the line at the beginning of the operation of the calling key, and to disconnect the sending circuit again at the end of the key operation.

The resistance of the relay is 100 ohms and it should receive from .075 to .100 ampere of current for operation.

The No. 26-A Telegraph Relay is to reverse the polarity of the main battery so that each succeeding impulse sent over the line is in the opposite direction to the preceding one. This relay is operated by the local battery through the K1-K2 contact of the calling key.

The resistance of the relay is 25 ohms and it should receive from .3 to .4 ampere of current for operation. Adjustments can be made on this relay by means of a knurled nut.

The No. 5-AD Retardation Coils and 6 No. 21-AA Condensers are for smoothing out the impulses of current used for operating the selectors so as not to interfere with the telephone transmission.

The No. 58-BP Protectors are to protect the inside apparatus against damage from high voltages by providing a shunt path from each side of the line through an air gap between the copper blocks to a ground connection. Seven-ampere fuses are also provided to guard the drop wires against abnormal currents.

The spacing between the blocks is such that 700 volts direct current will not jump across the gap, but voltages over 700 will.

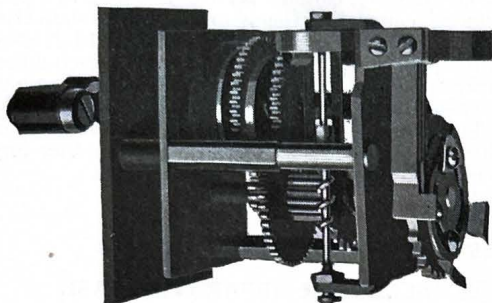


## RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEMS

## Description, Adjustments and Operation of Sets

(Continued)

## Selector Keys



No. 60-A Selector Key



No. 61-A Selector Key

No. 60-A Selector Key. No. 60-B Selector Key. No. 61-A Selector Key.

## GENERAL

The No. 60 Type Keys mount in the No. 60 Type Selector Key Case and can easily be removed with a screw driver by turning the screw under the handle counter clockwise. The keys, when mounted, make contact with the springs in the back of the key case. When a key is operated by turning the handle one-quarter turn and then releasing, it should return automatically to its normal position. The speed at which it returns can be increased or decreased by bending in or out the springs which carry the weights of the regulating governor.

## No. 60-A SELECTOR KEY

The No. 60-A Selector Key is for use with the No. 60-A and -AP Selectors when set for the code numbers given in Table No. 1. It may be set for any of the code numbers given in Table 1 by adjusting its segments as described below. In this series of settings the total number of current impulses for any code is seventeen. The governor springs for the No. 60-A key are so adjusted that the impulse wheel will make one revolution in not less than  $7\frac{1}{2}$  seconds and not more than 8 seconds.

## No. 60-B SELECTOR KEY

The No. 60-B Selector Key is for use with No. 60-A and -AP Selectors when set for the code numbers in Table No. 2 and the No. 60-B and -BP Selectors when set for code numbers given in Table No. 3. It may be set for any of the code numbers given in Table No. 2 or 3, by the adjustment of its segments in a manner similar to that explained in detail for the No. 60-A Key, with the exception that a third flat segment is used, so that the total number of impulses is increased by 10 for the 27 step settings of the No. 60-B and -BP Selectors as shown in the table.

The governor springs for the No. 60-B Selector Key are so adjusted that the impulse wheel will make one revolution in not less than 9 seconds and not more than  $9\frac{1}{2}$  seconds.

## METHOD OF SETTING No. 60 TYPE KEYS

In setting the key, each closure and each opening of the contacts count one. Two styles of segments are provided, one a flat segment which closes the contacts while the inner spring passes over it; the other segment with a bent-up part which engages with the insulated piece on the outer spring, raising this spring sufficiently to keep the contacts open while the outer spring passes over.

Each key requires two segments to give the three sets of impulses. If the first number in the code is odd, a flat segment is required, while a segment with the bent-up part is required if the first number is even. If the last number in the code is even, a flat segment is required, while a segment with the bent-up part is required if the last number is odd. Thus two like segments or one of each kind may be required to give the code setting. The first segment is set so that the inner contact spring, in passing over the first set of teeth on the impulse wheel, gives the number of closures and openings of the contacts represented by the first number in the code. The other segment is set so that the contact springs, in passing over the third set of teeth on the impulse wheel, give the number of closures and openings of the contacts as repre-

## RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEMS

## Description, Adjustments and Operation of Sets

(Continued)

## Selector Keys (Continued)

sented by the last number in the code. Since the number of any impulses for any three digit code combination is always the same as in any other in the same table, it follows that if the first and the last digits are set the middle one will be automatically determined.

For example, set the No. 60-A Selector Key for selecting station 8-5-4, begin at the first tooth and count 8 (first number in code) in a clockwise direction, counting one for each tooth and one for each space, in this case 4 teeth and 4 spaces. As the last count was a space, take a segment with the bent-up part and place it so as to keep the contact in the same position while passing over the segment, as on the last count. This segment is set approximately flush with the edge of the next tooth, so that the outside contact spring will be off this segment before the inner contact spring strikes the next tooth.

To set the other segment, begin at the ringing position and count 4 (last number in code) in a counter-clockwise direction, counting one for each space and one for each tooth, in this case two spaces and two teeth. As the last count was on a tooth, set the edge of a flat segment on the center of this tooth. The number of closures and openings of the contact while the inner contact spring passes between the two segments, is the middle number in the code (5 in this case).

## METHOD OF SETTING No. 60 TYPE KEYS FOR TIME SENDING

To set the key so that all No. 60-A and -AP Selectors will be advanced to their time receiving position, place a flat segment bridging from the center of first tooth to the center of the fourth tooth. This gives, after the first long impulse, 22 regular impulses in succession.

## TABLE OF CODE SETTINGS FOR No. 60 TYPE KEYS AND SELECTORS

## Total Steps in Each Code—17

## TABLE No. 1

## Total Code Settings—78

| Nos. 60A and 61A Keys—No. 60AP Selector |        |        |  |        |  |       |  |        |  |
|-----------------------------------------|--------|--------|--|--------|--|-------|--|--------|--|
| 2-2-13                                  |        | 4-2-11 |  | 5-2-10 |  | 6-2-9 |  | 7-2-8  |  |
| 2-3-12                                  | 3-2-12 | 4-3-10 |  | 5-3-9  |  | 6-3-8 |  | 7-3-7  |  |
| 2-4-11                                  | 3-3-11 | 4-4-9  |  | 5-4-8  |  | 6-4-7 |  | 7-4-6  |  |
| 2-5-10                                  | 3-4-10 | 4-5-8  |  | 5-5-7  |  | 6-5-6 |  | 7-5-5  |  |
| 2-6-9                                   | 3-5-9  | 4-6-7  |  | 5-6-6  |  | 6-6-5 |  | 7-6-4  |  |
| 2-7-8                                   | 3-6-8  | 4-7-6  |  | 5-7-5  |  | 6-7-4 |  | 7-7-3  |  |
| 2-8-7                                   | 3-7-7  | 4-8-5  |  | 5-8-4  |  | 6-8-3 |  | 7-8-2  |  |
| 2-9-6                                   | 3-8-6  | 4-9-4  |  | 5-9-3  |  | 6-9-2 |  |        |  |
| 2-10-5                                  | 3-9-5  | 4-10-3 |  | 5-10-2 |  |       |  |        |  |
| 2-11-4                                  | 3-10-4 | 4-11-2 |  |        |  |       |  |        |  |
| 2-12-3                                  | 3-11-3 |        |  |        |  |       |  |        |  |
| 2-13-2                                  | 3-12-2 |        |  |        |  |       |  |        |  |
| 10-2-5                                  |        | 11-2-4 |  |        |  |       |  |        |  |
| 10-3-4                                  |        | 11-3-3 |  | 12-2-3 |  |       |  |        |  |
| 10-4-3                                  |        | 11-4-2 |  | 12-3-2 |  |       |  |        |  |
| 10-5-2                                  |        |        |  |        |  |       |  | 13-2-2 |  |

## Total Steps in Each Code—27

## TABLE No. 2

## Total Code Settings—253

| Nos. 60B and 61B Keys—No. 60AP Selector |         |         |  |         |  |         |  |         |  |
|-----------------------------------------|---------|---------|--|---------|--|---------|--|---------|--|
| 2-2-23                                  |         | 4-2-21  |  | 5-2-20  |  | 6-2-19  |  | 7-2-18  |  |
| 2-3-22                                  | 3-2-22  | 4-3-20  |  | 5-3-19  |  | 6-3-18  |  | 7-3-17  |  |
| 2-4-21                                  | 3-3-21  | 4-4-19  |  | 5-4-18  |  | 6-4-17  |  | 7-4-16  |  |
| 2-5-20                                  | 3-4-20  | 4-5-18  |  | 5-5-17  |  | 6-5-16  |  | 7-5-15  |  |
| 2-6-19                                  | 3-5-19  | 4-6-17  |  | 5-6-16  |  | 6-6-15  |  | 7-6-14  |  |
| 2-7-18                                  | 3-6-18  | 4-7-16  |  | 5-7-15  |  | 6-7-14  |  | 7-7-13  |  |
| 2-8-17                                  | 3-7-17  | 4-8-15  |  | 5-8-14  |  | 6-8-13  |  | 7-8-12  |  |
| 2-9-16                                  | 3-8-16  | 4-9-14  |  | 5-9-13  |  | 6-9-12  |  | 7-9-11  |  |
| 2-10-15                                 | 3-9-15  | 4-10-13 |  | 5-10-12 |  | 6-10-11 |  | 7-10-10 |  |
| 2-11-14                                 | 3-10-14 | 4-11-12 |  | 5-11-11 |  | 6-11-10 |  | 7-11-9  |  |
| 2-12-13                                 | 3-11-13 | 4-12-11 |  | 5-12-10 |  | 6-12-9  |  | 7-12-8  |  |
| 2-13-12                                 | 3-12-12 | 4-13-10 |  | 5-13-9  |  | 6-13-8  |  | 7-13-7  |  |
| 2-14-11                                 | 3-13-11 | 4-14-9  |  | 5-14-8  |  | 6-14-7  |  | 7-14-6  |  |
| 2-15-10                                 | 3-14-10 | 4-15-8  |  | 5-15-7  |  | 6-15-6  |  | 7-15-5  |  |
| 2-16-9                                  | 3-15-9  | 4-16-7  |  | 5-16-6  |  | 6-16-5  |  | 7-16-4  |  |
| 2-17-8                                  | 3-16-8  | 4-17-6  |  | 5-17-5  |  | 6-17-4  |  | 7-17-3  |  |
| 2-18-7                                  | 3-17-7  | 4-18-5  |  | 5-18-4  |  | 6-18-3  |  | 7-18-2  |  |
| 2-19-6                                  | 3-18-6  | 4-19-4  |  | 5-19-3  |  | 6-19-2  |  |         |  |
| 2-20-5                                  | 3-19-5  | 4-20-3  |  | 5-20-2  |  |         |  |         |  |
| 2-21-4                                  | 3-20-4  | 4-21-2  |  |         |  |         |  |         |  |
| 2-22-3                                  | 3-21-3  |         |  |         |  |         |  |         |  |
| 2-23-2                                  | 3-22-2  |         |  |         |  |         |  |         |  |



## RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEMS

## Description, Adjustment and Operation of Sets

(Continued)

TABLE OF CODE SETTINGS FOR No. 60 TYPE KEYS AND SELECTORS (Continued)

|        |         |         |         |         |         |         |
|--------|---------|---------|---------|---------|---------|---------|
| 9-2-16 |         |         |         |         |         |         |
| 9-3-15 | 10-2-15 |         |         |         |         |         |
| 9-4-14 | 10-3-14 | 11-2-14 |         |         |         |         |
| 9-5-13 | 10-4-13 | 11-3-13 | 12-2-13 |         |         |         |
| 9-6-12 | 10-5-12 | 11-4-12 | 12-3-12 | 13-2-12 |         |         |
| 9-7-11 | 10-6-11 | 11-5-11 | 12-4-11 | 13-3-11 | 14-2-11 |         |
| 9-8-10 | 10-7-10 | 11-6-10 | 12-5-10 | 13-4-10 | 14-3-10 | 15-2-10 |
| 9-9-9  | 10-8-9  | 11-7-9  | 12-6-9  | 13-5-9  | 14-4-9  | 15-3-9  |
| 9-10-8 | 10-9-8  | 11-8-8  | 12-7-8  | 13-6-8  | 14-5-8  | 15-4-8  |
| 9-11-7 | 10-10-7 | 11-9-7  | 12-8-7  | 13-7-7  | 14-6-7  | 15-5-7  |
| 9-12-6 | 10-11-6 | 11-10-6 | 12-9-6  | 13-8-6  | 14-7-6  | 15-6-6  |
| 9-13-5 | 10-12-5 | 11-11-5 | 12-10-5 | 13-9-5  | 14-8-5  | 15-7-5  |
| 9-14-4 | 10-13-4 | 11-12-4 | 12-11-4 | 13-10-4 | 14-9-4  | 15-8-4  |
| 9-15-3 | 10-14-3 | 11-13-3 | 12-12-3 | 13-11-3 | 14-10-3 | 15-9-3  |
| 9-16-2 | 10-15-2 | 11-14-2 | 12-13-2 | 13-12-2 | 14-11-2 | 15-10-2 |
| 16-2-9 |         |         |         |         |         |         |
| 16-3-8 | 17-2-8  |         |         |         |         |         |
| 16-4-7 | 17-3-7  | 18-2-7  |         |         |         |         |
| 16-5-6 | 17-4-6  | 18-3-6  | 19-2-6  |         |         |         |
| 16-6-5 | 17-5-5  | 18-4-5  | 19-3-5  | 20-2-5  |         |         |
| 16-7-4 | 17-6-4  | 18-5-4  | 19-4-4  | 20-3-4  | 21-2-4  |         |
| 16-8-3 | 17-7-3  | 18-6-3  | 19-5-3  | 20-4-3  | 21-3-3  | 22-2-3  |
| 16-9-2 | 17-8-2  | 18-7-2  | 19-6-2  | 20-5-2  | 21-4-2  | 22-3-2  |

TABLE No. 3

Nos. 60B and 61A Keys—No. 60BP Selector

Total steps to "A" contact in each code 17  
 Total steps to "B" contact in each code 19  
 Total steps to "C" contact in each code 21  
 Total steps to "D" contact in each code 23

Total Code Settings—28

|                   |                   |                   |                   |                  |
|-------------------|-------------------|-------------------|-------------------|------------------|
|                   |                   | 7-2-8 A, B, C, D  |                   | 8-2-7 A, C, B, D |
|                   |                   | 7-3-7 A, B, C, D  |                   | 8-3-6 A, B, C, D |
|                   |                   | 7-4-6 A, B, C, D  |                   | 8-4-5 A, B, C, D |
|                   |                   | 7-5-5 A, B, C, D  |                   | 8-5-4 A, B, C, D |
|                   |                   | 7-6-4 A, B, C, D  |                   | 8-6-3 A, B, C, D |
|                   |                   | 7-7-3 A, B, C, D  |                   | 8-7-2 A, B, C, D |
|                   |                   | 7-8-2 A, B, C, D  |                   |                  |
| 9-2-6 A, B, C, D  |                   |                   |                   |                  |
| 9-3-5 A, B, C, D  | 10-2-5 A, B, C, D |                   |                   |                  |
| 9-4-4 A, B, C, D  | 10-3-4 A, B, C, D | 11-2-4 A, B, C, D |                   |                  |
| 9-5-3 A, B, C, D  | 10-4-3 A, B, C, D | 11-3-3 A, B, C, D | 12-2-3 A, B, C, D |                  |
| 9-6-2 A, B, C, D  | 10-5-2 A, B, C, D | 11-4-2 A, B, C, D | 12-3-2 A, B, C, D |                  |
| 13-2-2 A, B, C, D |                   |                   |                   |                  |

## No. 61-A SELECTOR KEY

The No. 61-A Selector Key is for use as a master key at test and switchboards; also at way stations on intercalling circuits. It may be set for any of the code numbers given in Tables No. 1 and No. 3 by moving the levers, extending through the cover, to the code desired. As in the case of the No. 60 Type Keys, the middle digit of the code is automatically determined by setting the first and the third digits.

The first lever on the left side is used only with the No. 60-B and -BP Selectors and normally is placed for station A and should be left in this position when used in connection with the No. 60-A and -AP Selectors. When used with the No. 60-B and -BP Selectors it should be moved to the B, C or D position, corresponding with the code of the station desired.

The second lever is placed opposite the first number of the code of the selector desired.

The third lever is placed opposite the last number of the code of the selector desired.

The fourth lever is then moved down to the bottom of its slot and released. The key then operates the same as the 60-A Key.

This key may be set to call all stations on the line equipped with No. 60-A and -AP (17 step) Selectors and all stations connected to the A contact of the No. 60-B and -BP Selectors by setting the second and third levers each on zero. The key then sends out 17 consecutive impulses to step all selectors to the first contact.

The key makes one complete operation in  $7\frac{1}{2}$  to 8 seconds. The speed is changed by bending the governor springs, at the right end, in to increase and out to decrease.

Three terminals on the bottom, designated K1, K2 and K3, connect to the corresponding terminals in the No. 60-A Selector Apparatus Case. The contact springs connecting to K1 and K2 terminals should be adjusted to be closed 50 per cent of the time as the key is operated. This may be determined by the method explained under the 60 Type Key.

## No. 61-B SELECTOR KEY

The No. 61-B Selector Key is similar to the No. 61-A Selector Key except that it is arranged for 27 steps and is timed to complete one operation in from 9 to  $9\frac{1}{2}$  seconds. See Table No. 2 for code settings.

## RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEMS

## Description, Adjustments and Operation of Sets

(Continued)

## TIME SENDING SET D-14386:

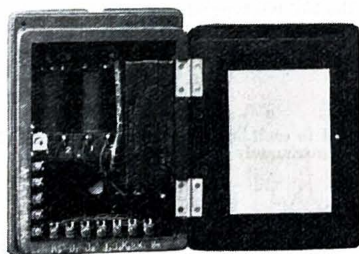
The No. 60-AP Selector is provided with a second or time ringing terminal for receiving time. For this purpose a time sending set is used with the No. 60-A Selector Apparatus Case connected as shown in the drawing on page 6 for sending the time signals over selector circuits. The set consists of a No. 60-AP Selector (set for one step per D-16647), a D.P.D.T. switch, condensers and a resistance. For normal operation of the circuit the D.P.D.T. switch is thrown to the "calling position."

When it is desired to send time signals, a No. 60-A Selector Key set to send 22 consecutive impulses is operated. This steps all the No. 60-AP Selectors on the circuit around to the time-receiving position (code wheel contact within one step of closing the second or time contact) where it is retained by an insulated "time arm." The D.P.D.T. switch is then thrown to the "time position." This closes the circuit between K1 and K3 and connects K2 to terminal 2 of the No. 60-AP Selector in the time sending set. Closing contacts K1 and K3 operates the No. 122-EW Relay which connects the main battery to the line. Then as a time repeating relay in the telegraph circuit operates and completes the circuit between T1 and T2 the No. 60-AP Selector in the time sending set advances one step and is held there by a code pin. The closing of the selector contacts operates the No. 26-A Relay. This sends an impulse of one polarity out over the line to momentarily advance all the No. 60-AP Selectors one step. This momentarily closes the time contacts and causes all bells to tap. The Selectors on the line then fall back to a position within one step of closing the time contact and are held there as before by the "time arm" engaging with the holding spring.

Then as the time repeating relay operates again, the No. 60-AP Selector in the time sending set advances another step and as it is not retained by a code pin, it falls back to the normal position within one step of closing its contact. The No. 26-A Relay releases as the contacts on the time sending selector open and sends out an impulse of the opposite polarity over the line, operating all the No. 60-AP Selectors and causing all bells to tap as before. This series of operations is repeated for each two operations of the time repeating relay, thus causing the bell to tap once each time the time repeating relay operates.

After the time signals have been set, the D.P.D.T. switch is thrown to the calling position. The selectors on the line are then stepped off the "time arm" by turning any selector key. The circuit is then in condition for regular calling.

The time sending set functions on a main battery of any voltage between 100 and 350 volts. The "time arm" of the No. 60-AP Selector is insulated from the bell circuit to prevent the answer-back tone from interfering with telephone conversation while time signals are being sent.



No. 502-B Desk Set Box



No. 345-A Jack Box

## Dispatcher's Telephone Equipment

## DESK SET BOX No. 502-B

The No. 502-B Desk Set Box is a high efficiency set, designed with an anti-side tone feature arranged so that the dispatcher is at all times insulated from the line.

As the dispatcher wears his receiver continuously, his battery circuit is closed a large portion of the time. With the anti-side tone feature, the dispatcher's voice and other noises in the dispatcher's office are kept out of his receiver.

The two induction coils in the set insulate the dispatcher's telephone equipment from the line. These coils have a break-down test of approximately 1000 volts A. C.

The arrangement of the condensers keeps down the thumps from signalling impulses, thus protecting the dispatcher's ears.

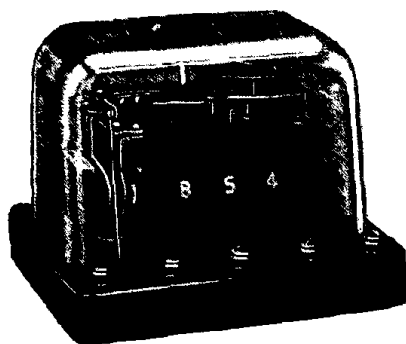
## JACK BOX No. 345-A

The No. 345-A Jack Box permits the use of two operators' telephone sets in parallel.

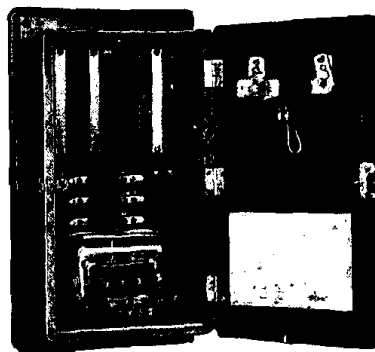
## RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEMS

Description, Adjustments and Operation of Sets  
(Continued)

## Way Station Selector Equipment



No. 60-AP Selector



No. 160 Type Selector Set—Open

## SELECTOR SETS

No. 160-AC Selector Set  
No. 160-AR Selector Set

No. 160-BC Selector Set  
No. 160-BR Selector Set

## GENERAL

The No. 160 type Selector Set contains all of the receiving apparatus at the way station with the exception of the telephone set. It consists of an oak cabinet approximately 14 inches high by 9 inches wide by 6 inches deep, arranged for wall mounting. The set is completely wired and provided with terminals for connecting the line and local battery wires.

The following is a list and description of the main apparatus used in the No. 160 type selector sets.

No. 51-F Retardation Coils  
No. 60-C Ringer

No. 60-AP Selector (Nos. 160-AC and -AR Sets)  
No. 60-BP Selector (Nos. 160-BC and -BR Sets)

## No. 51-F RETARDATION COILS

The two No. 51-F Retardation Coils in the Selector Sets, one connected to each line terminal, are to act as choke coils for high frequency voltages, as lightning, etc. The resistance of these coils is approximately 0.5 ohm each.

## No. 60-C RINGER

The function of the No. 60-C Ringer is to call the way-station operator and also give the time signals. This ringer is a vibrating, direct current type and is provided with contact springs for opening its own circuit intermittently.

The resistance of each ringer spool is 8 ohms, and the ringer is adjusted to operate on the same battery as the telephone equipment.

## No. 60-AP SELECTOR (USED WITH Nos. 160-AC &amp; -AR SELECTOR SETS)

The No. 60-AP Selector is a step-by-step selector operated by a definite code or sequence of alternating or reverse current impulses. It consists of a mechanism unit mounted on a magnet unit with a bakelite base and a glass cover.

In general, the code wheels are set so that the same total number of steps is necessary to advance the code wheel to the ringing position on all selectors that are to be used on the same line. With the number of holes provided in the code wheel this number of total steps may be any number from 8 to 32, which number would give a total of 6 and 337 code settings respectively. The No. 60-AP Selector, however, is set for a total of 17 steps, which number gives a total of 73 code settings, unless selectors are ordered for some other code setting than those given in Table No. 1 on page 9. The selector is not stepped up by 17 consecutive impulses, however, when selecting a station, but by three sets of successive impulses as indicated in Table No. 1, on page 9. (This is not counting the restoring impulses.)

The code pins on each selector are located so that, after the first set of impulses, the code wheel will be in position for the holding spring to engage with the first code pin. The second code pin is located so that after the second set of impulses, the code wheel will be in position for the holding spring to engage with the second code pin. The third set of impulses then advances the code wheel, so that the permanent code pin is in position to engage with the holding spring and, at the same time, the contact spring is directly over, and makes contact with, the first ringing terminal, thus completing the bell circuit. Each selector is capable of being set for any station number given in the Table No. 1 without any other change than the location of the two code pins in the code wheel.

In order to take care of special cases where a greater number of code settings are required than those given in Table No. 1 on page 9, the code settings for a No. 60-A Selector Set for 27 total steps in each code setting are given in Table No. 2, which gives a total of 253 code settings.



## RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEMS

## Description, Adjustments and Operation of Sets

(Continued)

## Way Station Selector Equipment

(Continued)

**No. 60-BP SELECTOR (used with Nos. 160-BC and -BR Selector Sets)**

The No. 60-BP Selector is known as the multiple contact selector and differs from the No. 60-AP Selector only in that it is equipped with four selective ringing terminals instead of one, so that any one of four local signal circuits can be closed by the same selector independently. This selector is not equipped with a terminal for receiving time signals. The method of setting the code numbers and the method of operation is the same as described in detail for the No. 60-AP Selector. The terminals on the No. 60-BP Selector are known by the letters A, B, C, D. Terminal A is the first terminal engaged by the contact spring on the code wheel as the code wheel is advanced. The last group of impulses in the code setting for selecting the first or A contact is increased by two impulses to select the B contact, four impulses to select the C contact and six impulses to select the D contact. The numbers pasted on the selector spool indicate the code setting for the A contact. For example, a selector having a code setting 8-5-4 for the first contact will be marked 8-5-4, and the contacts will be known as 8-5-4 A, 8-5-4 B, 8-5-4 C, 8-5-4 D.

The impulses required to select the four contacts on selector number 8-5-4 will be A contact 8-5-4, B contact 8-5-6, C contact 8-5-8, D contact 8-5-10.

Table No. 3 (page 10) gives all the code settings for the 17 step code which can be used for the No. 60-BP Selector without interference with any of the other regular 17 step code settings for the No. 60-AP Selector.

This selector functions in all other respects in the same way as the No. 60-AP Selector.

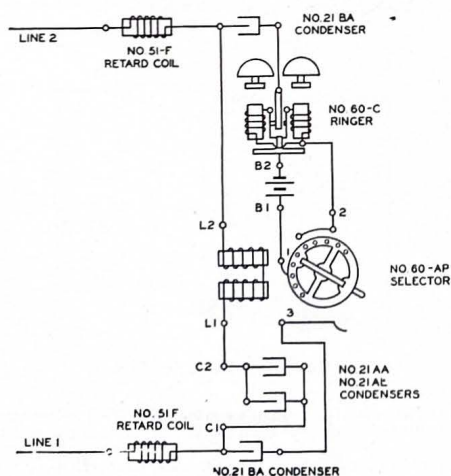


Fig. 1—No. 160-AC Selector Set

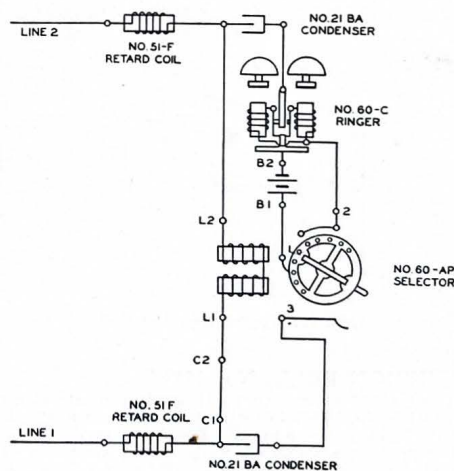


Fig. 2—No. 160-AR Selector Set

**No. 160-AC SELECTOR SET (see Schematic wiring Fig. 1.)**

The No. 160-AC Selector is for use in train dispatching circuits in which the selectors are not operated through repeating coils. The set is equipped with a No. 60-AP Selector and condensers of suitable capacity are provided for separating the local battery and the answer back circuit from any metallic connection to either line wire of two side circuits using the same local battery, thus preventing crossfire between the two side circuits or either side circuit and the phantom circuit.

**No. 160-AR SELECTOR SET (see Schematic wiring Fig. 2.)**

The No. 160-AR Selector Set differs from the No. 160-AC Selector Set in that it is for use on train dispatching circuits when the selectors are operated through the No. 70-A Repeating Coil (as described in detail under "operation of selector circuits through repeating coils"). No condensers are provided in series with the selector winding in this set.



## RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEMS

## Description, Adjustments and Operation of Sets

(Continued)

## Way Station Selector Equipment

(Continued)

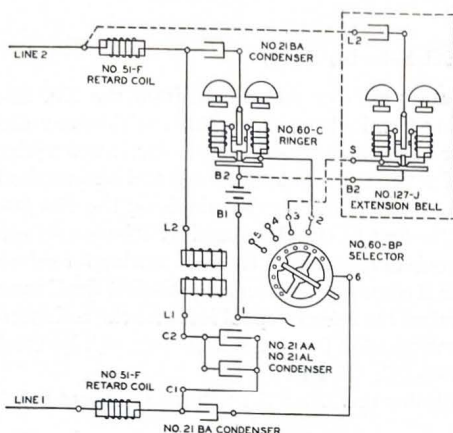


Fig. 1—No. 160-BC Selector Set

**No. 160-BC SELECTOR SET** (see Schematic wiring Fig. 1).

The No. 160-BC Selector Set differs from the No. 160-AC Selector Set in that it is equipped with a No. 60-BP Selector which is provided with four contacts for signalling 2 to 4 parties at the same place.

**No. 160-BR SELECTOR SET** (see Schematic wiring Fig. 2).

The No. 160-BR Selector Set differs from the No. 160-AR Selector Set in that it is equipped with a No. 60-BP Selector which is provided with four contacts for signalling 2 to 4 parties at the same place.

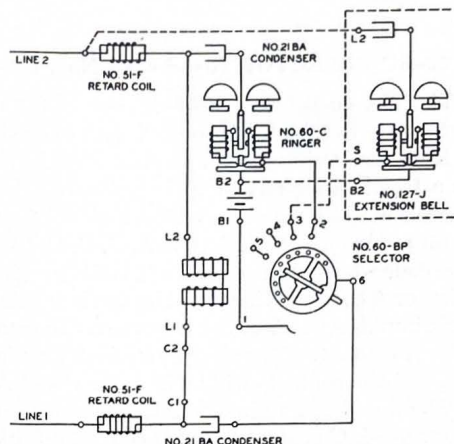
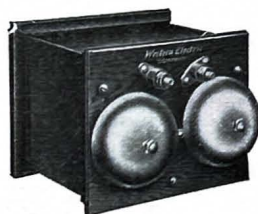
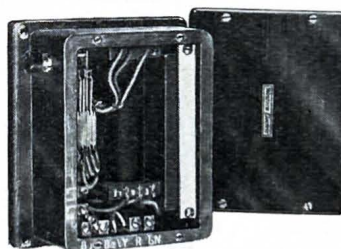


Fig. 2—No. 160-BR Selector Set



No. 127 Type Extension Bell



No. 501-A Desk Set Box

**EXTENSION BELL, No. 127-J**

The No. 127-J Extension Bell is used as an extension signal in connection with the multiple contact No. 60-B Selector. The ringer in the No. 160-BC or -BR Selector Set in which the selector is mounted gives the signal for the first ringing terminal; an extension bell is required for each remaining terminal.

It consists of a No. 60-CG Ringer and a No. 21-BA Condenser mounted in an oak box. The terminal connections of the extension bell and the No. 160-BC or -BR Selector Set are as follows:

No. 127-J  
Extension Bell  
Terminals

L-2 connect to  
B-2 connect to  
S connect to

No. 160-BC or -BR  
Selector Set  
Terminals

Line 2  
B2  
3 or 4 or 5

The above connections are shown on the circuit label furnished with the No. 160-BC or -BR Selector Sets.

**Way Station Telephone Equipment****DESK SET BOXES No. 501 TYPE**

The No. 501-A and -B Desk Set Boxes are high efficiency sets. The secondary of the induction coil, in series with the condenser is permanently bridged across the line, so that the characteristics of the line do not materially change whether one or all of the stations are listening in at the same time. This also insulates the operator from the line as the telephone equipment is connected to the primary of the induction coil. The induction coil has a break down of approximately 1000 volts A.C. between the windings.

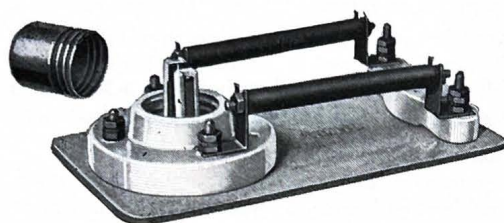
When the switch of the desk set box is closed to the transmitting position, the receiver is not cut out entirely, but is left across part of the coil so that the dispatcher can, in case of error, break in on an operator repeating an order.

In the No. 501-A Set, the key for switching from listening to talking position is included in the box. The No. 501-B Set is the same as the No. 501-A, except that the key is omitted, the wiring being brought to terminals in the set so that a foot switch or separate key can be used.

## RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEMS

## Description, Adjustments and Operation of Sets

(Continued)



No. 58-BP Protector

No. 543-W Loud  
Speaking TelephoneNo. 6033-A Amplifier]  
No. 6040-A Amplifier

## Protection of Way Station Equipment

**GENERAL**

Protection of way station equipment depends upon the circuit characteristics of each installation, so that no definite information can be given here; however, for the usual protection against high potential and abnormal currents the No. 58-BP Protector is recommended. This protector is equipped with 7 ampere fuses and protector blocks and has an approximate breakdown of 750 volts.

## Loud Speaking Telephone Equipment

## Dispatcher and Way Station

**GENERAL**

The loud speaking telephone amplifier is for use in Dispatcher's office, signal towers, and way stations to supplement the usual telephone outfit. It is designed to amplify the incoming conversation, so that the loud speaking telephone connected to it will produce sufficient volume to be heard at a distance of several feet, thus relieving the dispatcher or operator of the necessity of wearing a head set. The equipment is divided into two classes, that which is for use in dispatcher's offices and that which is for use at signal towers and way stations.

**DISPATCHER'S EQUIPMENT**

The following loud speaking telephone equipment may be used in the Dispatchers Office.;

No. 12-A Loud Speaking Telephone Outfit or,  
No. 6033-A Amplifier, or  
No. 6040-A Amplifier, with  
No. 543-W Loud Speaking Telephone  
No. 34-G Resistance  
No. 3-B Foot Switch  
No. 6002-B Key

**WAY STATION EQUIPMENT**

The following loudspeaking telephone equipment may be used in Way Stations

No. 6033-A Amplifier, or  
No. 6040-A Amplifier,  
No. 543-W Loud Speaking Telephone  
No. 34-A Resistance  
No. 3-B Foot Switch  
No. 6002-B Key.

**RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEMS****Description, Adjustments and Operation of Sets***(Continued)***Loud Speaking Telephone Equipment****Dispatcher and Way Station***(Continued)***No. 12-A LOUD SPEAKING TELEPHONE OUTFIT**

The No. 12-A Loud Speaking Telephone outfit consists of a No. 519-A Subscribers Set, a No. 216-A Vacuum Tube, and a No. 543-W Loud Speaking Telephone. This Outfit is designed for use at Dispatcher's Stations and is operated on a direct current power supply.

**No. 6033-A AMPLIFIER**

The No. 6033-A Amplifier consists of a No. 33-A Amplifier and two No. 205-D Vacuum Tubes and may be used at either Dispatcher or Way Stations. It is a single phase amplifier and will operate only on a power supply of 105 to 120 volts, 50 to 60 cycles alternating current. The power consumption is about 40 watts. No batteries are required for its operation.

The apparatus is contained in an octagonal metal box approximately  $12\frac{1}{8}$  inches high,  $11\frac{1}{4}$  inches long across the flats and  $8\frac{3}{8}$  inches wide across the flats. A cord, switch and plug are provided for connecting to the 110 volt, 60 cycle A.C. supply.

The amplification given by this amplifier is in general sufficient to give satisfactory loud speaking telephone operation, where good volume is obtained from the headset, and where the line and external noises are not excessive.

The input impedance for the amplifier set is such that a relatively large number of amplifiers may be connected across the telephone line without introducing excessive losses which might interfere with conversations carried on between stations at extreme ends of the line. Also in view of the possible use of the line for selector operation, the input impedance of the amplifier has been so arranged that it will not offer any considerable shunting effect to the selector currents.

When working from an impedance of 900 ohms, the gain of the amplifier is approximately 25-TU at 1000 cycles. The output impedance is 4000 ohms.

**THE No. 6040-A AMPLIFIER**

The No. 6040-A Amplifier used for train dispatching operates on 110 volt 25 cycle A.C. power supply circuits. It is otherwise the same electrically as the No. 6033-A and may also be used at either Dispatcher or Way Stations. It uses two No. 205-D Vacuum Tubes as does the No. 6033-A and is enclosed in a brown japan finished metal box about  $11\frac{1}{4}$ " x  $10$ " x  $9\frac{1}{4}$ ".

**No. 543-W LOUD SPEAKING TELEPHONE**

The No. 543-W Loud Speaking Telephone consists of a brass base similar to a desk stand base, equipped with a black finished fibre horn  $20\frac{5}{8}$  inches high.

The base is equipped with a felt cushion covering on the bottom, a hole is provided in the base for adjustment of the receiver unit. The No. 545-W Receiver and the No. 762 Cord form parts of this loud speaking telephone.

**No. 3-B AND No. 3-D FOOT SWITCHES**

The No. 3-B Foot Switch at the dispatcher's station and the No. 3-D Foot Switch at the way station are for use in disconnecting the transmitter from the line, and also changes the value of the shunting resistance across the output of the amplifier, as described below. The switch must be depressed to talk and released to receive, although reception for "break in" purposes at a reduced volume may be had while the switch is depressed.

**No. 34-G RESISTANCE**

The No. 34-G Resistance at the dispatcher's station is for use in providing an adjustment for the loud speaker volume.

**RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEMS****Description, Adjustments and Operation of Sets***(Continued)***Loud Speaking Telephone Equipment****Dispatcher and Way Station***(Continued)*

The connections to the No. 34-G Resistance at the dispatcher's station are shown on Page 80. The connections at "1" and "2" should be determined in the following manner:

With the power supply turned on, and the No. 6002-B Key depressed, any talk on the line should be heard in the loud speaker, the volume of which can now be adjusted to a satisfactory level by placing connection No. 1 on a suitable tap. The proper tap will generally be one of the last two or three or it may be that the full output of the amplifier is required, in which case this connection may be left off altogether.

The proper tap for connection No. 2 should be chosen with the foot switch depressed and a distant operator talking. This connection determines the loud speaker "break in" level and also is intended to prevent howling, which is caused by feed back from the loud speaker into the transmitter. This howling ordinarily occurs when the transmitter is in circuit unless the loud speaker volume is held below a certain critical value. The value of resistance which gives a satisfactory "break in" efficiency will usually be less than that required to prevent howling.

**No. 6002-B KEY**

The No. 6002-B Key at the dispatcher's station is used for switching from the loud-speaking telephone to the head-set telephone and vice versa.

**Battery Requirements****GENERAL**

The current supply for this system consists of a main D. C. source of 100 to 350 volts and a local battery of 10 to 12 volts at the dispatcher's stations and a 4 volt battery at each way station.

The main source furnishes the current for operating the selectors at the way stations. The voltage depends on the loop resistance of the line wires and the location and number of selector sets on the line. For circuits not operated thru repeating coils (160 type sets with condensers in set) the voltage required for normal operation can be determined from the voltage-line selector curves on next page. These curves show the voltage required for different length lines of No. 9 B. & S. copper wires—8.3 ohms per loop mile—equipped with selector sets uniformly distributed. The voltage specified for normal operation is higher than the minimum operating voltage required. This insures the operation of the selectors when the line insulation is low during wet weather and allows for a slight decrease in the potential for any reason. The potential should in no case be allowed to decrease more than 15 per cent.

A No. 60-A Vacuum Tube Rectifier, dry cells, storage cells, or a motor generator set may be used for this main current source. When dry cells are used frequent measurements should be made to determine the potential of the battery when the current is flowing under operating conditions. This is necessary because the gradual increase in internal resistance of the dry cells will lower the voltage available for operating the selectors.

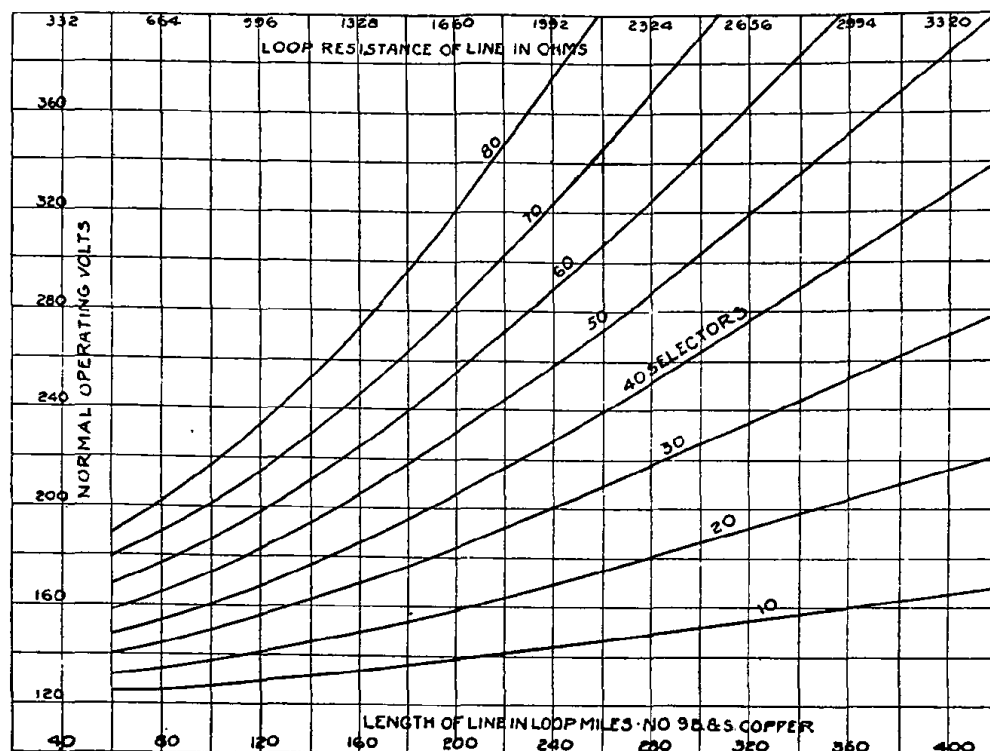


## RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEMS

Description, Adjustments and Operation of Sets  
(Continued)

## Battery Requirements

(Continued)



Voltage-line Selector curves for determining the voltage required for normal operation of circuits not operated through repeating coils.

## No. 60-A VACUUM TUBE RECTIFIER

The 60-A Vacuum Tube Rectifier, is operated from a 110 volt 60 cycle alternating current source and may be used instead of dry cells, storage cells, or a motor generator to furnish the main power for operating one or two selector circuits. It does away with the periodic tests of dry cells, the charging of storage cells, or the continuous large power drain of the motor generator sets.

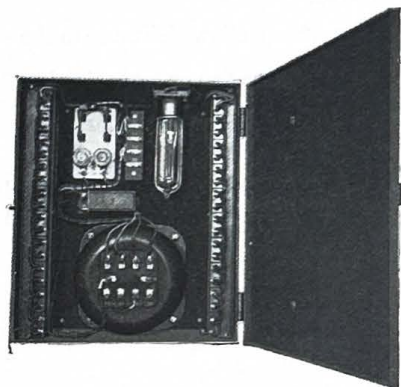
The rectifier consists of a fuse and switch block, 72-A repeating coil, F-11 Relay, 20-21-AA Condensers, 212-A Tube Socket, which takes a Western Electric No. 214-E Vacuum Tube, and Terminal Block mounted in a black finished sheet steel box 15" wide x 18" high x 6" deep. It weighs approximately 63 pounds.

The 110 volt 60 cycle alternating current is connected through the fuse (6 amperes) and switch block to the primary of the repeating coil (see Page 62). The secondary of the repeating coil is provided with taps for supplying alternating current of 60 to 540 volts potential in 60 volt steps to the plate circuit of the vacuum tube. The steps permit of adjusting the D. C. output of the rectifier to the needs of the circuit as determined from Page 62. The tertiary winding of the repeating coil supplies current at 10 volts potential for lighting the vacuum tube filament, through the contacts of the relay. The condensers tend to hold up the voltage of the rectified current during the interval between the rectified half-waves. The terminal block is provided with five terminals as follows:

**RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEMS****Description, Adjustments and Operation of Sets***(Continued)***Battery Requirements***(Continued)***No. 60-A VACUUM TUBE RECTIFIER—Continued**

B1, B2 and B3 to be connected to B1, B2 and B3 of one or two No. 60-A Selector Apparatus Cases. One K3 to be connected to K3 of one No. 60-A Selector Apparatus Case and the other K3 to be connected to K3 of another No. 60-A Selector Apparatus Case when required.

The filament of the vacuum tube lights only when the F-11 Relay is energized by the operation of a selector key in making a call. The filament circuit is closed a second before calling impulses are sent out. This allows the filament to heat sufficiently to rectify full potential impulse at the start. The average life of the No. 214-E Vacuum Tube, based on 200 to 300 calls per day, is approximately two years, but this figure is not guaranteed. This life is with a filament current of 3.3 amperes. If the current is increased the life of the tube is shortened.

**No. 60-A Rectifier**

The set rectifies only when the filament of the tube is lighted. This decreases the drain on the alternating current source and lengthens the life of the tube. The drain during non-calling periods when the filament circuit is open is eight watts and on the average selector circuit the drain is approximately 90 watts while calling. At the rate of 300 calls per day (8 seconds per call) the rectifier would require 250 watt-hours per day.

The direct current voltage output of the tube equals the alternating current input to the tube with no load on terminals B1 and B2 and decreases from 10 to 35 per cent in proportion to the selector load. Under maximum load conditions, the maximum direct current output is approximately .400 ampere at 350 volts potential.

The F-11 Relay in the filament circuit is provided with two windings so that it may be operated by the selector keys of either of the two selector circuits separately or at the same time.

**LOCAL BATTERY**

The local battery at the dispatcher's station furnishes current for operating the Nos. 26-A and 122-EW Relays. Eight dry cells or sufficient storage cells to give voltage of 10 to 12 volts should be used. In no case should the voltage of this battery be allowed to decrease to less than 8 volts.

**WAY STATION BATTERY**

The way station battery furnishes current for operating the No. 60-C Ringer. It may consist of primary or secondary cells. The voltage of this battery should be from 3 to 5 volts. The transmitter battery of the way station telephone sets may be used as a common battery for the transmitter and for the bell of one or two selector sets.

## RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEMS

## Description, Adjustments and Operation of Sets

(Continued)

## Operation of Selector Circuits Through Repeating Coils

In many cases it is of advantage to operate circuits equipped with No. 60 type selectors through repeating coils to:

- (1) Obtain a low resistance in the simplex telegraph leg.
- (2) Operate two or more simplex selector circuits from a common battery supply.
- (3) Operate one or more branch selector circuits from the main selector circuit without any metallic connection to it.
- (4) Allow two selector circuits to be used as side circuits for obtaining a composited or simplexed phantom with the physical and phantom telephone and the telegraph circuits terminated at the same or different points.

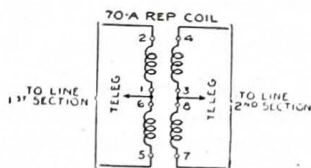


Fig. 1  
Intermediate Telegraph Station



No. 70-A Repeating Coil

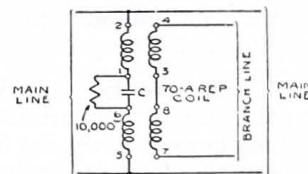


Fig. 2  
Branch Line Operated Through Repeating Coil

## MAIN SELECTOR CIRCUIT OPERATED THROUGH REPEATING COIL.

When the main selector circuit is operated through a repeating coil the connections should be as shown in figure 4. The capacity of the bank of condensers shown at C is 10 MF plus 1 MF for each selector on the circuit. A resistance of 2,000 ohms (Ward-Leonard DM-2,000) is connected in parallel with the condenser bank to prevent oscillatory discharges of the condensers from interfering with the operation of the selectors. When a 60-A rectifier is used as the main current supply, the contacts of the 122-EW relay should be closed permanently and the lead to terminal K 3 removed. This allows the condensers in the rectifier set to become discharged at the end of a call and thus prevent two preliminary pulses thru the selector on the next call.

When the total number of selectors on a circuit is greater than 20, two 70-A coils should be used with the primaries connected series aiding and the secondaries connected series aiding (See figure 3). When the total number of selectors is greater than 35, three 70-A coils should be used and connected in a similar manner. However, this depends somewhat on the length of line and the voltage of the main battery required.



## RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEMS

## Description, Adjustments and Operation of Sets

(Continued)

## Operation of Selector Circuits Through Repeating Coils

(Continued)

## REPEATING COIL FOR TWO OR MORE SIMPLEXED CIRCUITS

When two simplex selector circuits are operated from a common battery supply, each system should be connected with repeating coils as shown in figure 4.

## REPEATING COIL IN SIMPLEX TELEGRAPH CIRCUIT

When an intermediate simplex telegraph circuit is required the repeating coil should be connected in the line circuit as shown in figure 1. When used for this condition the main selector circuit should be operated through a repeating coil.

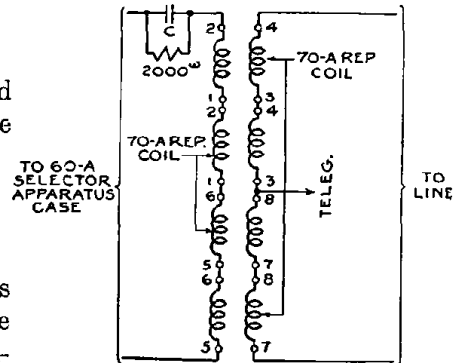


Fig. 3

Two Repeating Coils in Series Aiding

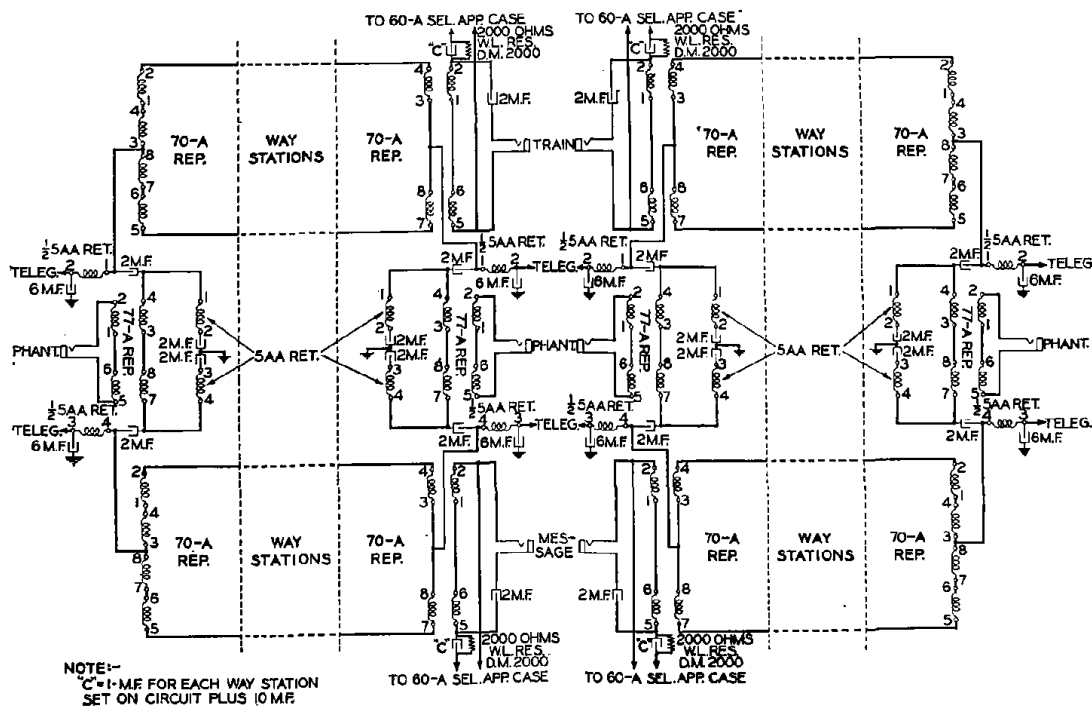


Fig. 4

Intermediate or through composed phantom circuits, with each side circuit controlled by one or two dispatchers.



**RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEMS****Description, Adjustments and Operation of Sets***(Continued)***Operation of Selector Circuits Through Repeating Coils***(Continued)*

When the 70-A repeating coil is used as an end simplex bridge, two or four windings connected in series aiding are bridged across the selector circuit. If the selector circuit is not operated through repeating coils a resistance of 500 to 1000 ohms should be connected on each side of the coil. If the selector circuit is operated through repeating coils the simplex coil windings should be bridged directly across without any resistance.

**REPEATING COIL FOR BRANCH SELECTOR CIRCUITS**

When a branch circuit is required without any metallic connection to the main line, it should be connected through a repeating coil as shown in figure 2, if the main line is not operated through repeating coils. The capacity of condenser "C" is 10 mf. plus 1 mf. for each selector in the branch. If the main selector circuit is operated through repeating coils the primary of the 70-A repeating coil for each branch is bridged directly across the main circuit without any condensers or resistance in series.

**REPEATING COIL FOR TWO SELECTOR CIRCUITS FOR COMPOSITED PHANTOM**

A general arrangement for using two selector circuits for side circuits of a composited phantom to give two simplexed telegraph circuits and a through telephone circuit in addition to the two selector circuits is shown in figure 4.

The voltage of the main current supply source for operating selector circuits through repeating coils should be 50 per cent higher than the voltage specified on the voltage-line-selector curves on page 18 for similar conditions.

**Portable and Siding Telephone Sets****GENERAL**

Portable and Siding telephone sets are intended for use of conductors and trainmen for calling dispatchers from various points on the railway train dispatching telephone system. The circuits of these sets are arranged similar to the telephone circuits of way stations. The sets are usually equipped with push-buttons for use when talking. Described in detail under "Telephone Sets."

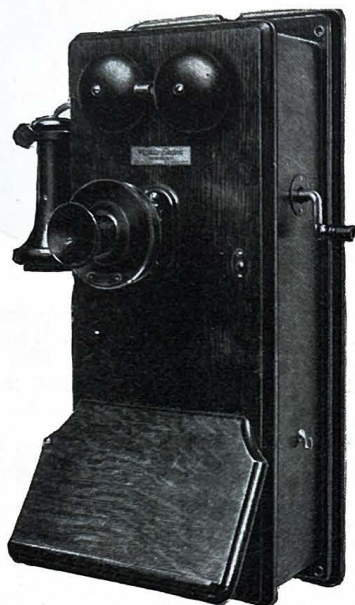
## RAILWAY TRAIN DISPATCHING TELEPHONE SYSTEMS

## Description, Adjustments and Operation of Sets

(Continued)

## Portable and Siding Telephone Sets

(Continued)

No. 1317 Type  
Telephone Set

## SIDING TELEPHONE SETS

Siding telephone sets are wall type sets usually employing a hand set receiver and equipped with or without a ringer or hand generator, depending upon whether one or two-way ringing service is required over the system.

## PORTABLE TELEPHONE SETS

Portable telephone sets are for use of conductors and trainmen for calling the dispatcher from any point on the train dispatching system. These sets are equipped with hand-set telephones. Line connections to the sets are usually made by means of line-poles which are furnished separately.

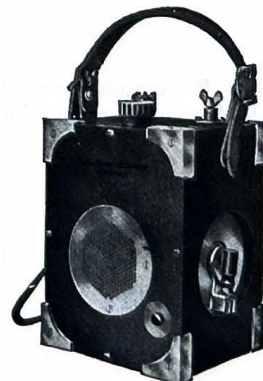
## Testing Equipment

## TEST BOARDS

The No. 2-A and -B and No. 3-A Test Boards are designed for testing and emergency transfer purposes when a number of Train Dispatching lines are terminated at one point. The boards are equipped with jacks, plugs and keys for testing and interconnecting purposes.

## TEST SETS

Test sets for various purposes can be furnished, depending upon the requirements. Refer to description of "Apparatus."

No. 1330 Telephone Set  
(closed)

No. 1017B Test Set

## BATTERIES AND SUPPLIES

## BLUE BELL DRY BATTERIES

## For Telephone Service



Gray Label

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.

Distributing houses are supplying a large and constant demand for these batteries. This fact insures the filling of orders promptly 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.



Blue Bell

| Size of<br>Zinc Cans<br>Ins. | Size<br>Overall<br>Ins. | Description                   | Wt. per<br>Cell | No. in<br>Bbl. | Shipping<br>Wt. per<br>Bbl. |
|------------------------------|-------------------------|-------------------------------|-----------------|----------------|-----------------------------|
| 2½ x 6                       | 2⅝ x 6¾                 | Standard Fahnestock Clip..... | 2               | 125            | 300 lb.                     |

## No. 6 COLUMBIA RED LABEL BATTERIES

Where steady service is demanded over a considerable period of time, Columbia Red Label Batteries prove reliable, efficient and economical. This is particularly true where the current drain is small, such as in bell, burglar alarm and toy service.

Columbia batteries will, however, stand up under hard service. They are satisfactory ignition batteries.

Equipped with either screw or Fahnestock connections, as desired.



Red Label



Columbia Ignitor

## No. 6 COLUMBIA IGNITOR BATTERIES

The Columbia Ignitor is a heavy duty cell, supplied in flush type carbons only. It is designed especially for particularly heavy duty and is adaptable for gas engine ignition, telephone pole changers and telephone train dispatching. The Fahnestock spring binding clip can be supplied without extra charge.

| List No. | Size of<br>Zinc Cans | Description             | Weight per<br>Cell | No. in<br>Bbl. | Wt. of<br>Bbl. |
|----------|----------------------|-------------------------|--------------------|----------------|----------------|
| 6        | 2½ x 6               | Columbia Red Label..... | 2 lbs.             | 125            | 300 lbs.       |
| 6        | 2½ x 6               | Columbia Ignitor.....   | 2 lbs.             | 125            | 300 lbs.       |

## OVAL COLUMBIA BATTERIES

## For Portable Telephones

| List No. | Size of Zinc Cans,<br>Ins. | Weight per Cell,<br>Ozs. | Weight per 100<br>Packed |
|----------|----------------------------|--------------------------|--------------------------|
| 04       | 1¼ x 2¼ x 4                | 11¼                      | 80                       |

For use with portable telephones. This cell is equipped with screw binding posts.

## EVEREADY TUNGSTEN BATTERIES

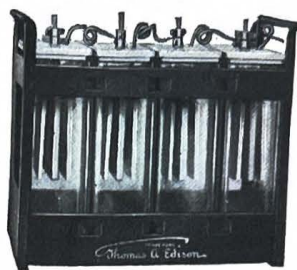
| List No. | No. of Cells | Size Over All<br>Height, Width, Depth,<br>Ins. Ins. Ins. | Used.                                                  |
|----------|--------------|----------------------------------------------------------|--------------------------------------------------------|
| 703      | 3            | 2⅝ 2⅞ ⅞                                                  | In the 1017B, C, E Tests Sets and 1375B Telephone Set. |
| 790      | 2            | 4¾ 1¼ ...                                                | In the 1330E, F and 1331E, F Telephone Sets.           |
| 792      | 2            | 2½ 1⅝ 1⅞                                                 | In the 1332A and E Telephone Sets.                     |



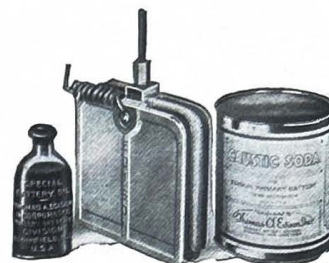
## BATTERIES AND SUPPLIES



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.

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.

## 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.

Capacity 250 ampere hours  
Rectangular heat resisting glass jar  
Size overall,  $3\frac{1}{2} \times 6 \times 12\frac{1}{2}$  inches  
Jar only, inside,  $2\frac{7}{8} \times 5\frac{1}{4} \times 10$  inches

## Description

Type S-252 Cell Complete  
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

(Continued)

## 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 who 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.

Capacity 400 ampere hours  
Cylindrical heat resisting glass jar  
Size overall,  $7\frac{1}{4} \times 11$  inches  
Jar only, inside,  $6\frac{7}{8} \times 8\frac{3}{4}$  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 of 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, intercommunicating 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,  $5 \times 6 \times 10$  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,  $7\frac{1}{8} \times 12\frac{1}{4}$  inches  
Jar only, inside, 6 in. diameter at top x 10 in. deep

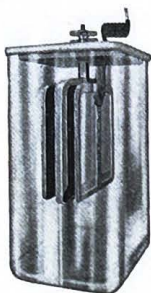
**Description**

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

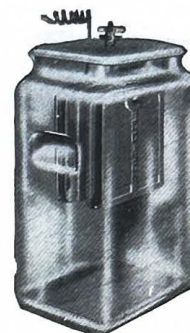
## BATTERIES AND SUPPLIES



Type No. S-502



Type No. S-504



Type No. M-1002

Edison Primary Batteries and Renewals  
(Continued)

## 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,  $7\frac{1}{8} \times 12\frac{1}{4}$  inches  
Jar only, inside dimensions  $6 \times 10$  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

**TYPE M-1002—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 classes 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  $5 \times 6$  inches  
Depth  $12\frac{3}{4}$  inches

**Description**

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

**Separate Parts**

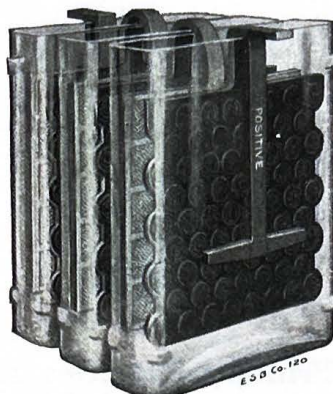
Type 1002 Jar  
Type 1002 Cover  
Wing Nuts and Washers, per set  
Type M-1000 Element  
Type 1000 Caustic Soda, per can  
Type 1000 Oil, per bottle



## 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.

### Chloride Accumulator Storage Batteries

| Type                                                    | BT             | CT             | PT              | ET             |
|---------------------------------------------------------|----------------|----------------|-----------------|----------------|
| Discharge rate in amperes {                             |                |                |                 |                |
| 8 hours.....                                            | $\frac{3}{4}$  | $1\frac{1}{2}$ | 3               | $4\frac{1}{2}$ |
| 5 hours.....                                            | 1              | 2              | $4\frac{1}{4}$  | $6\frac{1}{2}$ |
| 3 hours.....                                            | $1\frac{1}{2}$ | 3              | 6               | 9              |
| Normal Charging rate in amperes.....                    | $\frac{3}{4}$  | $1\frac{1}{2}$ | 3               | $4\frac{1}{2}$ |
| Outside dimensions of glass jar in inches {             |                |                |                 |                |
| Length.....                                             | $1\frac{3}{4}$ | $2\frac{1}{4}$ | $2\frac{1}{2}$  | $2\frac{1}{2}$ |
| Width.....                                              | $3\frac{3}{4}$ | $6\frac{1}{4}$ | 6               | $8\frac{3}{4}$ |
| Height.....                                             | $6\frac{3}{4}$ | 8              | 12              | 11             |
| Weight of electrolyte required for one cell, lbs.....   | 1              | $2\frac{1}{2}$ | $4\frac{1}{2}$  | $5\frac{1}{2}$ |
| Weight of one cell including electrolyte in pounds..... | $3\frac{1}{2}$ | $7\frac{1}{2}$ | $13\frac{1}{2}$ | 22             |
| Insulators per tray of 11 cells.....                    | 6              | 6              | 6               | 6              |

### Battery Connector Cord

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.

540

#### Description

Standard length 5 inches. The moisture-proofed cotton insulation is cut back at each end for  $\frac{5}{8}$  inch, and the bare stranded conductor soldered to prevent fraying.

### 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     | $3\frac{1}{4} \times 7\frac{15}{32} \times 9\frac{7}{16}$                                                           |
| 2A       | 4 No. 6 cells     | $3\frac{1}{4} \times 7\frac{3}{8} \times 12\frac{5}{16} - 3\frac{7}{32} \times 7\frac{3}{8} \times 12\frac{19}{64}$ |
| 2B       | 9 No. 6 cells     | $5\frac{23}{32} \times 7\frac{9}{16} \times 14\frac{1}{32}$                                                         |



No. 1A—Battery Box



# BELLS



No. 127 Type



No. 101402 Bell



No. 392 Type Loud Ringing Extension Bell

## Bells—Extension Type

These extension bells consist of a ringer mounted in an oak box with exposed gongs. The approximate overall dimensions are 6½ inches wide by 5⅞ inches high by 4⅞ inches deep. The standard finish is golden oak.

The No. 127-E, F and G Types are used as extension bells to operate on telephone ringing current.

The No. 127-H Extension Bell has a split wound ringer for use on simplex circuits. This ringer also performs the function of a split retardation coil for such services.

The No. 127-J Extension Bell contains a direct current type of ringer to operate from one or two dry cells for use in connection with selector apparatus equipment.

If different tone gongs are required, the extension bells should be ordered in accordance with D specifications as shown below opposite the code number listings. For example, if the No. 127-E Extension Bell is required equipped with a No. 3 cow gong, order as follows: No. 127-E Extension Bell D-5979.

| Code No. | Ringer No. | Resistance Ohms | Gong No. | Special Gongs (See note above)        |                |                 |
|----------|------------|-----------------|----------|---------------------------------------|----------------|-----------------|
|          |            |                 |          | No. 21 Sleigh Gong                    | No. 3 Cow Gong | No. 10 Tea Gong |
| 127-E    | 38-AG      | 1020            | 26-A     | D-25816                               | D-5979         | D-19344         |
| 127-F    | 38-BG      | 2500            | 26-A     | D-5980                                | D-7000         | D-7009          |
| 127-G    | 38-FG      | 1620            | 26-A     | .....                                 | .....          | .....           |
| 127-H    | 43-NG      | 88              | 26-A     | .....                                 | .....          | .....           |
| 127-J    | 60-CG      | ....            | 26-A     | (Equipped with a No. 21-BA Condenser) |                |                 |

## BELLS—LOUD RINGING EXTENSION TYPES

These bells equipped with galvanized gongs and black finished metal base with cover moisture proofed.

| Code No. | Resistance | Gong No. | Diameter of Gongs |
|----------|------------|----------|-------------------|
| 392-A    | 1000 ohms  | 28-A     | 6 inch            |
| 392-B    | 2500 ohms  | 28-A     | 6 inch            |
| 392-E    | 1600 ohms  | 28-A     | 6 inch            |

## BELLS—LOUD RINGING EXTENSION TYPES—WITH BACKBOARD

| Code No. | Extension Bell No. | Resistance | Backboard No.         |
|----------|--------------------|------------|-----------------------|
| 342-J    | 392-A              | 1000 ohms  | 152-A (replaces 149A) |
| 342-K    | 392-B              | 2500 ohms  | 152-A (replaces 149A) |

## BELLS—VIBRATING TYPES

These are loud ringing vibrating bells for operation on direct current. The No. 101403 Bell differs from the No. 101402 Type in that it is equipped with an armature contact for operating a drop.

| List No. | Resistance Ohms | Diameter of Gong | Used with Selector Sets |
|----------|-----------------|------------------|-------------------------|
| 12018    | 5               | 4 in.            | No. 102-F               |
| 101402   | 1100            | 4 in.            | No. 101-A, No. 101-B    |
| 101403   | 1100            | 4 in.            | No. 101-A, No. 101-B    |
| 101404   | 5.3             | 4 in.            | No. 102-A, No. 102-B    |

## Western Electric

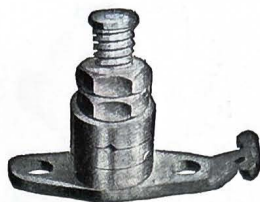
### BINDING POSTS



No. 1A]



No. 2A



No. 2E



No. 3A



No. P-121382



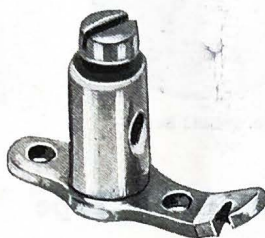
No. 9 Cord Fastener



No. 1B



No. 16A



No. 20A



No. 29A



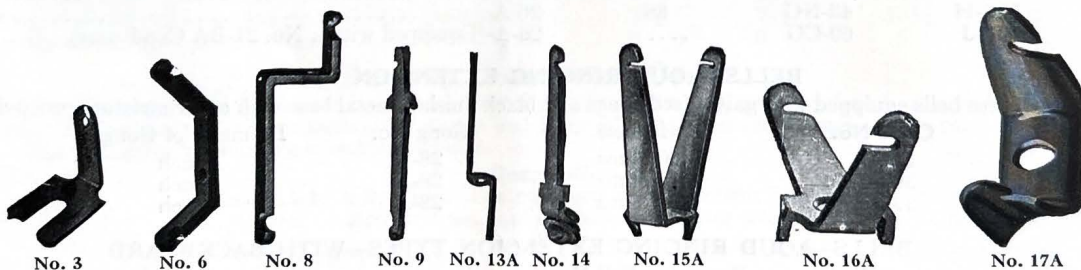
No. 30A



No. 37A

### 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     |
| 2C       | Similar to No. 2A but with wing nut instead of lock nuts.                                                                      | Nickel     |
| 2E       | Lock nut connections, one front soldering terminal.                                                                            | Brass      |
| 3A       | Lock nut connections, one back soldering terminal.                                                                             | Nickel     |
| 3B       | Wing nut connection; used in 1314A Telephone Set. Screw mounting.                                                              | Nickel     |
| 3C       | Wing nut connections; one back soldering terminal; used on the No. 1017 Test Set. Screw mounting.                              | Nickel     |
| 16A      | To take one tubular tip.                                                                                                       | Nickel     |
| 20A      | Screw connections, one front soldering terminal.                                                                               | Nickel     |
| 29A      | Used in No. 8 and No. 14 Cable Terminals when the original binding posts break off above the lower nut. For 10-32 thread only. | Nickel     |
| 30A      | Screw connection, one soldering terminal.                                                                                      | Tinned     |
| 37A      | Line Type for miscellaneous uses.                                                                                              | Tinned     |
| P-121382 | Line Type for miscellaneous uses.                                                                                              | Brass      |
| 9        | Cord fastener, Line Type for miscellaneous uses.                                                                               | Tinned     |



No. 3

No. 6

No. 8

No. 9

No. 13A

No. 14

No. 15A

No. 16A

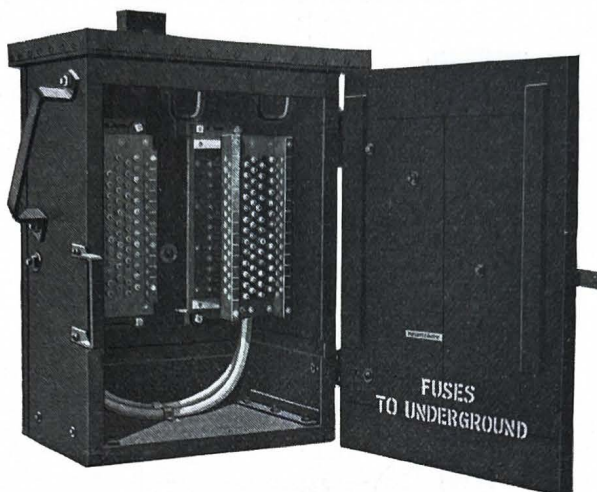
No. 17A

### 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 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. |



## CABLE AND CABLE TERMINALS

Cable for  
Interior Use

B-26 Cable Terminal

Lead Covered  
Cable

## CABLES (INTERIOR) FOR WAY STATIONS

The following list of interior way station cables have impregnated cores and are covered with a black glazed cotton braid. Each conductor consists of tinned copper wire, insulated with a coating of black enamel, also two servings of tussah floss and a braided cotton covering. The outer insulation of each conductor is colored according to standard code.

| Code No. | No. of Conductors | B & S Gauge | Dimensions |
|----------|-------------------|-------------|------------|
| 6166     | 6                 | No. 20      | 17/64"     |
| 6223     | 10                | No. 20      | 21/64"     |
| D-24269  | 20                | No. 20      | 15/32"     |

## CABLES—LEAD COVERED AND SUBMARINE

Lead covered cables for aerial and underground use, also for submarine purposes are available. For further information refer to detailed description of these cables in "Telephone Apparatus and Supplies Catalog."

## CABLES—"CIRCULAR LOOM"

These are emergency cables adapted for use in case of breaks in the telephone lines. The cable can be strung on poles, laid on the ground or through water. The cables are easily handled as they are furnished on reels which are provided with stands for unwinding.

These circular loom cables are furnished with No. 18 B. & S. gauge stranded copper conductors or No. 14 B. & S. gauge solid copper conductors in 1, 2, 3, 4, 5, 7, 10 and 12 or more pairs as required.

## 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.

| Code No. | Capacity Pairs | Cable Terminal Box No. | Includes                                                                                                                                                                                                                                     |
|----------|----------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| B-26     | 26             | B-26                   | Equipped with                                                                                                                                                                                                                                |
| B-51     | 51             | B-51                   | 1 B-26A Fuse Chamber and 1 B-26A Binding Post Chamber                                                                                                                                                                                        |
| B-76     | 76             | B-76                   | 1 B-51A Fuse Chamber and 1 B-51A Binding Post Chamber                                                                                                                                                                                        |
| B-101    | 101            | B-101                  | 1 B-76A Fuse Chamber and 1 B-76A Binding Post Chamber                                                                                                                                                                                        |
| B-152    | 152            | B-152                  | 1 B-101A Fuse Chamber and 1 B-101A Binding Post Chamber                                                                                                                                                                                      |
| B-202    | 202            | B-202                  | 2 B-76B Fuse Chambers and 2 B-76B Binding Post Chambers                                                                                                                                                                                      |
| B-304    | 304            | B-304                  | 2 B-101B Fuse Chambers and 2 B-101B Binding Post Chambers                                                                                                                                                                                    |
| B-404    | 404            | B-404                  | 2 B-76B Fuse Chambers and 2 B-76B Binding Post Chambers<br>2 B-76C Fuse Chambers and 2 B-76C Binding Post Chambers<br>2 B-101B Fuse Chambers and 2 B-101B Binding Post Chambers<br>2 B-101C Fuse Chambers and 2 B-101C Binding Post Chambers |

Note—"B Fuse Chambers" do not include the No. 7-T Fuses which must be ordered separately.

## TYPE "BB" CABLE TERMINALS

This type Cable Terminal was designed for use in cross-connecting long sections of aerial cable or at points where aerial cables branch. A splicing chamber is provided at the bottom of the box for housing splices.

| Code No. | Capacity Pairs | Cable Terminal Box No. | Includes                                                                       |
|----------|----------------|------------------------|--------------------------------------------------------------------------------|
| BB26     | 26             | BB26                   | Binding Post Chambers                                                          |
| BB51     | 51             | BB51                   | Left Side Right Side                                                           |
| BB76     | 76             | BB76                   | 1-BB26A 1-BB26A                                                                |
| BB101    | 101            | BB101                  | 1-BB51A 1-BB51A                                                                |
| BB152    | 152            | BB152                  | 1-BB76A 1-BB76A                                                                |
| BB202    | 202            | BB202                  | 1-BB101A 1-BB101A                                                              |
| BB304    | 304            | BB304                  | 2-BB76B 2-BB76B                                                                |
| BB404    | 404            | BB404                  | 2-BB101B 2-BB101B<br>2-BB76C 2-BB76C<br>2-BB101B 2-BB101B<br>2-BB101C 2-BB101C |

## TYPE "C" CABLE TERMINALS

The "C" Type Cable Terminal was designed for terminating lead covered cables and is provided with a cable stub which is attached to a terminal plate and sealed with compound.

| Code No. | Capacity Pairs | Standard Length of Stub in Inches | Dimensions in Inches    | Replaces    |
|----------|----------------|-----------------------------------|-------------------------|-------------|
| C-10     | 10             | 0 1/4 ft.                         | 4 1/8 x 5 3/16 x 12 3/4 | 8A          |
| C-16     | 16             | 0 1/4 ft.                         | 4 1/8 x 5 3/16 x 14 5/8 | *8B and 8D  |
| C-26     | 26             | 7 ft.                             | 4 1/8 x 5 1/16 x 17 3/4 | **8C and 8E |

\*Note—Two C-16 Cable Terminals replace one No. 8D.

\*\*Note—Two C-26 Cable Terminals replace one No. 8E.



## CABLE TERMINALS

(Continued)



No. 18E Cable Terminal, Open



No. 8 Type Cable Terminal Open



Closed

No. 14C—Cable Terminal



Open

## NO. 14 TYPE CABLE TERMINAL (Unprotected)

This terminal consists of a cast iron box with hinged cover, containing a porcelain terminal block with binding post for line connection. The back of the box is designed to permit mounting it on either a flat surface or a pole, by means of four screws.

The cover is arranged for charting the pairs on the inner surface.

This cable terminal can be ordered equipped with a 5½, 8, 10 or 12 ft. cable stub, as required. This stub will enter from the top, unless otherwise specified.

| Code No. | Capacity Pairs | Length Including Nipples | Width of Cover Ins. |
|----------|----------------|--------------------------|---------------------|
| 14-B     | 11             | 10 $\frac{3}{32}$        | 7 $\frac{1}{2}$     |
| 14-C     | 16             | 12 $\frac{21}{32}$       | 9 $\frac{1}{8}$     |
| 14-D     | 26             | 17 $\frac{23}{32}$       | 14 $\frac{1}{2}$    |

## NO. 18 TYPE CABLE TERMINALS (with Protectors)

This is a protected terminal for open wire distribution from underground or aerial cable. It is enclosed in a round black finished iron cover approximately 8 $\frac{5}{16}$  inches in diameter. The cover is equipped with a spring to hold it when raised to the top of the terminal and a safety chain fastening it to the base. The base is slotted at the back making the terminal suitable for either wall or pole mounting. Both cover and base are galvanized.

Terminals are equipped with:

No. 7-A Fuses (7 ampere unless otherwise specified)

No. 1 Protector Blocks

No. 2 Protector Blocks

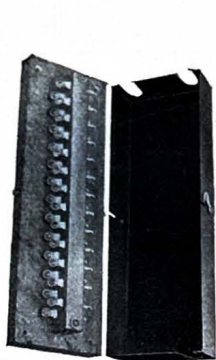
No. 3 Protector Micas

A six-foot No. 22 B & S gauge cable stub is standard, and will be furnished attached to assembled terminal unless otherwise ordered.

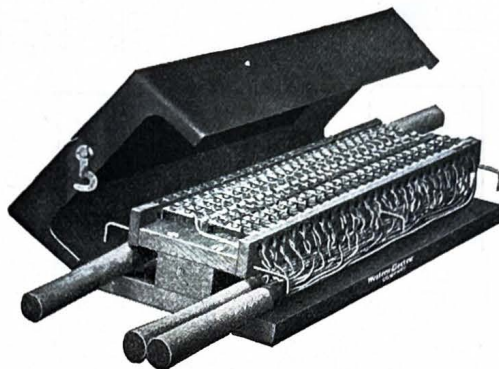
| Code No. | Capacity Pairs | Length, Ins.       | Code No. | Capacity Pairs | Length, Ins.       |
|----------|----------------|--------------------|----------|----------------|--------------------|
| 18-A     | 10             | 19 $\frac{9}{32}$  | 18-D     | 30             | 33 $\frac{1}{32}$  |
| 18-B     | 15             | 22 $\frac{1}{32}$  | 18-E     | 50             | 46 $\frac{25}{32}$ |
| 18-C     | 25             | 28 $\frac{29}{32}$ | 18-F     | 60             | 53 $\frac{21}{32}$ |

## CABLE TERMINALS, CIRCUIT BREAKERS

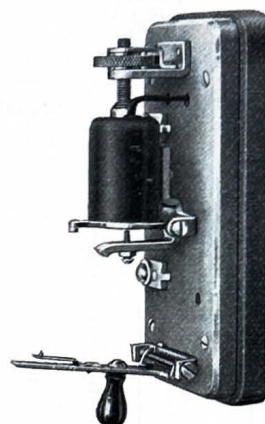
(Cable Terminals Continued)



No. 12-A Cable Terminal



No. 19-B Cable Terminal



No. 2-A Circuit Breaker

## 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 | Dimensions, Ins.   |                  |                   |
|----------|----------------|--------------------|------------------|-------------------|
|          |                | Length             | Width            | Depth             |
| 12-A     | 13             | 11 $\frac{15}{16}$ | 4 $\frac{1}{16}$ | 1 $\frac{13}{16}$ |
| 12-B     | 23             | 11 $\frac{15}{16}$ | 4 $\frac{1}{16}$ | 2 $\frac{13}{16}$ |
| 12-C     | 33             | 11 $\frac{15}{16}$ | 4 $\frac{1}{16}$ | 3 $\frac{13}{16}$ |

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 | Dimensions, Ins. |                 |                 |
|----------|----------------|------------------|-----------------|-----------------|
|          |                | Length           | Width           | Depth           |
| 19-A     | 14             | 8                | 5 $\frac{1}{8}$ | 2 $\frac{1}{2}$ |
| 19-B     | 26             | 14               | 5 $\frac{1}{8}$ | 2 $\frac{1}{2}$ |

## Circuit Breaker

## Code No.

## Description

**2-A** This is an overload circuit breaker, designed for use in the main battery circuit of train dispatching lines to protect the relays and associated apparatus from excess currents, due to short circuits. It consists of a coil, armature and circuit breaker arm mounted on a slate base, with a metal sub-base, the over-all dimensions being approximately 3 $\frac{3}{4}$ " x 6", and extending out from the wall approximately 4", when the arm is in the open or operating position. The coil is movable by means of an adjusting nut to vary the current at which the breaker will operate and will safely carry a current of 2 amperes. However, the margin between the operating and non-operating current is much greater in service than the factory adjustment. Therefore, in actual service, the standard adjustment is as follows:

Operating Current —.60 Amperes  
Non-Operating Current—.30 Amperes

This circuit breaker is much more sensitive and quicker than a fuse and can be reset. The resistance of the coil is approximately 1.65 ohms. Contacts which open are made of platinum and the distance they open is about 1 $\frac{3}{4}$ ".

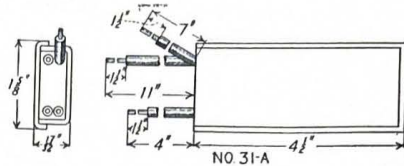


## CONDENSERS

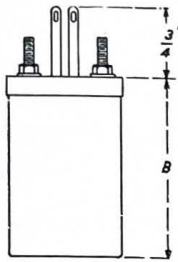
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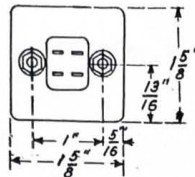
No. 33A



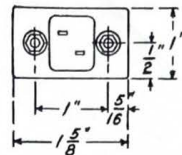
No. 31-A



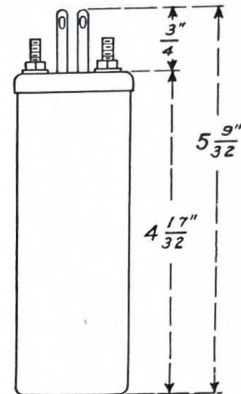
No. 57N



No. 57N



No. 90A



No. 90A

| CONDENSERS—UNMOUNTED TYPE |                         |                   |                |
|---------------------------|-------------------------|-------------------|----------------|
| Code No.                  | Capacity Micro-farads   | Tested On Voltage | Use            |
| 21-CB                     | 1 Min. .85<br>Max. 1.15 | 1000 A.C.         | Railway        |
| Code No.                  | Capacity Micro-farads   | Tested On Voltage | Use            |
| 31-A                      | {0.05<br>0.05           | 500 D.C.          | General (31-A) |

## 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, except No. 33S, No. 33T, which are tested to 1000 volts alternating current.

| Code No. | Condensers Used | Capacity, Each            | Overall Dimensions (inches)                               |
|----------|-----------------|---------------------------|-----------------------------------------------------------|
| 128-A    | 1 No. 21-CB     | { min. .85<br>1 max. 1.15 | $6\frac{7}{8} \times 7\frac{1}{16} \times 2\frac{3}{16}$  |
| 33-A     | 2 No. 21-L      | 2 (ea.)                   | $10\frac{3}{4} \times 1\frac{7}{8} \times 2\frac{3}{8}$   |
| 33-B     | 1 No. 21-L      | 2                         | $10\frac{3}{4} \times 1\frac{7}{8} \times 2\frac{3}{8}$   |
| 33-C     | 2 No. 21-BW     | 1 (ea.)                   | $10\frac{3}{4} \times 1\frac{7}{8} \times 1\frac{11}{16}$ |
| 33-D     | 1 No. 21-BW     | 1                         | $10\frac{3}{4} \times 1\frac{7}{8} \times 1\frac{11}{16}$ |
| 33-E     | 2 No. 21-N      | 0.5 & 1.0 (ea.)           | $10\frac{3}{4} \times 1\frac{7}{8} \times 1\frac{5}{8}$   |
| Code No. | Condensers Used | Capacity, Each            | Overall Dimensions (inches)                               |
| 33-F     | 1 No. 21-AS     | 0.5                       | $10\frac{3}{4} \times 1\frac{7}{8} \times 1\frac{5}{16}$  |
| 33-G     | 2 No. 21-AD     | {1.0 (ea.)<br>1.0         | $10\frac{3}{4} \times 1\frac{7}{8} \times 2\frac{3}{8}$   |
| 33-H     | 4 No. 21-L      | 2 (ea.)                   | $10\frac{3}{4} \times 1\frac{7}{8} \times 4\frac{1}{8}$   |
| 33-L     | 2 No. 21-AS     | 0.5 (ea.)                 | $10\frac{3}{4} \times 1\frac{7}{8} \times 1\frac{5}{16}$  |

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

| Capacity—Microfarads |                 |         |         |
|----------------------|-----------------|---------|---------|
| Code No.             | Condensers Used | Minimum | Maximum |
| 32-J                 | 2 No. 21-AA     | 1.00    | 1.00    |
| 33-QD                | 2 No. 21-QD     | 2.10    | 2.14    |
| 33-QE                | 2 No. 21-QE     | 2.12    | 2.16    |
| Capacity—Microfarads |                 |         |         |
| Code No.             | Condensers Used | Minimum | Maximum |
| 33S                  | 2-84A           | 2.14    | 2.18    |
| 33T                  | 2-84B           | 1.8     | 2.2     |

## 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  $1\frac{1}{16}$  in. horizontal and  $1\frac{3}{4}$  in. vertical centers. The No. 90 Type condensers are arranged to mount on  $1\frac{3}{4}$  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) |
|----------|----------------|--------------------------|
| 57-N     | 2              | $4\frac{15}{16}$         |
| 57U      | 1.0-1.0        | $4\frac{7}{16}$          |
| 57-QF    | 2.16           | $4\frac{27}{64}$         |
| Code No. | Capacity M. F. | Dimensions "B" (See Cut) |
| 90-A     | 1.00 & 1.00    | ....                     |
| 90-B     | 2.00           | ....                     |
| 90-C     | 2.16           | ....                     |

## CONDENSERS—CABINET TYPE

| Code No. | Description                                                                        |
|----------|------------------------------------------------------------------------------------|
| 160-A    | Consists of 12 No. 21-AA Condensers mounted in an oak box. Has capacity of 10 M.F. |

Use  
In A.C. Train Dispatching Circuits when selectors are operated through a repeating coil and are connected in series with the primary winding of the repeating coil.



## CONDENSERS

(Continued)

These 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.

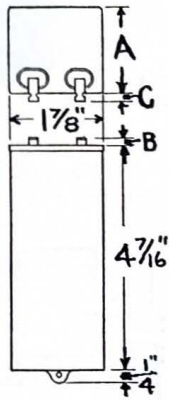


Fig. 1  
Bent Terminals



No. 21D



No. 21J

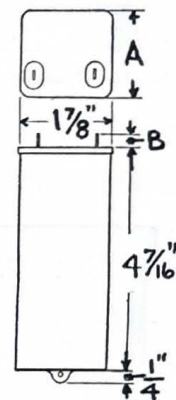


Fig. 2  
Straight Terminals

## Condensers—Unmounted

| Code No. | Capacity Microfarads       | Fig. No. | —Dimensions (Inches)—           |                                 |      | Voltage Tested On | Used in Sets                        |
|----------|----------------------------|----------|---------------------------------|---------------------------------|------|-------------------|-------------------------------------|
|          |                            |          | A                               | B                               | C    |                   |                                     |
| 21-D     | 2.0                        | 1        | 1 <sup>21</sup> / <sub>32</sub> | 1/8                             | 5/32 | 500 D.C.          | 1312-A, 1314-A, 311-A               |
| 21-E     | 2.0                        | 2        | 1 <sup>5</sup> / <sub>8</sub>   | 1 <sup>1</sup> / <sub>32</sub>  | ..   | 500 D.C.          | General                             |
| 21-F     | 1.0                        | 1        | 1                               | 5/32                            | 1/8  | 500 D.C.          | 1330, 1331, 502, 1312, 1314, 1311-A |
| 21-H     | 0.1                        | 1        | 1                               | 5/32                            | 7/8  | 1200 D.C.         | Interrupters                        |
| 21-J     | 0.3 & 0.3                  | 2        | 1                               | 1 <sup>1</sup> / <sub>32</sub>  | ..   | 500 A.C.          | 3 terminals                         |
| 21-K     | 1.0                        | 2        | 2 <sup>29</sup> / <sub>32</sub> | 5/16                            | ..   | 500 D.C.          | General                             |
| 21-L     | 2.0                        | 2        | 1 <sup>21</sup> / <sub>32</sub> | 1 <sup>1</sup> / <sub>32</sub>  | ..   | 500 D.C.          | Coil Racks                          |
| 21-N     | 1.0 & 0.5                  | 2        | 2 <sup>29</sup> / <sub>32</sub> | 3/32                            | ..   | 500 D.C.          | Coil Racks, 3 terminals             |
| 21-R     | 0.1                        | 2        | 1 <sup>13</sup> / <sub>32</sub> | 3/8                             | ..   | 500 D.C.          | General                             |
| 21-S     | .125, .25 & .5             | 2        | 1                               | 1 <sup>13</sup> / <sub>32</sub> | ..   | 500 D.C.          | Telegraph, 4 terminals              |
| 21-U     | 0.05                       | 2        | 1                               | 5/16                            | ..   | 1200 A.C.         | 1312, 1314, 311-A, 101, 161-A       |
| 21-W     | {Max. 1.35<br>Min. 0.8}    | 1        | 1                               | 5/32                            | 5/16 | 350 D.C.          | 1317, 300                           |
| 21-Y     | 0.25                       | 1        | 2 <sup>1</sup> / <sub>32</sub>  | 5/32                            | 7/32 | 1200 A.C.         | Telegraph                           |
| 21-AA    | 1.0                        | 1        | 1 <sup>21</sup> / <sub>32</sub> | 5/32                            | 7/32 | 1000 A.C.         | 1293, 1317, 1336, 160, 295, 300     |
| 21-AB    | .125, .25 & .5             | 2        | 1                               | 1 <sup>13</sup> / <sub>32</sub> | ..   | 1000 A.C.         | Telegraph                           |
| 21-AC    | 0.5                        | 2        | 1 <sup>17</sup> / <sub>32</sub> | 15/32                           | ..   | 500 D.C.          | General                             |
| 21-AD    | 1.0 & 1.0                  | 2        | 1 <sup>21</sup> / <sub>32</sub> | 1 <sup>1</sup> / <sub>32</sub>  | ..   | 500 D.C.          | Composite                           |
| 21-AH    | {Max. .031<br>Min. .019}   | 2        | 2 <sup>29</sup> / <sub>32</sub> | 1 <sup>1</sup> / <sub>32</sub>  | ..   | 500 D.C.          | 4 Terminals                         |
| 21-AK    | 0.5                        | 1        | 1                               | 5/32                            | 1/8  | 1000 A.C.         | Telegraph                           |
| 21-AL    | 0.25                       | 1        | 1                               | 5/32                            | 1/8  | 1000 A.C.         | 160, 501, 1317                      |
| 21-AM    | {Max. 1.18<br>Min. 1.06}   | 1        | 2 <sup>29</sup> / <sub>32</sub> | 5/16                            | ..   | 500 D.C.          | General                             |
| 21-BA    | 0.01                       | 1        | 1                               | 7/32                            | 1/8  | 1000 A.C.         | 160                                 |
| 21-BE    | {Max. 2.24<br>Min. 2.16}   | 2        | 1 <sup>5</sup> / <sub>8</sub>   | 1 <sup>1</sup> / <sub>32</sub>  | ..   | 500 D.C.          | General                             |
| 21-BJ    | {Max. 2.512<br>Min. 2.488} | 2        | 1 <sup>21</sup> / <sub>32</sub> | 1 <sup>1</sup> / <sub>32</sub>  | ..   | 500 D.C.          | General                             |
| 21-BW    | 1.0                        | 2        | 1                               | 5/16                            | ..   | 500 D.C.          | General, 1332                       |

## Condenser Straps

- P-43065 A straight galvanized iron strap, overall dimensions 4<sup>15</sup>/<sub>16</sub> x 1/2 inches.  
P-43121 A galvanized iron clamp, overall dimensions 5<sup>5</sup>/<sub>16</sub> x 9/16 inches.  
P-48022 A straight galvanized iron strap for mounting two condensers, 9<sup>5</sup>/<sub>8</sub> x 1/2 inches.

## CONNECTING BLOCKS AND BRIDGING CONNECTORS



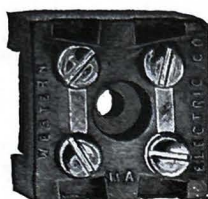
No. 1A—Connecting Block



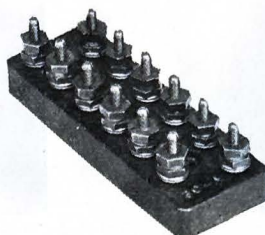
No. 8A—Connecting Block



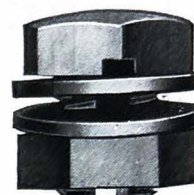
No. 31A—Connecting Block



No. 11A—Connecting Block



No. 30A—Connecting Block



No. 3 Test Connector

## CONNECTING BLOCKS

| Code No. of<br>No. Connectors | Type of Connector                                                            | Size of Base, Ins. |                 |                 | Material<br>Base               |
|-------------------------------|------------------------------------------------------------------------------|--------------------|-----------------|-----------------|--------------------------------|
|                               |                                                                              | Length             | Width           | Thickness       |                                |
| 1A 3                          | { One Screw and Cord Tip Terminal<br>on each connector<br>See illustration } | $2\frac{17}{32}$   | $2\frac{1}{32}$ | $\frac{13}{32}$ | Composition                    |
| 3 1                           |                                                                              | $\frac{5}{8}$      | $\frac{3}{4}$   | $\frac{39}{64}$ | *                              |
| 8A 6                          |                                                                              | 5                  | 1               | $\frac{5}{8}$   | Ebonized Wood                  |
| 8G 8                          | { Bridge Type Connectors same as<br>used in No. 19 Cable Terminal. }         | $5\frac{5}{8}$     | $1\frac{3}{8}$  | $\frac{5}{8}$   | { Wood-Maple<br>Black Finish } |
| 8H 12                         |                                                                              | $8\frac{1}{8}$     | $1\frac{3}{8}$  | $\frac{5}{8}$   |                                |
| 11A 2                         | { Two Screw Terminals on each con-<br>nector electrically connected. }       | $1\frac{1}{8}$     | $1\frac{5}{32}$ | $\frac{9}{16}$  | Composition                    |
| 11B 2                         |                                                                              | $1\frac{1}{8}$     | $1\frac{5}{32}$ | $\frac{9}{16}$  | Composition                    |

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

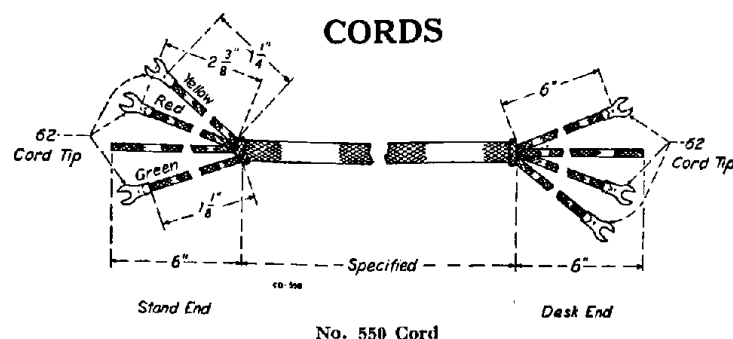
|       |                                                                                                         |                  |                 |                |             |
|-------|---------------------------------------------------------------------------------------------------------|------------------|-----------------|----------------|-------------|
| 12C 3 | { Two Screw Terminals on each con-<br>nector electrically connected.<br>Equipped with Cord Fasteners. } | $1\frac{11}{16}$ | $1\frac{5}{32}$ | $\frac{9}{16}$ | Composition |
| 12D 3 |                                                                                                         | $1\frac{15}{16}$ | $1\frac{5}{32}$ | $\frac{9}{16}$ | Composition |

Replace Nos. 12A and B Connecting Blocks respectively. (The No. 12C Connecting Block is the same as the No. 12D, except that it is equipped with a black finished metal cover).

|        |                                                                                                                                                            |                   |                |               |             |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------|---------------|-------------|
| 30A 12 | { Consists of sets of binding posts<br>molded into the block arranged<br>in $\frac{5}{8}$ " centers in two rows, $\frac{3}{4}$ "<br>apart and staggered. } | $4\frac{3}{16}$   | $1\frac{1}{2}$ | $\frac{1}{2}$ | Composition |
| 30B 22 |                                                                                                                                                            | $7\frac{5}{16}$   | $1\frac{1}{2}$ | $\frac{1}{2}$ | Composition |
| 30C 32 |                                                                                                                                                            | $10\frac{7}{16}$  | $1\frac{1}{2}$ | $\frac{1}{2}$ | Composition |
| 30D 52 |                                                                                                                                                            | $16\frac{11}{16}$ | $1\frac{1}{2}$ | $\frac{1}{2}$ | Composition |

(Each post equipped with nuts and washers for connecting distributing wires. Replace No. 6 Type connecting blocks except for replacements.)

|        |                                                                                                                                               |                   |                |               |             |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------|---------------|-------------|
| 31A 12 | { Each connector has one lock nut<br>binding post and one soldering<br>terminal, brought out on the side,<br>otherwise same as No. 30 Type. } | $4\frac{3}{16}$   | $1\frac{1}{2}$ | $\frac{1}{2}$ | Composition |
| 31B 22 |                                                                                                                                               | $7\frac{5}{16}$   | $1\frac{1}{2}$ | $\frac{1}{2}$ | Composition |
| 31C 32 |                                                                                                                                               | $10\frac{7}{16}$  | $1\frac{1}{2}$ | $\frac{1}{2}$ | Composition |
| 31D 52 |                                                                                                                                               | $16\frac{11}{16}$ | $1\frac{1}{2}$ | $\frac{1}{2}$ | Composition |



**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 Covering                                                                                                                                | Conductors | Cord Tips Trans. End | Set End | Tracer Colors            | Standard Length Feet | Desk Stand                                                        | Used with Telephone Arm                                                                          |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------------|---------|--------------------------|----------------------|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| 409      | Moisture-proofed                                                                                                                             | 3          | 92                   | 92      | Red, Yellow, Green       | 6                    | 1020-AB, 1120-AB, 1042-AB, & 1142-AB                              | 1048-DA, DB, DC & DD, 1148-DA, DB, DC & DD, 1020-C & 1120-C                                      |
| 416      | Moisture-proofed                                                                                                                             | 4          | 92                   | 92      | Red, Green, Blue, Yellow | 6                    | 1020-BR & 1042-BR                                                 | 1048-GA, GB, GC & GD                                                                             |
| 423      | Moisture-proofed                                                                                                                             | 1          | 61                   | 92      |                          | 9 1/2"               | 1020 & 1042-BR                                                    | 1048 & 1148 Type                                                                                 |
| 426      | Moisture-proofed                                                                                                                             | 1          | 97                   | 92      | Yellow                   | 9 1/8"               | 1020-AB & BR, 1120-AB, 1042AB & BR, & 1142-AB (Replaces 330 cord) | 1020-C & E, 1120-C, 1048-DA, DB, DC & DD, 1148-DA, DB, DC, & DD                                  |
| 27       | Moisture-proofed                                                                                                                             | 1          | 97                   | 92      | D'bl Yellow              | 9 1/8"               | 1020-AB & BR, 1042AB & BR, & 1120AB, & 1142AB                     | 1048-DA, DB, DC & DD, 1020-E, 1148-DA, DB, DC & DD                                               |
| 541      | Water-proofed                                                                                                                                | 3          | 62                   | 62      | Red, Yellow, Green       | 5 1/2                | 1020- & 1042 Type                                                 | 1048 & 1148 Type                                                                                 |
| 550      | Tinsel Silk                                                                                                                                  | 3          | 62                   | 62      | Red, Yellow, Green       | 5 1/2                | 1020-AL, 1040-AL                                                  | 1020-CC                                                                                          |
| 554      | Moisture-proofed                                                                                                                             | 2          | 69                   | 103     | White, Green             | 2 1/2                | 1020-AB & BR, 1042-AB & BR, 1120-AB & 1142-AB                     | 1048-DA, DB, DC & DD, 1148-DA, DB, DC & DD using No. 186-W & 189-W Receivers, 1020-C and 1120-C. |
| 571      | Tinsel Silk                                                                                                                                  | 2          | 69                   | 103     | White, Green             | 5 1/2                | 1020 Type (using 190-W Receiver)                                  |                                                                                                  |
| 582      | Tinsel Cotton                                                                                                                                | 1          | 56                   | 62      | Yellow                   | 1                    |                                                                   | 1020-CC                                                                                          |
| 450      | Combination cord for use with 1020-AL and 1040-AL Desk Stands consists of 550 Cord 5 1/2 ft., R2A Cord 2 1/2 ft., and 2 T1A Cords, 9 1/8 in. |            |                      |         |                          |                      |                                                                   |                                                                                                  |

The following are new coded type cords. The first letter of the code number indicates the type of apparatus with which the cord is used and the middle number represents the number of conductors in the cord. For example, Cord D4E is a desk stand cord having 4 conductors.

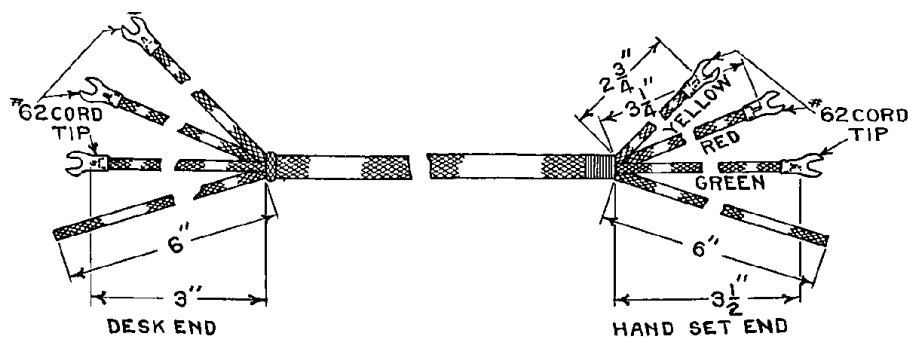
| Code No. | Type Covering    | Conductors | Cord Tips Trans. End | Set End | Tracer Colors            | Standard Length Feet | Desk Stand                                            | Used with Telephone Arm |
|----------|------------------|------------|----------------------|---------|--------------------------|----------------------|-------------------------------------------------------|-------------------------|
| D4E      | Moisture-proofed | 4          | 103                  | 103     | Green, Red, Yellow, Blue | 5 1/2                | 1020-U & 1040-U (Replaces 365 Cord)                   |                         |
| D4G      | Moisture-proofed | 4          | 103                  | 103     | Yellow, Blue, Green, Red | 6                    | 1020-BR & 1042-BR                                     | 1020E                   |
| R2A      | Tinsel Silk      | 2          | 92                   | 92      | Green, White             | 2 1/2                | 20 & 40 Types (Replaces 549 Cord)                     | 1020-CC                 |
| R2U      | Water-proofed    | 2          | 62                   | 103     | Green, White             | 2 1/2                | 20 & 40 Types                                         | 1020-CC                 |
| R2U      | Moisture-proofed | 2          | 69                   | 103     | Green, White             | 2 1/2                | 1020-AB, 1042-AB, 1020-BR, 1120-AB, 1142-AB & 1042-BR | 1020-C, 1020-E, 1120-C  |
| R2Y      | Tinsel Silk      | 2          | 103                  | 103     | Green, Red               | 2 1/2                | 1020-U & 1040-U (Replaces 412 Cord)                   |                         |
| T1A      | Moisture-proofed | 1          | 97                   | 86      |                          | 9 1/8"               | 1020-U & 1040-U (Replaces 547 Cord)                   | 1020-CC                 |



## CORDS

### Telephone Set Cords

(Continued)



No. 422 Cord

### Wall Telephone Transmitter and Receiver Cords

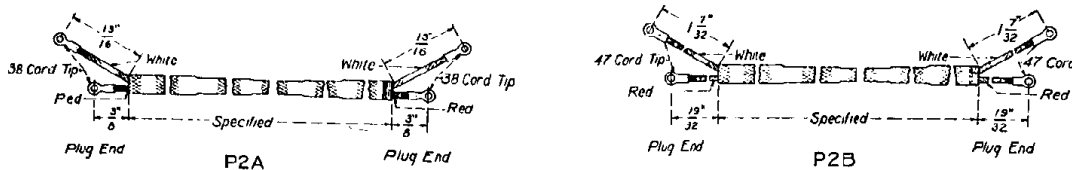
| Code No. | Type Covering    | Conductors | Cord Trans. End | Tips Set End | Tracer Colors      | Standard Length Feet | Used with Telephones                            |
|----------|------------------|------------|-----------------|--------------|--------------------|----------------------|-------------------------------------------------|
| 329      | Tinsel Silk      | 1          | 56              | 62           | Red                | 9 7/8"               | 1293 Type                                       |
| 384      | Water-proofed    | 2          | 62              | 62           | White, Green       | 10 1/2"              | 1336-F & H., 1314-A                             |
| 385      | Weather-proofed  | 1          | 56              | 62           |                    | 7"                   | 1336-F & H, 1305-AC                             |
| 422      | Water-proofed    | 3          | 62              | 62           | Yellow, Red, Green | 6                    | 1278-G & H (for hand set)                       |
| 446      | Moisture-proofed | 2          | 29 & 76         | 62           | White, Green       | 10 1/2"              | 1317-W & AD, 1305-AC, 1293-AD & AK              |
| 521      | Tinsel Worsted   | 2          | 105             | 105          | White, Green       | 2 1/2                | 1312-A, 1317-P, S, AH, BK, CN, CR, CP, CS & CG  |
| 540      | Moisture-proofed | 1          |                 |              |                    | 5"                   | 1317 Types, 1336-F & H, 1330-E & F Battery Cord |
| 546      | Moisture-proofed | 2          | 69              | 103          | White, Green       | 2 1/2                | 1317 Type, 1293-AE & AL with 186-W Receiver     |
| T1A      | Moisture-proofed | 1          | 97              | 86           |                    | 9 7/8"               | 1375-B & 1398-A (Replaces 547 cord)             |

### Portable Telephone, Test Set and Hand Set Cords

| Code No. | Type Covering | Conductors | Cord Rec. End | Tips Set End | Tracer Colors      | Standard Length Feet | Used with Telephones                         |
|----------|---------------|------------|---------------|--------------|--------------------|----------------------|----------------------------------------------|
| 243      | Tinsel Cotton | 1          | 62            | 62           |                    | 8"                   | 1375-B & 1398-A with 1001-H Hand Sets        |
| 366      | Water-proofed | 3          | 62            | 62           | Red, Yellow, Green | 6                    | 1330, 1331 & 1332 Types with 1001-C Hand Set |
| 384      | Water-proofed | 2          | 62            | 62           | Green, White       | 10 1/2"              | 1336 F & H, 1314A                            |
| 422      | Water-proofed | 3          | 62            | 62           | Yellow, Red, Green | 6                    | 1278-G & H with 1001-F Hand Set              |
| 509      | Water-proofed | 2          | 62            | 22           |                    | 6                    | 1330 & 1331 Types, using 146 Plug            |
| 523      | Water-proofed | 2          | 30            | 30           | Red, White         | 2                    | 1017-B, C, E and 1006-D Test Sets            |
| 537      | Water-proofed | 2          | 30            | 30           | Red, White         | 4                    | 10-A Test Set                                |
| 545      | Tinsel Silk   | 2          | 38            | 62           | Green, Red         | 6                    | Portable Telephone with 148 Plug             |
| 572      | Water-proofed | 2          | 78            | 30           | Green, Red         | 2                    | 1017 Test Set with 189-W Receiver            |
| 574      | Water-proofed | 1          | 62            | Special      |                    | 5                    | 1375-B, 1398-A using 1001-A Hand Set         |
| M1A      | Water-proofed | 1          | Special       | 22           |                    | 100                  | No. 4 Line Pole                              |
| M2J      | Water-proofed | 2          | 62            | 22           |                    | 100                  | No. 3 Line Pole                              |
| M2K      | Water-proofed | 2          | 62            | 22           |                    | 100                  | No. 5 Line Pole                              |

## CORDS

(Continued)



## Dispatcher's and Operator's Head Set Receiver Cords

| Code No. | Type Covering    | Conductors | Cord Tips Rec. End | Set End | Std. Length Feet | Used With                                                                                            |
|----------|------------------|------------|--------------------|---------|------------------|------------------------------------------------------------------------------------------------------|
| 363      | Tinsel           | 4          | 29                 | 38      | 6                | 137 Plug on 147-W Head Receiver and 283-W Transmitter, series connection (see 566).                  |
| 364      | Tinsel           | 2          | 29                 | 92      | 6                | 147-W Head Receivers (2) in series.                                                                  |
| 371      | Silk             | 6          | 29                 | 38      | 6                | 137 Plug on 147-W Head Receiver and 283-W Transmitter multiple connection (see 567).                 |
| 375      | Moisture-proofed | 4          | 29                 | 38      | 6                | With 137 Plug for dispatchers head receiver and chest transmitter (see 565).                         |
| 565      | Moisture-proofed | 4          | 69                 | 104     | 5½               | 137 Plug for dispatchers head receiver and chest transmitter where 189-W Receiver is used (see 375). |
| 566      | Moisture-proofed | 4          | 69                 | 104     | 5½               | 137 Plug on 190-W Receiver and 283-W Transmitter (series connection; (see 363).                      |

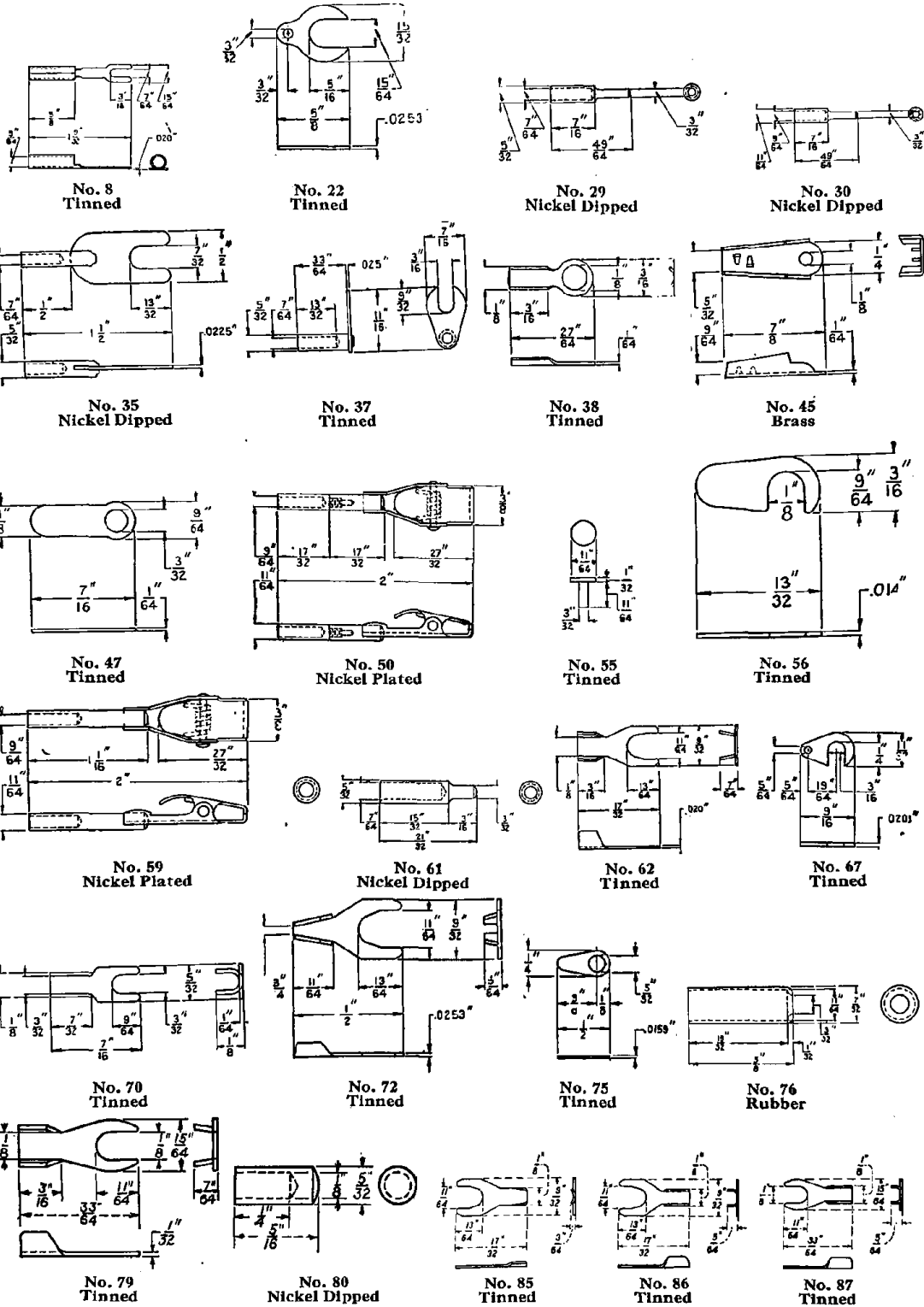
## Test Board and Switchboard Patching Cords

| Code No. | Type Covering    | Conductors | Cord Tips Rec. End | Set End   | Std. Length Feet | Used With                                                                                                                               |
|----------|------------------|------------|--------------------|-----------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| *513     | Moisture-proofed | 1          | —                  | 103       | 2                | 116 Plug with test boards.                                                                                                              |
| *519     | Moisture-proofed | 1          | —                  | 103       | 3                | 116 Plug with Test Boards 2A, 2B & 3A.                                                                                                  |
| 525      | Moisture-proofed | 2          | —                  | —         | 3                | Double conductor patching cord with W. U. 3-A Plug.                                                                                     |
| 526      | Moisture-proofed | 2          | —                  | —         | 5                | For joining two duplex sets terminated at switchboard jack for use as a repeater.                                                       |
| 527      | Moisture-proofed | 2          | —                  | —         | 3                | "Y" patching cord to connect two loops or sets to one looping jack or to transfer a group of loops or sets from one circuit to another. |
| 537      | Waterproofed     | 2          | 30                 | 30        | 4                | 19-A Test Set using receiver.                                                                                                           |
| 584      | Waterproofed     | 2          | 80                 | 30        | 4 ft. 3 in.      | Two 528 Receivers on 19-A Test Set.                                                                                                     |
| 736      | Waterproofed     | 2          | 62                 | 62 and 27 | 6                | 17 type Test Sets.                                                                                                                      |
| 747      | Waterproofed     | 2          | 80                 | 30        | 4                | 19-C Test Set for receiver. (528)                                                                                                       |
| P1A      | Moisture-proofed | 1          | 75                 | 75        | 2                | 116 Plug for switchboard patching (Replaces 510).                                                                                       |
| P1B      | Moisture-proofed | 1          | 38                 | 38        | 2                | 47 Plug for switchboard patching (Replaces 637).                                                                                        |
| P2A      | Moisture-proofed | 2          | 38                 | 38        | 3                | 47 Plug for switchboard patching (Replaces 516).                                                                                        |
| P2B      | Moisture-proofed | 2          | 47                 | 47        | 3                | 110 Plug for switchboard patching (Replaces 515).                                                                                       |
| S1A      | Moisture-proofed | 1          | 8                  | 45        | 6 ft. 3 in.      | 116 Plug for switchboard (Replaces 511).                                                                                                |

\*External braiding of glazed cotton furnished in red, white, black and green. White will be furnished unless otherwise specified.

## CORD TIPS

All cord tips are made of brass.





## DESIGNATION STRIPS AND DESK STANDS



No. 8 Designation Strip

## Designation Strips

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, In.     | Length             | Code No. | Width, In.     | Length                | Code No. | Width, In.      | Length               |
|----------|----------------|--------------------|----------|----------------|-----------------------|----------|-----------------|----------------------|
| 8G       | $\frac{7}{16}$ | Specify            | 8N       | $\frac{7}{16}$ | $21\frac{11}{16}$ in. | 43B      | $\frac{39}{64}$ | $1\frac{1}{2}$ in.   |
| 8H       | $\frac{3}{8}$  | Specify            | 8P       | $\frac{7}{16}$ | $22\frac{13}{16}$ in. | 43C      | $\frac{39}{64}$ | $1\frac{1}{4}$ in.   |
| 8K       | $\frac{5}{8}$  | $6\frac{1}{8}$ in. | 8R       | $\frac{7}{16}$ | $27\frac{5}{16}$ in.  | 43D      | $\frac{3}{4}$   | $1\frac{1}{4}$ in.   |
| 8L       | $\frac{7}{16}$ | Specify            | 8S       | $\frac{7}{16}$ | $19\frac{47}{64}$ in. | 90A      | $\frac{7}{16}$  | $15\frac{1}{16}$ in. |
| 8M       | $\frac{3}{8}$  | Specify            | 8U       | $\frac{5}{8}$  | Specify               | 90B      | $\frac{5}{8}$   | $6\frac{3}{16}$ in.  |

(\*Has a  $\frac{1}{16}$  inch holly strip mounted on top. The width of face as given above includes the holly strip.)



No. 1042-AB Desk Stand



No. 1040-AL Desk Stand

## Desk Stands

The following Bower-Barff finished steel desk stands are for use with the various telephone circuits, as indicated. The entire terminal plate and switch hook assemblies of these stands 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 removing one screw from the bottom of the base plate.

The bottom and edge of the base plate are covered with felt. All current carrying parts are insulated from the frame.

The No. 1040-U Desk Stand is for railway composite service and replaces the No. 1020-U Desk Stand.

The No. 1040-AL Desk Stand is for local and central battery line and replaces the No. 1020-AL Desk Stand.

The No. 1042-AB Desk Stand is used in train dispatching circuits, where insulated transmitters and head receivers are required and where a foot switch or a No. 465-C Key is used. This desk stand replaces No. 1020-AB.

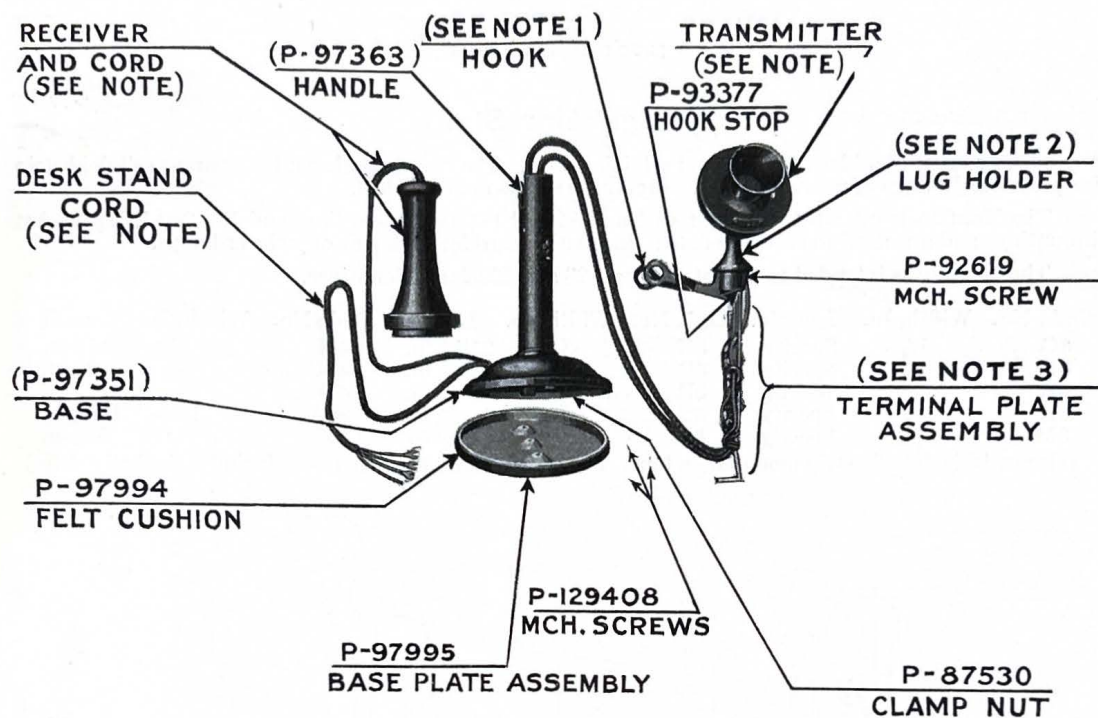
The No. 1042-BR Desk Stand is used in train dispatching circuits, where it is desired to insulate the primary circuit from the secondary, to prevent noises from the ringing selector. Replaces 1020-BR.

The No. 1142-AB Desk Stand is for use with the No. 501-A and B Desk Set boxes at way stations of train dispatching lines. This desk stand replaces the No. 1120-AB Desk Stand.

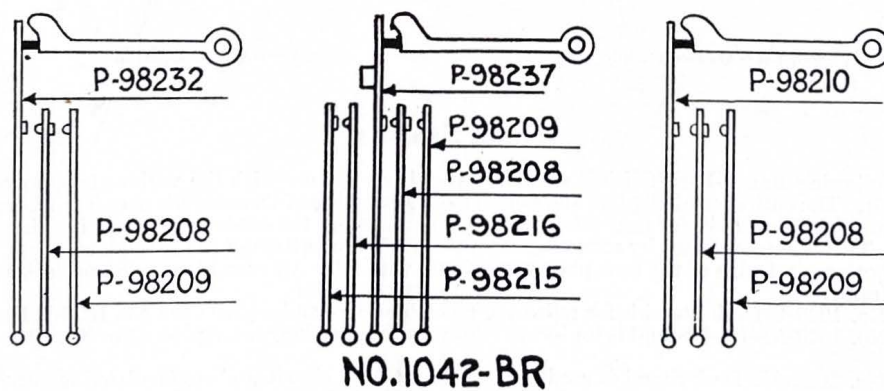
| Code No. | Transmitter No. | Receiver No. | Cords Receiver          | Cords Transmitter             | Cords Desk Stand        |
|----------|-----------------|--------------|-------------------------|-------------------------------|-------------------------|
| 1040-U   | 323-BW          | 144-AW       | R2Y— $2\frac{1}{2}$ ft. | 2-TIA— $9\frac{7}{8}$ in.     | D4E— $5\frac{1}{2}$ ft. |
| 1040-AL  | 323-BW          | 143-AW       | R2A— $2\frac{1}{2}$ ft. | 2-T3A— $9\frac{7}{8}$ in.     | D3A— $5\frac{1}{2}$ ft. |
| 1042-AB  | 349-BW          | 186-W        | R2U— $2\frac{1}{2}$ ft. | 2-No. 427— $9\frac{7}{8}$ in. | D3D— $5\frac{1}{2}$ ft. |
| 1042-BR  | 349-BW          | 186-W        | R2U— $2\frac{1}{2}$ ft. | 2-No. 427— $9\frac{7}{8}$ in. | D4G—8 ft.               |
| 1142-AB  | 349-BW          | 189-W        | R2U— $2\frac{1}{2}$ ft. | 2-No. 427— $9\frac{7}{8}$ in. | D3D— $5\frac{1}{2}$ ft. |

## DESK STANDS

(Continued)



Desk Stands—Replacement Parts



Contact Springs—Replacement Parts

Note.—The Receiver, transmitter, etc., are given in the code number listings of the desk stand. (Page 41).

1040-U  
1040-AL  
1042-AB  
1042-BR  
1142-AB

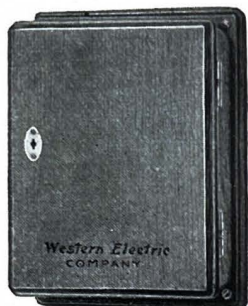
Hook  
P-97343  
P-97343  
P-97348  
P-97348  
P-97348

Lugholder  
P-97372  
P-97377  
P-97374  
P-97842  
P-97374

Terminal  
Plate  
Assembly  
P-98247  
P-98247  
P-98247  
P-98247



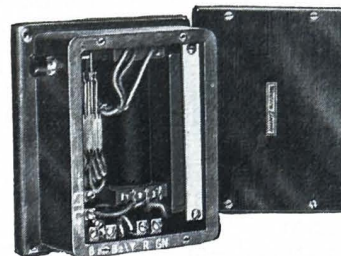
## DESK SET BOXES



No. 295-AJ Desk Set Box



No. 300 Type Desk Set Box



No. 501-A Desk Set Box

## Desk Set Boxes

The following desk set boxes are used on train dispatching circuits in dispatchers' telephone sets, with head set telephone equipments consisting of the No. 386-W Transmitter and the No. 189-W Receiver:

| Code No. | Condenser No.                 | Induction Coil No. | Remarks:                                                           |
|----------|-------------------------------|--------------------|--------------------------------------------------------------------|
| 295-AJ   | 21-AA                         | 29                 | Replaced by No. 502-A for new installations.                       |
| 502-A    | 1 No. 21-F and<br>2 No. 21-AK | 43 and<br>44       | Replaces No. 295-AJ for new installations. (Replaced by No. 502B). |
| 502-B    | 1 No. 21-F and<br>2 No. 21-AK | 43 and<br>44       | Replaces No. 502-A.                                                |

## Way Station Desk Set Boxes

The following desk set boxes are used on train dispatching circuits in way station telephone sets with desk stand, Flexiphones or transmitter arm, equipped with No. 349-BW Transmitter and No. 189-W Receiver.

The No. 501-B Desk Set Box, together with the No. 501-A replaces the No. 295-AK on new installations.

| Code No.                   | Retardation Coil | Condenser No. | Induction Coil No. | Remarks:                                                           |
|----------------------------|------------------|---------------|--------------------|--------------------------------------------------------------------|
| 295-AK                     | 51-A             | 21-AA         | 29                 | Used with earlier type equipment.                                  |
| Spec. 300-K<br>per D-11275 | 51-A             | 21-AA         | 29                 | Also equipped with No. 38-BG Ringer and 1 No. 48-A Hand Generator. |
| 501-A                      | ....             | 21-AL         | 42                 | Equipped with 1 No. 1014-A Push Button.                            |
| 501-B                      | ....             | 21-AL         | 42                 | Arranged for No. 3-C Foot Switch.                                  |

## Composite Telephone Desk Set Box

The following desk set box is for use with the No. 1040-U Desk Stand for desk type composite telephone set, for same class of service as the No. 1312-A Telephone Set.

| Code No. | Retardation Coil No. | Condenser No. | Induction Coil No. | Interrupter No. | Howler No. |
|----------|----------------------|---------------|--------------------|-----------------|------------|
| 311-A    | 12-G                 | 21-D-H-U      | 5                  | P-101594        | 1-C        |





## Indicator Alarm Type

(Continued)

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 Center, Inches |
|----------|-----------------|-----------------|----------------------|---------------|-------------------|-------------------------|
|          |                 | Amperes         | In Less Than         |               |                   |                         |
| 35A      | 1 $\frac{1}{8}$ | 2               | 1 $\frac{1}{2}$ min. | White         | No. 10            | 1 $\frac{1}{4}$         |
| 35B      | 1 $\frac{1}{8}$ | 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 | Used With                                          |
|----------|------------------------|----------------------------------------------------|
| 7A       | 1 to 8 as specified    | Nos. 61, 77, 1074A, 1075A and 1078A Protectors.    |
| 7T       | 7                      | "B" Cable Terminals and Fuse Chambers.             |
| 11C      | 7                      | Nos. 58AP and 1079 AP Protectors.                  |
| 11D      | 7                      | No. 25 Protector Mounting (No. 12 Type Protector). |

## FUSES AND GENERATORS

Fuses (Continued)



No. 47A



Telegraph Fuse

## PORCELAIN SHELL FUSES

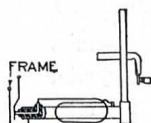
In certain cases where lines are exposed to high potential crosses, it is advisable to insert a fuse in the drop wire near the cross arm in addition to the No. 60AP Protector installed at the telephone station. In such cases the No. 47 Type is recommended; the porcelain shell used on this type of fuse 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. | Capacity   |
|----------|------------|
| 47A      | 7 amperes  |
| 47B      | 14 amperes |

## GENERATORS



No. 48A



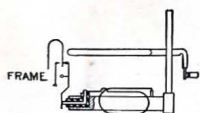
Nos. 22A &amp; E



No. 29E

The following list of generators are used with desk set boxes and telephone sets as indicated. All of these generators are open circuit type. For repair part information on these generators refer to Telephone Apparatus and Supplies Catalog.

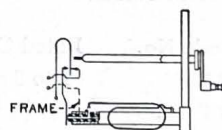
| Code No. | No. of Bars | Voltage and Current | Used With                                                                                             |
|----------|-------------|---------------------|-------------------------------------------------------------------------------------------------------|
| 22-A     | 3           | 60-AC               | No. 303-A, No. 315-H Desk Set Boxes, No. 1317-AH, No. 1331-E and F Telephone Sets.                    |
| 29-E     | 2           | 65-AC               | No. 1375-B and No. 1398-A Telephone Sets.                                                             |
| 29-F     | 2           | 60-AC               | No. 1017-D and E Test Sets.                                                                           |
| 48-A     | 5           | 80-AC               | No. 300-K, L, M, N Desk Set Boxes, No. 1317-P, S, W, AD, AE, AW, BU, No. 1330-E and F Telephone Sets. |
| 48-C     | 5           | 80-AC               | No. 1278-G and H, No. 1336-F and H Telephone Sets.                                                    |
| 48-R     | 5           | 80-AC               | No. 1317-BK Telephone Set.                                                                            |
| 50-A     | 3           | 60-AC               | Magneto Telephone Sets where a more efficient generator than the No. 22 Type is required.             |
| 50-F     | 3           | 60-AC               | No. 1317-CG, CN, CP, CS Telephone Sets.                                                               |



Nos. 48-A, C &amp; G



No. 299F



No. 29E

## 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 <sup>5</sup> / <sub>16</sub> | 4 <sup>13</sup> / <sub>16</sub> | 8 <sup>1</sup> / <sub>8</sub> |
| 303G     | 50A       | Alternating.....               | 6 <sup>5</sup> / <sub>16</sub> | 4 <sup>13</sup> / <sub>16</sub> | 8 <sup>1</sup> / <sub>8</sub> |

## GONGS, GONG MOUNTINGS, HAND SETS AND HOWLERS



No. 3



No. 10



No. 3 Gong Mounting

No. 7  
Gong Mounting



## Gongs

| Code No. | Diameter, Inches | Height, Inches | Metal and Finish         | Where Used                                                                                                                                                                    |
|----------|------------------|----------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3        | 2x1 1/2          | 1 5/8          | Metal, Nickel Plated     | Cow gong.                                                                                                                                                                     |
| 10       | 2 15/32          | 1 11/16        | Metal, Nickel Plated     | Tea gong.                                                                                                                                                                     |
| 20       | 3                | 1              | Brass, Black Finish      | 1336 Telephone Set.                                                                                                                                                           |
| 23-A     | 8                | 1 3/4          | Steel, Galvanized        | No. 292 Type Extension Bell.                                                                                                                                                  |
| 24-A     | 2                | 1 1/16         | Brass, Black Finish      | Telephone Sets.                                                                                                                                                               |
| 26-A     | 3                | 1              | Brass, Black Finish      | Telephone Sets.                                                                                                                                                               |
| 28-A     | 6                | 1 13/32        | Steel, Galvanized        | No. 392 Type Extension Bell.                                                                                                                                                  |
| 29-A     | 2 1/2            | 5 1/64         | Brass, Black Finish      | Telephone Sets.                                                                                                                                                               |
| 31-A     | 2 1/2            | 5 1/64         | Brass, Black Finish      | Differs from the 29-A, in that each has a different tone intended for use where a number of telephones are placed close to each other. Recommended in place of Nos. 3 and 10. |
| 32-A     | 2 1/2            | 5 1/64         | Brass, Black Finish      |                                                                                                                                                                               |
| 33-A     | 2 1/2            | 5 1/64         | Bell Metal, Black Finish |                                                                                                                                                                               |

## GONG MOUNTINGS

Each gong mounting consists of a pair of gong posts or gong post extenders together with the necessary mounting screws.

| Code No. | Length of Post or Extender | Used with Gongs | Finish        |
|----------|----------------------------|-----------------|---------------|
| 3        | 1 11/16 in.                | Nos. 3 and 10   | Nickel plated |
| 7        | 1 3/16 in.                 | Nos. 3 and 10   | Brass         |

## GONG NUTS

| Code No. | Description                                         | Dimensions, Inches |          |        | Finish        |
|----------|-----------------------------------------------------|--------------------|----------|--------|---------------|
|          |                                                     | Thread             | Diameter | Height |               |
| P-19097  | Knurled thumb nut used with No. 3 Gong Mounting.... | 10-32              | 7/16     | 1/2    | Nickel plated |

## Hand Sets and Howlers

### Hand Sets



No. 1001-C Hand Set



No. 1C Howler

| Code No. | Transmitter | Receiver | Code No. | Cords                     |  | Push Button Spring Combination | Principal Use                                            |
|----------|-------------|----------|----------|---------------------------|--|--------------------------------|----------------------------------------------------------|
|          |             |          |          | Length                    |  |                                |                                                          |
| 1001C    | 285W        | 131W     | 366      | 6 ft. (water-proof)       |  | 2 make                         | Used with Nos. 1330 and 1331 Portable Magneto Telephone. |
| 1001H    | 244W        | 131W     | 422      | 5 ft. 2 in. (water-proof) |  | 2 make                         | Used with No. 1375B Portable Magneto Telephone.          |

## HOWLERS

Howlers consist of a special bipolar receiver with an adjustable diaphragm and a horn mounted on a wooden base. They are designed for use in calling in signal circuits.

| Code No. | Approx. Total Resistance | Approximate Overall Dimensions |
|----------|--------------------------|--------------------------------|
| 1-C      | 1,000 ohms               | 3 15/16" x 6 5/16" x 6 1/4"    |

## INDUCTION COILS AND INTERRUPTERS



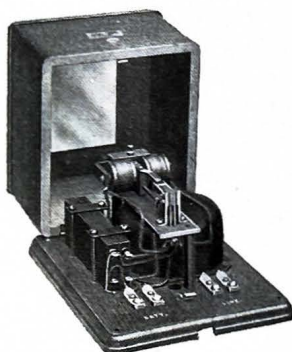
No. 5 Induction Coil



No. 13 Induction Coil

**Induction Coils**

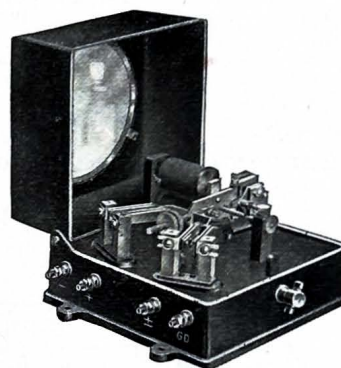
| Code No. | Size, Ins.                            | Used In                                                                                                                                                |
|----------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5        | $4\frac{29}{32} \times 1\frac{1}{16}$ | Nos. 1312A, 1314A, 6023A Telephone Sets and 311A Desk Set Box.                                                                                         |
| 13       | $3\frac{1}{4} \times 1$               | Nos. 300K, L, M, N and 315H Desk Set Boxes, 1317P, S, AH, BK, CN, CR, CP, CS and CG Telephone Sets, 1017B, C and E Test Sets.                          |
| 29       | $3\frac{1}{4} \times 1$               | Nos. 295AJ, AK and special 300H and K Desk Set Boxes, 1278G, H, 1293AD, AE, AK, AL, 1317W, AD, AE, AW, 1330E, F, 1331E, F and 1332A, E Telephone Sets. |
| 30       | $4\frac{1}{4} \times 1\frac{3}{8}$    | No. 1336H Telephone Set.                                                                                                                               |
| 31       | $3\frac{1}{4} \times 1$               | No. 1375B Telephone Set. Moisture-proofed No. 13 Coil.                                                                                                 |
| 32       | $3\frac{1}{4} \times 1$               | No. 1336F Telephone Set, and No. 1004B Hand Set. Moisture-proofed No. 29 Coil.                                                                         |
| 42       | $4\frac{1}{4} \times 1\frac{23}{32}$  | No. 501 Desk Set Box for way stations, Nos. 1317BU Telephone Set.                                                                                      |
| 43       | $4\frac{1}{4} \times 1\frac{23}{32}$  | No. 502 Desk Set Box in transmitter circuits.                                                                                                          |
| 44       | $4\frac{1}{4} \times 1\frac{23}{32}$  | No. 502 Desk Set Box in receiver circuits.                                                                                                             |



No. 62A Interrupter



No. 84E Interrupter



No. 84E Interrupter (Open)

**Interrupters**

| Code No. | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 62A      | An electrically operated interrupter for furnishing alternating current for Railway Telephone Service from a direct current source. Especially adapted for use in block towers, on yard lines, etc., where several telephones are connected to the same line. Operates on five cells of dry battery and only when battery key is closed.                                                                                                                                                                                                                     |
| 84D      | An electrically operated automatic pole changer producing alternating current from a source of direct electromotive force for ringing purposes. Operates on one Edison BSCO No. 502 Cell. Ringing battery varies according to line conditions.                                                                                                                                                                                                                                                                                                               |
| 84E      | Same as 84D excepting that it will give pulsating currents. Ringing battery varies according to line conditions.                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 6000A    | A circuit interrupter attachment used in the No. 1017E Test Set. The attachment is associated with the generator to provide high frequency ringing current for signalling on composite lines and consists of: <ul style="list-style-type: none"> <li>1 Commutator with bracket and mounting screw.</li> <li>1 Switch with mounting screws.</li> <li>1 No. 21K Condenser with mounting strap and screws.</li> <li>1 No. 3 Binding Post with mounting screws.</li> <li>1 8-inch standard wire transposition lead.</li> <li>1 Diagram of connection.</li> </ul> |
| P-101495 | High frequency interrupter used with No. 5 Induction Coil for signalling on composite circuits. Furnished with Nos. 1312A, 1314A and 6023A Telephone Sets.                                                                                                                                                                                                                                                                                                                                                                                                   |





## 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  $\frac{3}{4}$  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"<br>Type | Fig. "C"<br>Type | Replaces<br>Jack No. | Fig. "B"<br>Type | Fig. "D"<br>Type | Replaces<br>Jack No. |
| 215A             | 216C             | 204                  | 216B             | 219D             | 175                  |
| 216A             | 217C             | 209                  | 218B             | 220D             | 176                  |
| 217A             | 218C             | 207                  | 220B             | 221D             | 173                  |
| 218A             | 219C             | 155                  | 221B             | 225D             | 177                  |
| 219A             | 220C             | 154                  | 225B             |                  |                      |
| 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"<br>Type | Fig. "C"<br>Type | Replaces<br>Jack No. | Fig. "B"<br>Type | Fig. "D"<br>Type | Replaces<br>Jack No. |
| 246A             |                  | 126                  | 246B             |                  |                      |
| 248A             |                  | 134                  | 248B             | 248D             |                      |
| 249A             |                  | 143                  | 249B             |                  |                      |

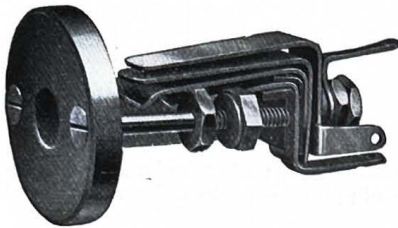
## JACKS FOR USE WITH Nos. 110, 150, 202 AND 213 TYPE PLUGS

| Code<br>No.<br>"A"<br>Type | Re-<br>places<br>Jack<br>No. | Mounting Center,<br>Inches |                   |                 |                 | Code<br>No.<br>"C"<br>Type | Re-<br>places<br>Jack<br>No. | Code<br>No.<br>"B"<br>Type | Re-<br>places<br>Jack<br>No. | Mounting Center,<br>Inches |                   |                 |                 | Code<br>No.<br>"D"<br>Type | Re-<br>places<br>Jack<br>No. |
|----------------------------|------------------------------|----------------------------|-------------------|-----------------|-----------------|----------------------------|------------------------------|----------------------------|------------------------------|----------------------------|-------------------|-----------------|-----------------|----------------------------|------------------------------|
|                            |                              | Horizontal<br>"A"          | Horizontal<br>"C" | Vertical<br>"A" | Vertical<br>"C" |                            |                              |                            |                              | Horizontal<br>"B"          | Horizontal<br>"D" | Vertical<br>"B" | Vertical<br>"D" |                            |                              |
| 238A                       | 159                          | $\frac{5}{8}$              | $\frac{7}{8}$     | $\frac{7}{8}$   | $\frac{5}{8}$   | 238C                       | 274                          | 238B                       | 178                          | $\frac{5}{8}$              | $1\frac{1}{8}$    | $1\frac{1}{8}$  | $\frac{5}{8}$   | 238D                       | ....                         |
| 239A                       | 160                          | $\frac{5}{8}$              | $\frac{7}{8}$     | $\frac{7}{8}$   | $\frac{5}{8}$   | 239C                       | 260                          | 239B                       | 179                          | $\frac{5}{8}$              | $1\frac{1}{8}$    | $1\frac{1}{8}$  | $\frac{5}{8}$   | 239D                       | ....                         |
| 240A                       | 161                          | $\frac{3}{4}$              | $\frac{7}{8}$     | $\frac{7}{8}$   | $\frac{5}{8}$   | 240C                       | ...                          | 240B                       | 180                          | $\frac{3}{4}$              | ...               | $1\frac{1}{8}$  | ...             | ...                        | ....                         |
| 241A                       | 162                          | $\frac{3}{4}$              | $\frac{7}{8}$     | $\frac{7}{8}$   | $\frac{5}{8}$   | 241C                       | ...                          | 241B                       | 181                          | $\frac{3}{4}$              | $1\frac{1}{8}$    | $1\frac{1}{8}$  | $\frac{5}{8}$   | 241D                       | ....                         |
| 242A                       | 163                          | $\frac{3}{4}$              | $\frac{7}{8}$     | $\frac{7}{8}$   | $\frac{5}{8}$   | 242C                       | 259                          | 242B                       | 182                          | $\frac{3}{4}$              | ...               | $1\frac{1}{8}$  | ...             | ...                        | ....                         |
| 243A                       | 165                          | $\frac{3}{4}$              | ...               | $\frac{7}{8}$   | ...             | ...                        | ...                          | 243B                       | 184                          | $\frac{3}{4}$              | ...               | $1\frac{1}{8}$  | ...             | ...                        | ....                         |
| 244A                       | 244                          | $\frac{7}{8}$              | ...               | $\frac{7}{8}$   | ...             | ...                        | ...                          | ...                        | ...                          | ...                        | ...               | ...             | ...             | ...                        | ....                         |
| 245A                       | ...                          | $\frac{29}{32}$            | ...               | $\frac{7}{8}$   | ...             | ...                        | ...                          | 245B                       | ...                          | $\frac{29}{32}$            | ...               | $1\frac{1}{8}$  | ...             | ...                        | ....                         |
| 280A                       | ...                          | $\frac{7}{8}$              | $\frac{7}{8}$     | $\frac{7}{8}$   | $\frac{5}{8}$   | 280C                       | ...                          | 280B                       | ...                          | $\frac{7}{8}$              | ...               | $1\frac{1}{8}$  | ...             | ...                        | ....                         |
| 284A                       | ...                          | 1                          | ...               | $\frac{7}{8}$   | ...             | ...                        | ...                          | 284B                       | ...                          | 1                          | ...               | $1\frac{1}{8}$  | ...             | ...                        | ....                         |
| 285A                       | ...                          | $\frac{3}{16}$             | ...               | $\frac{7}{8}$   | ...             | ...                        | ...                          | ...                        | ...                          | ...                        | ...               | ...             | ...             | ...                        | ....                         |
| 300A                       | 282                          | $\frac{9}{8}$              | ...               | $\frac{5}{8}$   | ...             | ...                        | ...                          | ...                        | ...                          | ...                        | ...               | ...             | ...             | ...                        | ....                         |
| ...                        | ...                          | ...                        | ...               | ...             | ...             | ...                        | ...                          | 289B                       | ...                          | $\frac{15}{16}$            | ...               | $1\frac{1}{8}$  | ...             | ...                        | ....                         |
| ...                        | ...                          | ...                        | ...               | ...             | ...             | ...                        | ...                          | 290B                       | ...                          | $\frac{15}{16}$            | ...               | $1\frac{1}{8}$  | ...             | ...                        | ....                         |
| ...                        | ...                          | ...                        | ...               | ...             | ...             | ...                        | ...                          | 291B                       | ...                          | 1                          | ...               | $1\frac{1}{8}$  | ...             | ...                        | ....                         |
| ...                        | ...                          | ...                        | ...               | ...             | ...             | ...                        | ...                          | 293B                       | ...                          | $\frac{15}{16}$            | ...               | $1\frac{1}{8}$  | ...             | ...                        | ....                         |

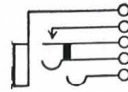
## JACKS

(Continued)

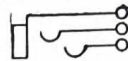
## Singly Mounted—Miscellaneous Types



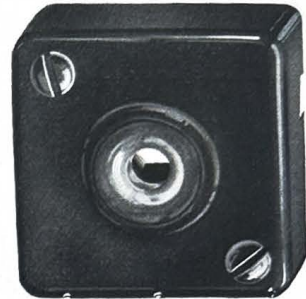
No. 77



No. 77



Nos. 78 &amp; 190



No. 190

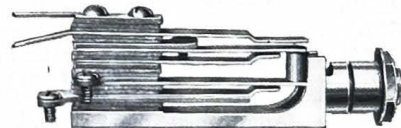
Code  
No.

## Description

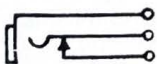
- 77 Operator's telephone set. Makes one separate contact when a No. 148 Plug is inserted; has tip ring and sleeve terminals.
- 78 Same as No. 77 Jack, except that the make contact is omitted. Diameter of mounting plate  $1\frac{1}{16}$  inches.
- 190 This jack is intended for use in restaurants and 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  $1\frac{1}{16}$  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



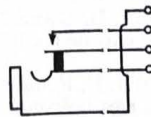
No. 224 Jack



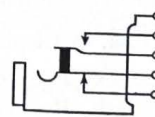
No. 200



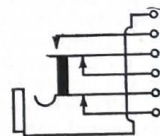
No. 201



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<br>No. | Mounting Centers, Inches |                 | Used with<br>Plugs        | Used in<br>Jack Boxes |
|-------------|--------------------------|-----------------|---------------------------|-----------------------|
|             | Horizontal               | Vertical        |                           |                       |
| 99          | $\frac{5}{8}$            | $1\frac{5}{16}$ | 47A, B & 116<br>137 & 144 | .....                 |
| 200         | $1\frac{5}{16}$          | 1               | 1A, 47 & 116              | .....                 |
| 201         | $1\frac{5}{16}$          | $1\frac{1}{4}$  | 1A, 47 & 116              | .....                 |
| 203         | $1\frac{5}{16}$          | $1\frac{1}{4}$  | 1A, 47 & 116              | .....                 |
| 208         | $1\frac{5}{16}$          | $1\frac{1}{8}$  | 1A, 47 & 116              | 385, 386, 389         |
| 224         | $1\frac{5}{16}$          | $1\frac{1}{2}$  | 1A, 47 & 116              | 385, 386, 389         |

## JACKS AND JACK BOXES

(Jacks Continued)



No. 186 Jack

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. 186 JACK WIRING



No. 186 Jack—Open



No. 345A Jack Box

Code

No.

345A

## Jack Boxes

## 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.



No. 385A Jack Box

## 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.

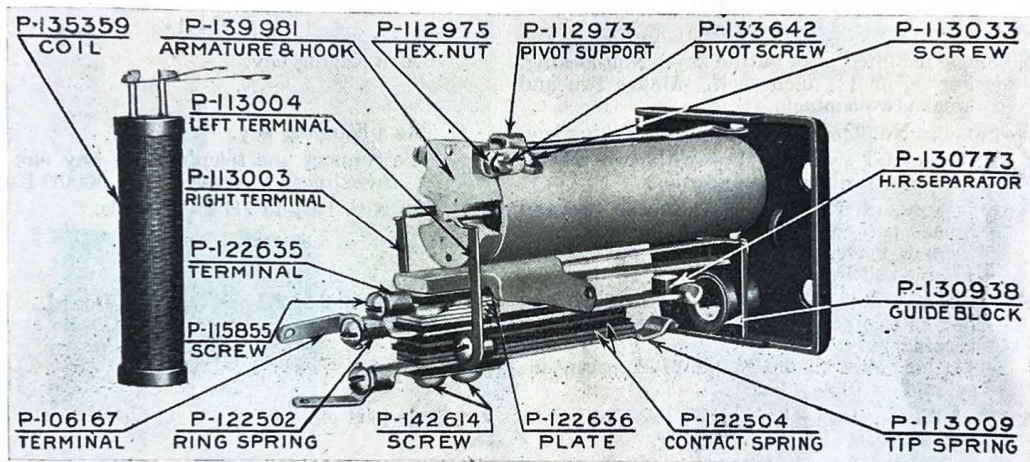
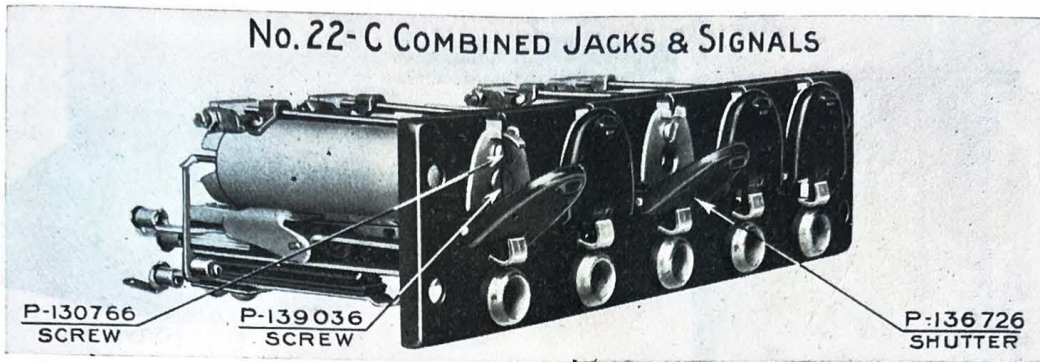
| Code No. | Line Equipment | Capacity | Equipped with Jacks | Service   | Dimensions, inches |        |       |
|----------|----------------|----------|---------------------|-----------|--------------------|--------|-------|
|          |                |          |                     |           | Width              | Height | Depth |
| *385A    | 2              | 3        | 208                 | Telephone | 4½                 | 2¾     | 6¼    |
| 385B     | 3              | 3        | 208                 | Telephone | 4½                 | 2¾     | 6¼    |
| *385C    | 2              | 3        | 224                 | Telegraph | 4½                 | 2¾     | 6¼    |
| 385D     | 3              | 3        | 224                 | Telegraph | 4½                 | 2¾     | 6¼    |
| *386A    | 4              | 6        | 208                 | Telephone | 6¼                 | 2¾     | 7½/16 |
| *386B    | 5              | 6        | 208                 | Telephone | 6¼                 | 2¾     | 7½/16 |
| 386C     | 6              | 6        | 208                 | Telephone | 6¼                 | 2¾     | 7½/16 |
| *386D    | 4              | 6        | 224                 | Telegraph | 6¼                 | 2¾     | 7½/16 |
| 386E     | 5              | 6        | 224                 | Telegraph | 6¼                 | 2¾     | 7½/16 |
| 386F     | 6              | 6        | 224                 | Telegraph | 6¼                 | 2¾     | 7½/16 |
| 389A     | 12             | 12       | 208                 | Telephone | 7½/16              | 4⅝     | 6¼    |
| 389B     | 12             | 12       | 224                 | Telegraph | 7½/16              | 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.



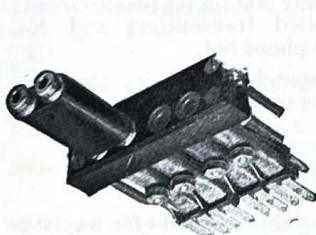
# JACKS AND JACK MOUNTINGS

## No. 22-C COMBINED JACKS & SIGNALS

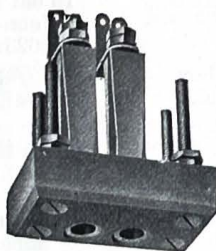


## Combined Jacks and Signals SHUTTER TYPE

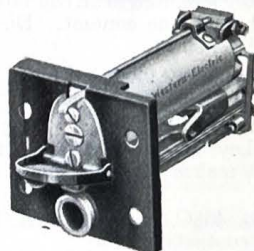
| Code No. | Resistance | Mounting               | Used With           |
|----------|------------|------------------------|---------------------|
| 22C      | 350        | Single or 5 per strip. | Special jack boxes. |
| 22D      | 1000       | Single or 5 per strip. | Special jack boxes. |
| 29D      | 1000       | No. 92E single.        | Special jack boxes. |



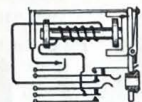
No. 30 Jack Mounting



No. 80 Jack Mounting



No. 22 Type Combined Jack and Signal



29-D TYPE

Circuit Arrangements

## Jack Mountings

| Code No. | Description                                                      | Dimensions, Ins.    | Used With                                                   |
|----------|------------------------------------------------------------------|---------------------|-------------------------------------------------------------|
| 30       | Composition mounting for 4 Nos. 99, 185, 220, 221, or 234 Jacks. | 3 3/4 x 1 1/4 x 5/8 | Dispatcher's telephone equipment. In No. 345A Desk Set Box. |
| 80       | Composition mounting for 2 Nos. 99, 185, 220, 221, or 234 Jacks. | 2 3/8 x 1 1/4 x 5/8 | Head telephone sets with No. 137 Plug.                      |

## KEYS



No. 387A Key



No. 92B Key



No. 465 Type Key

## Keys

| Code No. | Description                                                                                                                                                                                                          | Used                                                                                                          |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| 92A      | Single mounted push button key. Non-locking. For $\frac{7}{8}$ or $1\frac{1}{4}$ inch shelf. Makes two and breaks two contacts.                                                                                      | As a ringing key.                                                                                             |
| 92B      | Same as No. 92A except that it is a locking key.                                                                                                                                                                     | As a listening key.                                                                                           |
| 136B     | A horizontal switching key with two sets of springs. Locks in both positions.                                                                                                                                        | To connect one telephone to any one of three lines. Part of the No. 6000B Key. In Nos. 1A and 1B test boards. |
| 272A     | Single mounted locking key. Makes two and breaks two contacts. Key is operated by a turning movement of button. For $\frac{7}{8}$ and $1\frac{1}{4}$ inch shelf.                                                     |                                                                                                               |
| 272F     | Single mounted locking key. Makes two and breaks two contacts. Key is operated by a turning movement of button. For $\frac{7}{8}$ and $1\frac{1}{4}$ inch shelf similar to No. 272A, except insulated on 1000 volts. | On Nos. 2A, 2B and 3A Test Board.                                                                             |
| 375A     | Push button ringing key; makes two and breaks two contacts and is non-locking.                                                                                                                                       | As part of the No. 6002C Key.                                                                                 |
| 377A*    | Plunger type key used with key lever. Makes two contacts.                                                                                                                                                            | In No. 6000A Key.                                                                                             |
| 378A*    | Plunger type key used with key lever. Makes two and breaks two contacts.                                                                                                                                             | Used as a listening key.                                                                                      |
| 392A*    | Plunger type key used with key lever. Makes four and breaks four contacts.                                                                                                                                           | In No. 335A Blocking Set.                                                                                     |
| 393C     | Non-locking, push button key, makes three contacts, breaks two contacts.                                                                                                                                             | In the No. 6003A Key.                                                                                         |
| 465A     | Push button key mounted in an oak box. Makes three and breaks one contact. Dimensions: $4\frac{1}{16} \times 3\frac{1}{16} \times 1\frac{13}{32}$ inches.                                                            | In old type way station telephone circuits (non-insulated transmitter) and No. 6023A Telephone Set.           |
| 465C     | Push button type key mounted in an oak box. Dimensions $4\frac{1}{16} \times 3\frac{1}{16} \times 1\frac{13}{32}$ inches. Makes two and breaks one contact.                                                          | In train dispatching circuits for way-station operators to cut in transmitter.                                |
| 465D     | Push button key, similar to the No. 465A, except that it makes one and breaks one contact.                                                                                                                           | With the No. 1317 Telephone Sets.                                                                             |
| 465E     | Similar to No. 465C, except makes three and breaks two contacts.                                                                                                                                                     | In train dispatching circuits for way stations with No. 501B Desk Set Boxes.                                  |

**Notes.** When ordering keys Nos. 92A, 92B or 272A unmounted, specify the thickness of the shelf or table top in which key is to be mounted.

\*Are either locking or non-locking, depending on the type of lever used.



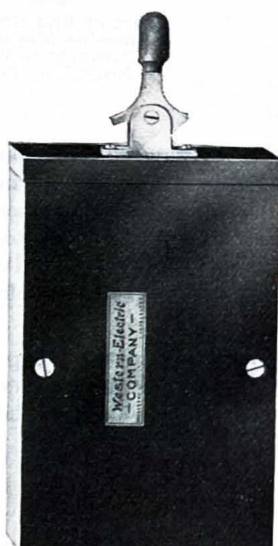
# KEYS (Continued)



No. 6000A Key



No. 6000B Key



No. 6002A



No. 6A Key Lever



No. 6002C

## Keys

| Code No. | Description                                                                                                                                                                              | Used                                                                                                    |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| 6000A    | Plunger type key. No. 377A with No. 6A Key Lever mounted in a box $4\frac{3}{4} \times 3\frac{3}{4} \times 1\frac{1}{2}$ ins.                                                            | In dispatcher's telephone circuit.                                                                      |
| 6000B    | Consists of No. 136B Key mounted in a No. 334 Key Mounting. Dimensions approximately $6\frac{1}{4} \times 3\frac{1}{8} \times 2\frac{1}{8}$ ins.                                         | Where it is desired to connect one telephone set to any one of three separate lines.                    |
| 6002A    | Wooden box equipped with 1 No. 378A Key and 1 No. 23A Key Lever. Ebonized finish. Size of box $5\frac{1}{2} \times 3\frac{1}{8} \times 1\frac{5}{8}$ ins.                                | Intended for use as switching key to connect a telephone instrument on either one or both of two lines. |
| 6002B    | Wooden box equipped with 1 No. 378A Key and 1 No. 6A Key Lever. Ebonized finish. Dimensions same as No. 6002A.                                                                           | Intended for use as a switching key to connect a telephone instrument on either one or two lines.       |
| 6002C    | Wooden box equipped with 1 No. 375A Key. Ebonized finish. Dimensions same as No. 6002A.                                                                                                  | Intended for use as a ringing key at sub-station.                                                       |
| 6003A    | Wooden box equipped with a push button type key. Size of box $6\frac{1}{8} \times 3\frac{1}{8} \times 2\frac{1}{8}$ ins. Non-locking. Makes three and breaks two contacts when operated. | For operating a No. 62A Interrupter.                                                                    |

## Key Levers

| Code No. | Operated Position of Lever | Description                                                                                                                                                                         |
|----------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6A       | Vertical                   | Used with lever type keys. Black handle. Locking.                                                                                                                                   |
| 6B       | Vertical                   | Same as No. 6A, except red handle.                                                                                                                                                  |
| 14A      | Horizontal                 | Otherwise same as No. 6A.                                                                                                                                                           |
| 23A      | Horizontal                 | Switch key. Locks in all positions. Normally all contacts are open. When thrown to the left the inner contacts are closed; when thrown to the right, the outer contacts are closed. |



## Western Electric LINE POLES



No. 3 Line Pole

End Section with  
Spreaders Extended  
No. 3 Line PolePart 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

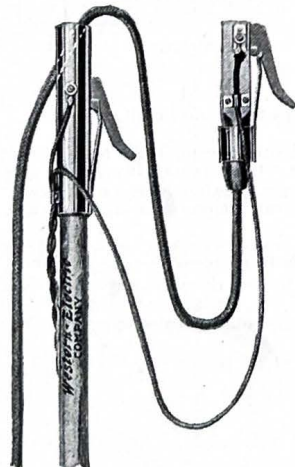
### Line Poles,

The line poles here listed are intended primarily for connecting portable telephones to open wire lines. They are made of hardwood 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.



No. 5 Line Pole

Part of End Section Showing  
Free Clamp. No. 5 Line Pole

| Code No. |                                                | Cord                                                                                    | Description                                                                                                                                                                                                                                                                                 |
|----------|------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3        | For Making Contact With 2 metallic conductors. | 100 feet of M2J two conductor cord. For use with 1330-E, 1331-E, 1332-A & E Telephones. | 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 M1A two conductor cord. For use with 1314-A Telephones.                     | The top section has one connecting clamp only.                                                                                                                                                                                                                                              |
| 5        | 2 metallic conductors.                         | 100 feet of M2K two conductor cord. For use with 1330-E, 1331-E, 1332-A & E Telephones. | 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. |

## PLUGS



Nos. 109 &amp; 110



No. 47



No. 148



No. 146



No. 151



FIG. 1

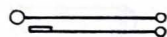
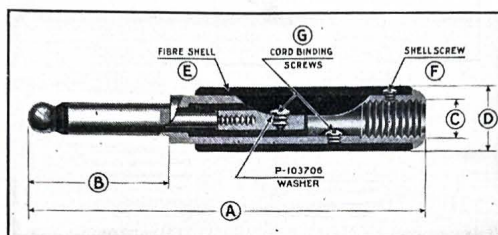


FIG. 2



Dimensions and Replacement Parts

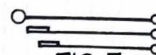


FIG. 3

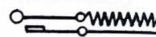


FIG. 4

| Code No. | Conductors | Dimensions        |                  |                 |                 | Used with Jack Nos.                                                    | Used with Cords                             | Notes                                        | Replacement Parts (See Cut) |          |              |
|----------|------------|-------------------|------------------|-----------------|-----------------|------------------------------------------------------------------------|---------------------------------------------|----------------------------------------------|-----------------------------|----------|--------------|
|          |            | A                 | B                | C               | D               |                                                                        |                                             |                                              | E                           | F        | G            |
| 1A       | Fig. 1     | 3 $\frac{5}{16}$  | 1 $\frac{3}{16}$ | $\frac{5}{16}$  | $\frac{9}{16}$  | Same as for 47A Plug                                                   | 511                                         | Shell Frame                                  | P-146711                    | P-82233  | P- 84662     |
| 3A       | Fig. 2     | 3 $\frac{5}{16}$  | 1 $\frac{3}{16}$ | $\frac{5}{16}$  | $\frac{9}{16}$  | Same as for 47A Plug                                                   | 536                                         | Fully Insulated                              | P-147704                    | P-162652 | P-162653 & 4 |
| 47A      | Fig. 2     | 3 $\frac{5}{16}$  | 1 $\frac{3}{16}$ | $\frac{5}{16}$  | $\frac{9}{16}$  | (99, 200, 201-203, 208, 215-221, 223, 225-227, 230-237, 281, 297, 303A | P2A, W2F, P1B, P2T                          | 47A has Red Shell                            | P- 81335                    | P- 82233 | P- 82239     |
| 47B      |            |                   |                  |                 |                 |                                                                        | 768                                         | 47B has Black Shell                          | P-110576                    | P- 82233 | P- 82239     |
| 109      | Fig. 3     | 3 $\frac{1}{2}$   | 1 $\frac{3}{2}$  | $\frac{9}{2}$   | $\frac{3}{8}$   | 92-292-246-248-249                                                     | S3A                                         | *Has Red Shell                               | P- 81319                    | P- 81212 | P- 82341     |
| 110      | Fig. 3     | 3 $\frac{1}{2}$   | 1 $\frac{3}{4}$  | $\frac{5}{8}$   | $\frac{7}{4}$   | { 49-50-70-141<br>238 to 295 incl.                                     | S3B-P2B<br>W3C-W2C<br>S2B, S1B,<br>P1C, P3E | *Has Red Shell                               | P- 81200                    | P- 81299 | P- 82341     |
| 116      | Fig. 1     | 3 $\frac{5}{16}$  | 1 $\frac{3}{16}$ | $\frac{5}{16}$  | $\frac{9}{16}$  | Same as for 47 Plug                                                    | 510, 511<br>513, 519                        | Red Shell                                    | P- 81335                    | P- 82233 | P- 84662     |
| 136      | Fig. 2     | 3 $\frac{3}{8}$   | 1 $\frac{3}{16}$ | $\frac{9}{16}$  | $\frac{9}{16}$  | 99-152                                                                 | 369                                         | Red Shell                                    | P- 81335                    | P- 82233 | P- 82239     |
| 144      | Fig. 1     | 3 $\frac{3}{8}$   | 1 $\frac{3}{16}$ | $\frac{9}{16}$  | $\frac{9}{16}$  | Same as for 47 Plug                                                    | W1A                                         | Has Cord Bushing                             | P- 81335                    | P- 82233 | P- 84662     |
| 145      | Fig. 2     | 3 $\frac{17}{64}$ | 1 $\frac{7}{64}$ | $\frac{27}{64}$ | $\frac{27}{64}$ | .....                                                                  | 658                                         | .....                                        | P- 81200                    | P- 81299 | P- 82341     |
| 146      | Fig. 2     | 2 $\frac{7}{32}$  | 2 $\frac{3}{4}$  | $\frac{19}{16}$ | $\frac{19}{16}$ | 186                                                                    | 509                                         | 1330, 1331 Tel.                              | P-143217                    | .....    | P-127343     |
| 148      | Fig. 3     | 2 $\frac{7}{16}$  | 1                | $\frac{9}{16}$  | $\frac{29}{32}$ | 77, 78, 190                                                            | { 539, L3C,<br>545, 735                     | Replaces 85 Plug                             | P-134310                    | P-135465 | P-135464     |
| 150      | .....      | 3 $\frac{7}{32}$  | 1 $\frac{9}{64}$ | $\frac{27}{64}$ | $\frac{27}{64}$ | Same as for 110 Plug                                                   | Nonrequired                                 | For plugging out signals in lines in trouble | P-141633                    | P-124071 | .....        |
| 151      | .....      | 3 $\frac{17}{64}$ | 1 $\frac{3}{16}$ | $\frac{27}{64}$ | $\frac{27}{64}$ | Same as for 47 Plug                                                    | Nonrequired                                 | .....                                        | P-141307                    | P-123581 | .....        |
| 153A     | Fig. 4     | 4 $\frac{1}{4}$   | 1 $\frac{3}{16}$ | $\frac{27}{64}$ | $\frac{27}{64}$ | Same as for 47 Plug                                                    | Nonrequired                                 | See Note 1                                   | P-143232                    | P- 81299 | .....        |
| 153B     |            |                   |                  |                 |                 |                                                                        |                                             |                                              | P-143233                    |          |              |
| 153C     | .....      | 2 $\frac{1}{16}$  | 1 $\frac{3}{16}$ | $\frac{27}{64}$ | $\frac{27}{64}$ | Same as for 47 & 116                                                   | .....                                       | See Note 2                                   | P-143234                    | .....    | .....        |
| 165      | Fig. 2     | 3 $\frac{7}{16}$  | 1 $\frac{3}{16}$ | $\frac{9}{16}$  | $\frac{27}{32}$ | Same as for 47                                                         | Same as for 47                              | Has large red insulating shell               | P-203388                    | P- 82233 | P- 82239     |
| 221      |            |                   |                  |                 |                 |                                                                        |                                             |                                              | .....                       | .....    | .....        |

**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  $\frac{1}{2}$  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    |

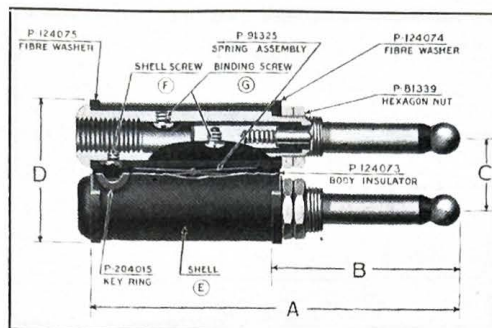


## PLUGS

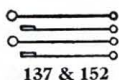
(Continued)



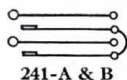
No. 137



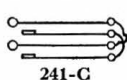
No. 241



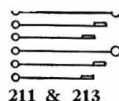
137 &amp; 152



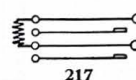
241-A &amp; B



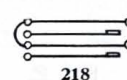
241-C



211 &amp; 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 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.

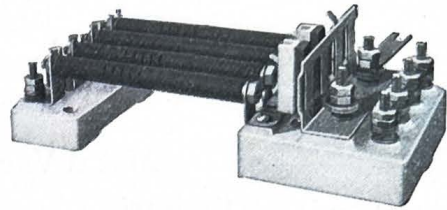
| Code No. | Conductors (Each Plug) | Dimensions |         |                       |         | Used with Jack Nos.                                              | Used with Cords No.                                      | Used for                                                                                                                                                                                                            | Replacement Parts (See Cut) |          |          |       |
|----------|------------------------|------------|---------|-----------------------|---------|------------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|----------|----------|-------|
|          |                        | A          | B       | C                     | D       |                                                                  |                                                          |                                                                                                                                                                                                                     | E                           | F        | G        |       |
| 137      | 2                      | 3 11/32    | 1 3/16  | 5/8                   | 1 15/64 | {99, 236, 281, 297<br>{and 215 to 237                            | {87, 12E, 371, 555,<br>{562, 565, P4C, 748,<br>{740, 848 | {Standard opera-<br>tor's head tele-<br>phone<br>Black shell (see<br>Note 1)<br>Red shell<br>Black shell<br>Same as No. 137<br>but has ridges in<br>shell to identify<br>one side from<br>other<br>No. 19C Test Set | P-124076                    | P-124071 | P- 82239 |       |
| 241A     | 2                      | 3 15/32    | 1 13/64 | 5/8                   | 1 3/16  | {99, 236, 281, 297<br>{and 215 to 237                            | {520, W3D, P3G,<br>{855, P2T                             |                                                                                                                                                                                                                     |                             | P-113782 | P-113784 | ..... |
| 241B     | 2                      |            |         |                       |         |                                                                  |                                                          |                                                                                                                                                                                                                     |                             |          |          |       |
| 241C     | 2                      |            |         |                       |         |                                                                  |                                                          |                                                                                                                                                                                                                     |                             |          |          |       |
| 152      | 2                      | 3 5/16     | 1 3/16  | {39/64<br>to<br>41/64 | 1 1/4   | {99, 236, 281, 297<br>{and 215 to 237                            | {87, 550, 568, W2G<br>{674                               |                                                                                                                                                                                                                     | P-142984                    | P-124071 | P- 82239 |       |
| 186      | 2                      | 2 7/32     | 2 1/32  | 7/16                  | 1 19/64 | No. 19C Test Set                                                 | 747                                                      | No. 19C Test Set                                                                                                                                                                                                    | P-205776                    | P-158989 | .....    |       |
| 211      | 3                      | 3 7/32     | 1 9/64  | 7/16                  | 1 19/64 | {49, 50, 70, 141,<br>{259, 260, 274, 275,<br>{295 and 238 to 245 | .....                                                    |                                                                                                                                                                                                                     | P-163952                    | P- 81299 | P- 82341 |       |
| 213      | 3                      | 3 7/32     | 1 9/64  | 1 1/16                | 1 3/16  | .....                                                            | .....                                                    |                                                                                                                                                                                                                     | P-164090                    | P- 81299 | P- 82341 |       |
| 218      | 2                      | 3 1/2      | 1 3/16  | 5/8                   | 1 9/32  | {99, 236, 281, 297,<br>{and 215 to 237                           | .....                                                    | {Operator's tele-<br>phone with<br>breast trans-<br>mitter, otherwise<br>same as No. 137                                                                                                                            | P-167562                    | P-124071 | P- 82239 |       |
|          |                        |            |         |                       |         |                                                                  |                                                          |                                                                                                                                                                                                                     | Cord Co                     | ductor   | P-167563 |       |

**Note 1.** No. 241 Type Plug has brass frames of the two plugs electrically connected to the two plug sleeves, the tips are separately insulated.



# Western Electric PROTECTORS

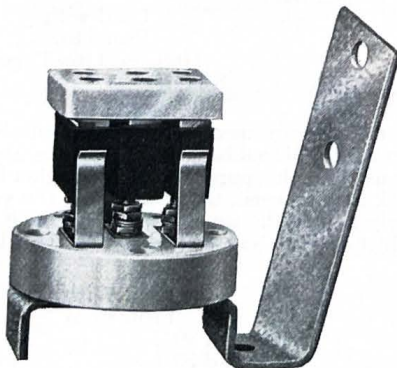
59



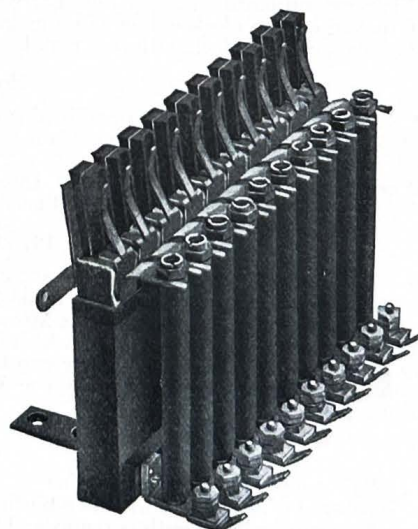
| No. 58AP Protector |                 |                                      | No. 1079AP Protector                            |                                                |                                                                                                                                                                                                   |
|--------------------|-----------------|--------------------------------------|-------------------------------------------------|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Code No.           | Line Protection | Protector Mountings                  | Consists of                                     |                                                | Protects Against                                                                                                                                                                                  |
|                    |                 |                                      | Protector Blocks                                | Fuses                                          |                                                                                                                                                                                                   |
| *58-AP             | 2-Wire          | { 1 No. 29-B<br>1 No. 16<br>1 No. 48 | { 2 No. 26<br>2 No. 27                          | { 2 No. 11-C                                   | { High potential (lightning) and abnormal currents.                                                                                                                                               |
| 58-BP              | 2-Wire          | { 1 No. 29-B<br>1 No. 16<br>1 No. 48 | { 2 No. 26<br>2 No. 30                          | { 2 No. 11-C<br>(7 amp.)                       | { High potential currents (lightning).                                                                                                                                                            |
| 76-AP              | 2-Wire          | { 1 No. 29-B                         | { 2 No. 26                                      | { .....                                        | { Same as 58-AP, less No. 16 and No. 48 Mountings and fuses.                                                                                                                                      |
| 86-B               | 2-Wire          | { .....                              | { .....                                         | { .....                                        | { High potential and abnormal currents.                                                                                                                                                           |
| 93-A               | 10 per strip    | { 10 No. 72-A                        | { 10 No. 20<br>10 No. 25<br>10 No. 11<br>(mica) | { 10 No. 51-A<br>and<br>10 No. 74<br>cord tips | { Units for mounting in wood cable terminals. Furnished 10 per strip, each strip supplied with a strap for connecting to others mounted in tiers and a strap hook for connecting the ground wire. |
| 1074-A             | As Required     | { 74-A                               | { 1 No. 19<br>1 No. 20<br>1 No. 11<br>(mica)    | { 1 No. 7-A<br>(7 amp.)                        | { High potential and abnormal currents.                                                                                                                                                           |
| **1079             | 4-Wire          | { 1 No. 79-A<br>1 No. 80-A           | { 4 No. 26<br>4 No. 27                          | { 4 No. 11-C<br>(7 amp.)                       | { High potential (lightning) and abnormal currents for group mounting. Fuses mount on 7/8-inch centers. Common 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.



No. 86B Protector, Cover Removed



No. 1074A Protector

## 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<br>1 Vacuum arrester tube—List No. 140116 | Base has 1 terminal for the ground connection, 1 terminal for the line and 1 terminal for connecting to instrument | Protection against high voltage (lightning)            |
| 148057   | 1 Porcelain base—List No. 148056<br>1 Vacuum arrester tube—List No. 140116 | Base has 1 ground 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 $2\frac{3}{16}$ in. overall height                     | Used in No. 144585 Vacuum Tube Arrestor                |
| 148056   | Base for mounting one vacuum arrester tube                                 | Porcelain; two terminals, $5\frac{3}{4}$ in. x 1 in., and $2\frac{3}{16}$ in. overall height                       | Used in No. 148057 Vacuum Tube Arrestor                |
| 140116   | Vacuum arrester tube                                                       | Single pole. This tube must be mounted in vertical position                                                        | Used in No. 144585 and No. 148057 Vacuum Tube Arrestor |

**Note.** Arresters used on telephone circuits must be mounted in vertical position with the stem of the arrester tube down. Arresters for other circuits can be mounted to suit wiring conditions.



No. 1



No. 2



No. 19



No. 20

## Protector Blocks

Nos. 1, 2 AND 5 TYPES

| Code No. | Description                             | Protector Micas  | Used With                |
|----------|-----------------------------------------|------------------|--------------------------|
| 1        | Plain carbon block with fuse metal      | No. 3 and No. 12 | Protectors               |
| 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 cut-out is to be made non-operative.

| Code No. | Description           | Used with                         |
|----------|-----------------------|-----------------------------------|
| 9        | Paraffined wood dummy | Protectors<br>1168 and 1169 Types |

## 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                                                          |
|----------|-------------------------------------------------|--------------------------------------------------------------------|
| 19       | Plain copper block with two pins                | 60B and 80A<br>Protectors                                          |
| 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, 1079AP, 1268A and 1269A.<br>No. 83A Protector Mounting. |
| 27       | Porcelain frame with carbon insert | Same as No. 26, except No. 83A Protector Mounting.                                   |
| 30       | Porcelain frame with carbon insert | 83A Protector Mounting.                                                              |

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. 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

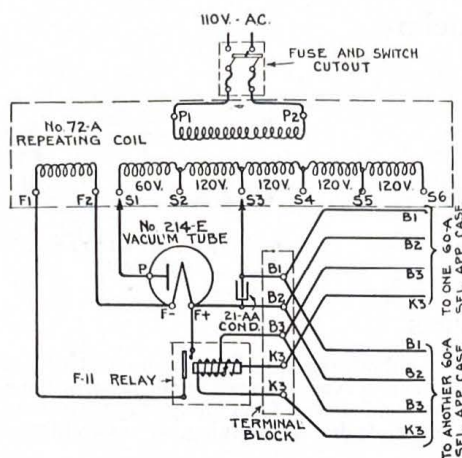
## PROTECTOR MICAS

| 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.



## VACUUM TUBE RECTIFIERS



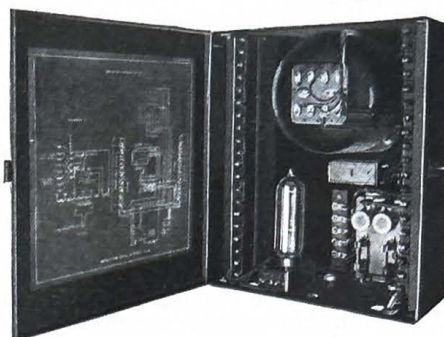
Schematic Diagram of  
No. 60A Vacuum Tube Rectifier

## Description

Standard black finish metal case 1 ft. 6 in. high, 1 ft. 3 in. wide and 6 in. deep. Case contains:  
1. 72A Repeating Coil secondary of which has taps so that voltage of 60 to 540 in 60 volt steps may be obtained.

- \*1 No. 214E Vacuum Tube.
- 1 No. 212A Vacuum Tube Socket.
- 1 F-11 Relay.
- 1 E-1 Relay Cover.
- 20 No. 21AA Condensers.

**\*Note.** Not included. Must be ordered separately.



No. 60A Rectifier Cabinet (Open)

## Use

Designed for use in train dispatching circuits to furnish direct current to operate selectors in place of dry cells and motor generators.

The primary of the coil is intended to connect across a 110 volt 60 cycle source. The "no load drain" will be approximately 8 watts. A tertiary winding provides 10 volt for lighting the filament. A relay is inserted in the filament circuit so that a D.C. voltage is delivered to terminals B-1 and B-2 only when a selector key is operated. The D.C. voltage output of the tube is equal to the A.C. voltage input to the tube at "no load" and decreases from 10% to 35% in proportion to the selector load. The maximum D.C. output is approximately 350 volts at .4 amperes for intermittent service.

## FILTER

## Use

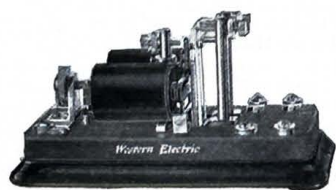
Used with rectifier when 295 Desk Set Boxes are on the dispatching circuit.

## RELAYS

## Code No.

## Description

**K-1** Consists of No. 2E, flat type Relays, mounted adjacent on an individual mounting; the left-hand relay being in an inverted position. When proper current is applied to the windings of the right-hand relay, the armature moves to the core, locks itself and remains in the locked position until the latch is raised by the operation of the left-hand relay. The right-hand relay operates on .28 amperes and non-operates on .15 amperes. The left-hand relay operates on .28 amperes and non-operates on .05 amperes.



No. 27A Relay

Code Resistance  
No. (Ohms)

**26A** 25 Calling relay.

**27A** ... Calling relay (replaces Relay List No. 100865).

**122EW** 100 Holding relay in calling.

**190M** {2325} .....  
                  {2325}

**120281** 50 Selector sending.

## Use

Used by railways in selector circuits.

## Used

In No. 60A Apparatus Case.

In Nos. 51A and 53A Apparatus Cases.

In No. 60A Apparatus Case.

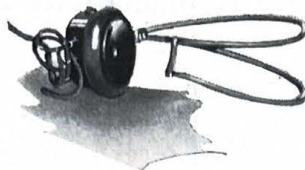
In Nos. 102C, E and F Selector Sets.

On inter-calling selector circuits. No. 52A Selector Apparatus Case.

# RECEIVERS



No. 131W Receiver



No. 186W Receiver  
(3B Headband)



No. 190W Receiver

Code  
No.

## Description

- 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.
- 189W** Similar to the No. 186W except wound to a low resistance. Approximate resistance 45 ohms. Replaces No. 148W.
- 190W** Composed of two special No. 189W Receivers with a wire type headband. (45 ohms.)
- 191W** Composed of one special No. 189W (45 ohms) and one special No. 186W (400 ohms) Receivers with a wire type headband.
- 515W** Brass, black finish. Approximate resistance 45 ohms.
- 528BW** Brass, black finish, single head receiver with No. 3A Headband. Approximate resistance 80 Ohms.

## HEAD TYPE

## Used

With Nos. 1042AB, BR deskstands, 1293AE, AK, 1317AW, AE Telephone Sets, 1020C, E, 1048DA, DB, DC, DD, GA, GB, GC., GD, Arms. With Nos. 546 and 554 Cords, With Nos. 1042AB deskstand, 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 with No. 565 Cords.

With No. 566 Cords with breast transmitter. Replaces Nos. 147W and 153W Receivers. On No. 567 Cords multiple connection. Replaces No. 164W Receivers.

With No. 1017 Type Test Sets.

With Cords having No. 80 Cord Tips at Receiver end. (See Test Board Cords, Page 39.)



No. 528BW  
(3A Headband)



143AW, 144AW, 508W, Equipped with  
Cord

Code  
No.

## Description

- 133W** Insulated bipolar hand receiver with rubber case. Resistance 70 ohms.
- 143AW** Concealed binding post hand receiver. Composition case. Approximate resistance 75 ohms.
- 144AW** Same as No. 143AW, excepting that the case is hard rubber. Approximate resistance 75 ohms.
- 508W** A concealed binding post hand receiver. Same as the 143AW except that the resistance is 550 ohms.

## HAND TYPE

## Used

With No. 1314A Telephone Set.

With Nos. 1040AL deskstands, 1317P, S, AH, BK, CN, CR, CP, CS, CG Telephone Sets and 1020CC Telephone Arm.

With Nos. 1040U deskstand, 1305AC, 1312A, 1336H and 6023A Telephone Sets.

With Nos. 1317W, AD, 1293AD, AK and 1336F Telephone Sets. Replaces No. 163W Receiver.

## HAND SET TYPE

**131W** Resistance  
70 ohms

Shell Material  
Brass, Nickel Plate

Used with  
No. 1001 Type Hand Sets



## RECEIVERS

## Receiver Replacement Parts

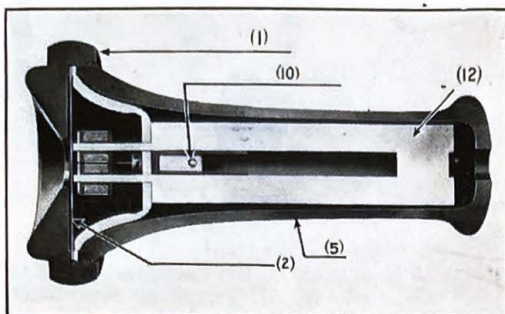


Fig. 1

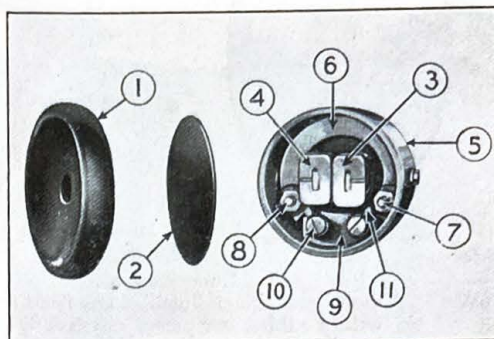


Fig. 2

| Sym-<br>bol | Name of Part                 | Receiver Code Nos.   |          |         |         |                        |
|-------------|------------------------------|----------------------|----------|---------|---------|------------------------|
|             |                              | 131W                 | 133W     | 143AW   | 144AW   | 186W                   |
| 1           | Receiver cap.....            | P-81496              | P- 90348 | P-93519 | P-93520 | P- 97614               |
| 2           | Diaphragm.....               | P-81525              | P- 95118 | P-95114 | P-95114 | P- 95225               |
| 3           | Right spool assembly.....    | P-81492              | P- 80724 | .....   | .....   | P- 97074               |
| 4           | Left spool assembly.....     | P-81493              | P- 80723 | .....   | .....   | .....                  |
| 5           | Case.....                    | P-90076              | P- 90803 | P-93518 | P-94533 | P- 97058               |
| 6           | Magnet.....                  | { P-93903<br>P-93904 | P- 93906 | .....   | .....   | { P- 97066<br>P- 97064 |
| 7           | Magnet machine screw.....    | P-82028              | P- 87411 | .....   | .....   | P- 97056               |
| 8           | Nut or binding post.....     | .....                | P- 93592 | .....   | .....   | P-132958               |
| 9           | Receiver block assembly..... | P-81499              | .....    | .....   | .....   | P- 98974               |
| 10          | Machine screw.....           | P-82027              | P-107062 | P-93799 | P-93799 | P- 93540               |
| 11          | Terminal.....                | P-81506              | .....    | .....   | .....   | P- 97062               |
| 12          | Inner Unit.....              | .....                | .....    | P-94436 | P-94436 | .....                  |

Group Nos. 131W-133W, 186W-189W, 190W-191W, 528BW and 515W with Note "See Fig. 2."  
Group Nos. 143AW, 144AW and 508W with Note "See Fig. 1."

| Sym-<br>bol | Name of Part                 | Receiver Code Nos.     |                        |                      |         |                        |
|-------------|------------------------------|------------------------|------------------------|----------------------|---------|------------------------|
|             |                              | 189W                   | 190W, 191W             | 528BW                | 508W    | 515W                   |
| 1           | Receiver cap.....            | P-145247               | P-145248               | P-98524              | P-99073 | P- 99485               |
| 2           | Diaphragm.....               | P- 95225               | P- 95225               | P-98387              | P-95114 | P- 95225               |
| 3           | Right spool assembly.....    | P-145239               | P-145239               | P-99087              | .....   | P-145239               |
| 4           | Left spool assembly.....     | .....                  | .....                  | P-99088              | .....   | .....                  |
| 5           | Case.....                    | P-145241               | P-145241               | P-99202              | P-93518 | P- 99491               |
| 6           | Magnet.....                  | { P- 97066<br>P- 97064 | { P- 97066<br>P- 97064 | { P-99862<br>P-99541 | .....   | { P- 97066<br>P- 97064 |
| 7           | Magnet machine screw.....    | P- 97056               | P- 97056               | P-99541              | .....   | P- 97056               |
| 8           | Nut on binding post.....     | P-132958               | P-132958               | P-98752              | .....   | P-132958               |
| 9           | Receiver block assembly..... | P- 98974               | P- 98974               | P-98361              | .....   | P- 98974               |
| 10          | Machine screw.....           | P- 93540               | P- 93540               | P-99794              | P-93799 | P- 93540               |
| 11          | Terminal.....                | P- 97062               | P- 97062               | P-98383              | .....   | P- 97062               |
| 12          | Inner Unit.....              | .....                  | .....                  | .....                | P-99071 | .....                  |

## Head Bands (Receivers)

| Code<br>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). |
| 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 3A, except that the wire head piece is covered with black sleeving.                                                                                                         |

The above types of head bands are illustrated elsewhere under "Receivers."



# Western Electric

## REPEATING COILS

65



No. 76A



No. 50A



No. 77A



No. 56A



No. 70A

### 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. 72A is used in the No. 60A Rectifier. Is mounted on a wooden base  $4\frac{1}{16}'' \times 4\frac{1}{16}''$ .

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.

The 122A is the same as the No. 70A except that it is insulated to withstand 25,000 volts.

| 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      | 1            | 4                         | 2 of 45           | 2 of 40   | .....    | 1 to 1          | 11 x $8\frac{5}{8}$ | .....   |
| 76A      | 2            | 4                         | 2 of 20           | 2 of 21   | .....    | 1 to 1          | $10\frac{3}{4}$ 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          | $10\frac{3}{4}$ x 4 | .....   |

\*Has two resistance units. See above notes.

### NO. 25 TYPE

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.

| Code No. | No. of Coils | No. of Windings Each Coil | Resistances, Ohms |           |          | Impedance Ratio | Dimensions, Inches              |         |
|----------|--------------|---------------------------|-------------------|-----------|----------|-----------------|---------------------------------|---------|
|          |              |                           | Primary           | Secondary | Tertiary |                 | of Wood Base                    | of Coil |
| 25E      | 1            | 2                         | 42                | 42        | ..       | 1 to 1          | $3\frac{7}{8}$ x $4\frac{7}{8}$ | .....   |

### 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 $8\frac{5}{8}$ | .....   |
| 56B      | 1            | 3                         | 2 of 2.35         | 1 of 27.7 | .....    | .....           | 11 x $8\frac{5}{8}$ | .....   |

### NO. 50 TYPE

The No. 50 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 30,000 volts A.C. for one minute. Resistance of inner windings 26.5 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  $9\frac{1}{2}$  inches, length  $11\frac{1}{2}$  inches.

## RETARDATION COILS



No. 5AF



No. 5AA



No. 44F



No. 51A

## Retardation Coils

## Code No.

## Description

- 5AA** Toroidal type coil enclosed in a crosstalk-proof shell and mounted on a wooden base. It has two independent groups of windings; resistance of windings 74 ohms each. Base 11 x 8 5/8 inches.
- 5AD** Mounted on wooden base, and has 4 terminals brought out to clips on the base. Consists of two windings of 25 ohms resistance each. Base 9 x 9 inches.
- 5AF** Toroidal type coil, in crosstalk-proof shell. Equipped with mounting brackets and has wooden base with 3 terminals. It has 4 windings, connected series aiding with tap brought out from the middle point of the series arrangement. Total resistance 330 ohms, base 3 3/8 x 3 3/8 inches.
- 12G** Consists of winding with a resistance of 2.3 ohms and is equipped with movable core for varying the impedance. Size 3 1/8 x 1 x 1 1/8 inches.
- 12M** Resistance 2.3, similar to No. 12G but for portable sets. Base 3 1/4 x 1 inches.
- 44F** Two toroidal coils, each enclosed in a crosstalk-proof shell and mounted on a single wooden base. Each coil has 4 inductive windings connected permanently in series (inductive aiding); the maximum resistance of the series arrangement (L-1—L-2) is 330 ohms. Terminals arranged so protector blocks on No. 53 mounting can be associated with the coil. Same as two No. 5AF coils on one base. Base 11 3/4 x 4 7/8 inches.
- 51A** Retardation coil of one winding equipped with two brass terminals bent up to 90 degrees with the head of the coil. Resistance 520 ohms. Height 1 1/8 inch, diameter 1 1/8 inch.
- 51B** Similar to 51A excepting it is moisture-proof. Height 1 1/8 inch, diameter 1 1/8 inch.
- 51F** Similar to No. 51A except it has a resistance of 45 ohms. Height 1 1/8 inch, diameter 1 1/8 inch.
- 78A** A laminated steel core mounted between two split wooden spool heads. Resistance 525 ohms. Mounted by means of angle pieces. Size 5 x 5 x 10 inches.

## Used With

Composite circuits in place of two No. 5K or two No. 5L Retardation Coils.

Nos. 52A, 53A and 60A Selector Apparatus Cases.

Simplexing telephone line. Replaces No. 5AC Coil.

Nos. 1312A and 6023A Telephone Sets.

No. 1314A Telephone Set.

Used as phantom retardation coil; replaces No. 44C.

Nos. 295AK, special 300H and K Desk Set Boxes, Nos. 1293AD, AE, AK, AL, and 1317W, AD, AE, AW Telephone Sets.

No. 1336F telephone set.

Nos. 101A, B, 102A, B, C, D, E, F, 160A, B and 161A Selector Sets.

No. 61A Selector Apparatus Case.



No. 1 Resistance Coil



No. 18 Resistance Coil



No. 5 Resistance Coil



No. 31-A Resistance Coil



No. 34-A Resistance Coil



No. 35-D Resistance Coil

## Resistances

## Code No. Resistance (Ohms)

- 1F** 1000
- 5G** 10000
- 18A** 37
- 18G** 200
- 18AK** 60
- 31A** 1200
- 34A** 200 to 30,000
- 34B** 100 to 3,100
- 34C** 4 to 3,124
- 35D** 250
- 38A** 48000

## Used With

- Nos. 101A and 101B Selector Sets.
- No. 102A Selector Set.
- No. 52A Selector Apparatus Case.
- No. 60A Selector Apparatus Case.
- Nos. 51A and 52A, 53A and 60A Selector Apparatus Cases.
- Telegraph relays on composite circuits. Steel tube enameled resistance.
- Nos. 101A, 101B, 102A, and 102B Selector Sets.
- Nos. 51C, 51D and 53A Selector Keys on intercalling circuits.
- Simplex train dispatching circuits.
- Nos. 51A and 53A Selector Apparatus Cases. Enameled resistance.
- No. 160A Selector Sets.

**Note**—Resistance units in No. 34 Type Resistances arranged so that various values may be obtained. In No. 34A values from 200 to 30,000 ohms may be obtained in steps of 200. With the No. 34B values from 100 to 3100 ohms in steps of 100 are obtainable and with the No. 34C values from 4 to 3124 ohms in steps of from 4 to 64.



# RINGERS



No. 51 Type



No. 60 CG Ringer

## Nos. 4, 32, 38, 43, 45, 51, 53, and 60 Type

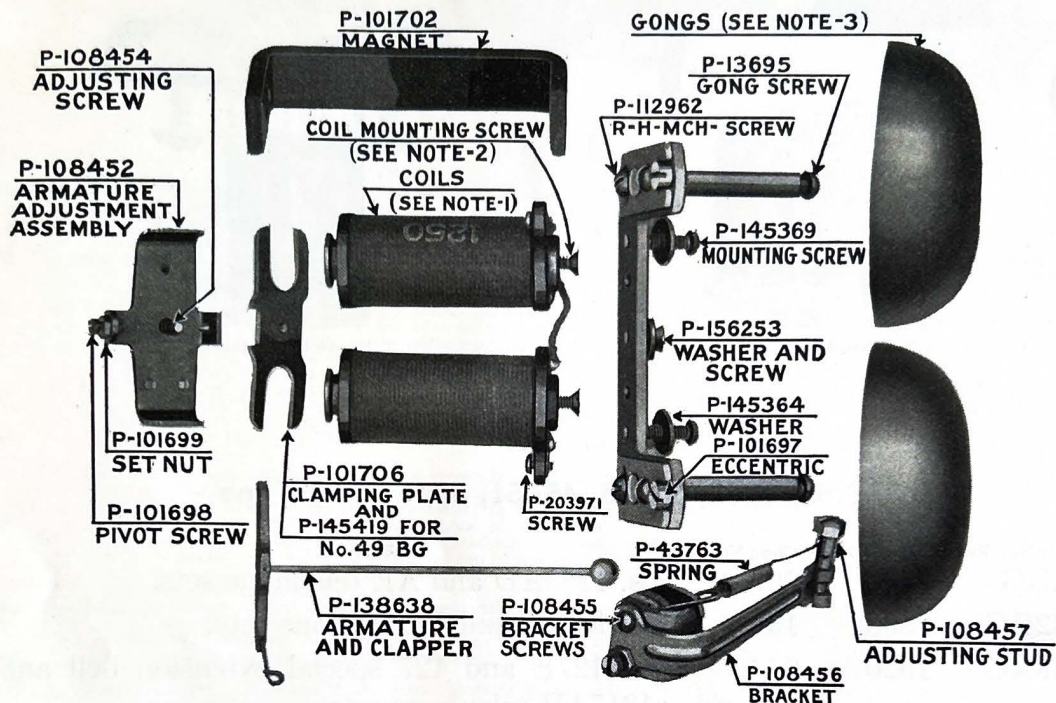
| Code No.     | Resistance in Ohms | Gong No. | Used in                                                                   |
|--------------|--------------------|----------|---------------------------------------------------------------------------|
| <b>4BG</b>   | 2500               | 29A      | Nos. 1293AD and AE telephone sets.                                        |
| <b>32BG</b>  | 2500               | 13       | Nos. 1330E and F telephone sets.                                          |
| <b>38AG</b>  | 1020               | 26A      | Nos. 127E and 127 special extension bell and 1317AH telephone sets.       |
| <b>38BG</b>  | 2500               | 26A      | Nos. 127F extension bell, 1317P, S, W, AW and BK telephone sets.          |
| <b>38FG</b>  | 1620               | 26A      | No. 127G extension bell.                                                  |
| <b>43NG</b>  | 88                 | 26A      | No. 127H extension bell.                                                  |
| <b>45BG</b>  | 2500               | 20       | Nos. 1336F and H and 1305AC telephone sets. Moisture-proofed.             |
| <b>*51AG</b> | 1020               | 29A      | Nos. 1278G and H telephone sets and 315H desk set box.                    |
| <b>*51BG</b> | 2500               | 29A      | Telephone sets and desk set boxes 300K and N.                             |
| <b>*51FG</b> | 1620               | 29A      | Telephone sets and desk set boxes 300L and M.                             |
| <b>53AG</b>  | 1000               | 29A      | No. 1317CG telephone sets.                                                |
| <b>53BG</b>  | 2500               | 29A      | Nos. 1317CP and CS telephone sets.                                        |
| <b>53FG</b>  | 1600               | 29A      | Nos. 1317CN and CR telephone sets.<br>(160A, 160B and 161A selector sets. |
| <b>60CG</b>  | 16                 | 26A      | Nos. { 160AC, 160BC<br>{ 160AR, 160BR.                                    |

\*The No. 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

(Continued)



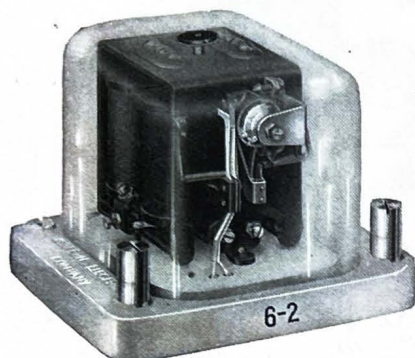
## Repair Parts of Ringers

Repair parts for the Nos. 38, 51, 53, 55 and 60 Type Ringers are the same as shown above with the following exceptions:

| Description    | Ringer                  | Ringer |
|----------------|-------------------------|--------|
| Coils (Note 1) | 38AG                    | 38BG   |
|                | 51AG                    | 51BG   |
|                | 53AG                    | 53BG   |
|                | 55AG                    |        |
|                | 38FG                    |        |
|                | 51FG                    |        |
|                | 53FG                    |        |
|                | P-133726 (500 ohms ca.) |        |
|                | P-133729 (800 ohms)     |        |
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Gongs (Note 3) for various type ringers are listed with the code numbers on the preceding page.

## SELECTIVE APPARATUS



No. 50-B Selector



No. 60-AP Selector

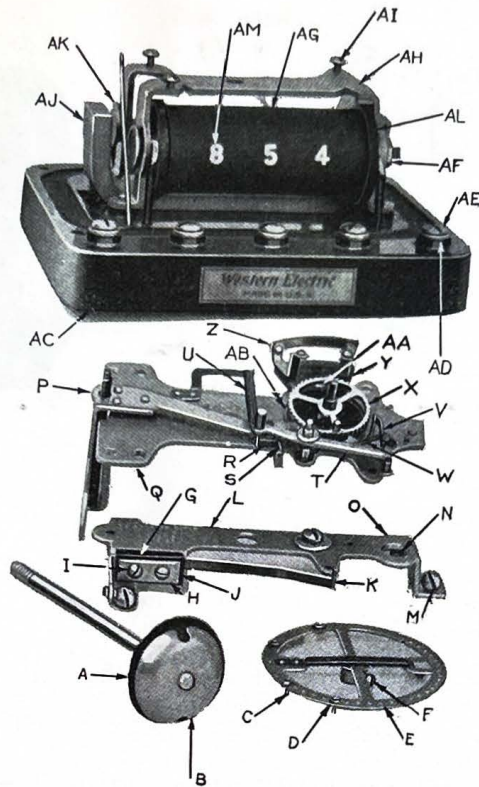
## Selectors

| Code No.    | Description                                                                                                                                                                                                                                  | Resistance in Ohms | Used                                                                               |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------------------------------------------------------------------|
| <b>*50A</b> | Bridging selector mounted on a porcelain base and protected by a glass cover. Capacity 48 stations.                                                                                                                                          | 3750               | At way stations on train dispatching circuits in Nos. 101A and 102A selector sets. |
| <b>*50B</b> | Group selector, first selects a group and then from this group the particular station desired. Capacity 65 stations.                                                                                                                         | 16000              | At way stations on train dispatching circuits in Nos. 101A and 102A selector sets. |
| <b>*50C</b> | Same as No. 50A except it is of low resistance and operates from a local battery in the set. Capacity 48 stations.                                                                                                                           | 9.4                | At way stations in No. 102C selector sets.                                         |
| <b>*50D</b> | Same as No. 50B except it is moistureproof. Capacity 65 stations.                                                                                                                                                                            | 16000              | In No. 1A semaphore set.                                                           |
| <b>50F</b>  | A group selector in which contacts are mechanically locked at ringing position. Capacity 65 stations.                                                                                                                                        | 9.4                | At way stations in No. 102F selector sets.                                         |
| <b>60AP</b> | Alternating selector, mounted on phenol base and supplied with a glass cover. Operates on 17 impulses and has capacity of 78 stations. Also equipped for receiving time signals.                                                             | 21000              | At way stations in No. 160A selector sets.                                         |
| <b>60BP</b> | Similar to No. 60A except it is equipped with 4 ringing terminals so that four bells in the same station can be run by the same selector. Not equipped for receiving time signal. Operates on 17 impulses and has a capacity of 48 stations. | 21000              | At way stations in No. 160A selector sets.                                         |

\*Specify on order the number of stations for which the selectors are desired. In the Nos. 50B and D specify the group number and number of stations.



## SELECTIVE APPARATUS (Continued)



Replacement Parts for No. 60 Type Selectors

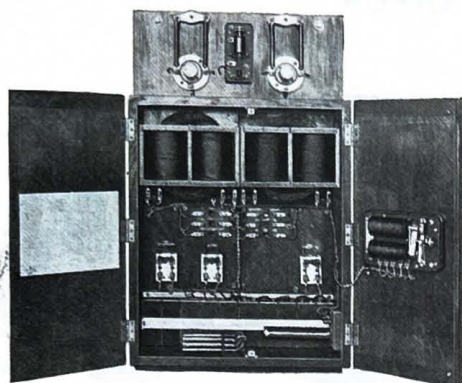
| No. | Subject              | 60-A.P.<br>Selector | 60-B.P.<br>Selector | No. | Subject                                            | 60-A.P.<br>Selector | 60-B.P.<br>Selector |
|-----|----------------------|---------------------|---------------------|-----|----------------------------------------------------|---------------------|---------------------|
| A   | Felt Washer          | P-91966             | P-91966             | U   | Rocker Arm Spring                                  | P-137692            | P-137692            |
| B   | Clamping stud        | P-207899            | P-207899            | V   | Stepping Pawl                                      | P-146149            | P-146149            |
| C   | Code Pin             | P-137652            | P-137652            | W   | Stepping Pawl Spring                               | P-93202             | P-93202             |
| D   | Code Nut             | P-137651            | P-137651            | X   | Ratchet                                            | P-137678            | P-137678            |
| E   | Code Wheel           | P-146196            | P-146199            | Y   | Terminal Plate                                     | P-137658            | P-143503            |
| F   | Code Wheel Screw     | P-137650            | P-137650            | Z   | Terminal Bridge Screw                              | P-94505             | P-94505             |
| G   | Insulator Bushing    | P-207896            | P-207896            | AA  | Terminal Plate Screw                               | P-93836             | P-93836             |
| H   | Clamping Plate       | P-146610            | P-146610            | AB  | Spiral Spring                                      | P-137649            | P-137649            |
| I   | Clamping Plate Screw | P-93833             | P-93883             | AC  | Base                                               | P-207828            | P-207829            |
| J   | Insulator            | P-137632            | P-137632            | AD  | Base Terminal                                      | P-137683            | P-137683            |
| K   | Holding Spring       | P-137636            | P-137636            | AE  | Terminal Screw                                     | P-137685            | P-137685            |
| L   | Upper Plate          | P-146308            | P-146308            | AF  | Core lock nut                                      | P-121772            | P-121772            |
| M   | Upper Plate Screw    | P-147796            | P-147796            | AG  | Coil                                               | P-147429            | P-147429            |
| N   | Adjusting Screw      | P-92642             | P-92642             | AH  | Frame                                              | P-146145            | P-146145            |
| O   | Hex. Nut             | P-137686            | P-137686            | AI  | Frame screw                                        | P-121770            | P-121770            |
| P   | Armature             | P-146148            | P-146148            | AJ  | Magnet                                             | P-145918            | P-145918            |
| Q   | Middle Plate         | P-146306            | P-146306            | AK  | Core                                               | P-147431            | P-147431            |
| R   | Holding Pawl         | P-137643            | P-137643            | AL  | End Play Washer                                    | P-137641            | P-137641            |
| S   | Holding Pawl Spring  | P-137648            | P-137648            | AM  | 1/4" white gummed<br>paper figures, Glass<br>Cover | P-162258            | P-162258            |
| T   | Rocker Arm           | P-146152            | P-146152            |     |                                                    |                     |                     |



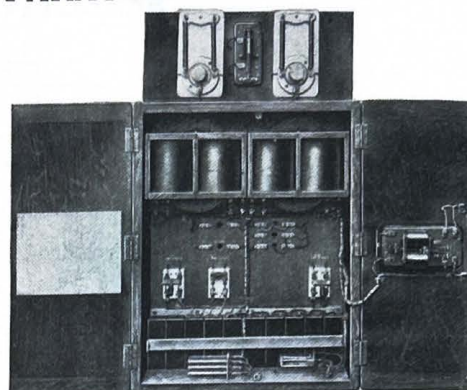
# Western Electric

## SELECTIVE APPARATUS

71



No. 53-A Selector Apparatus Case, Open



No. 60-A Selector Apparatus Case

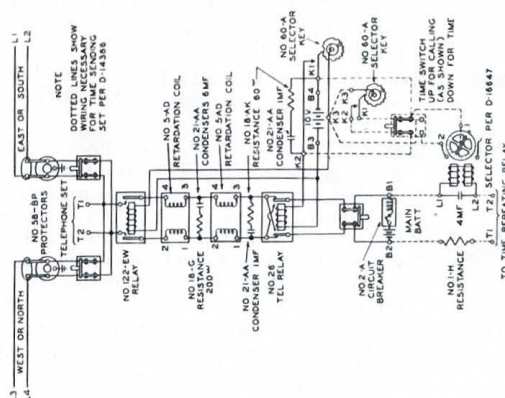
### Selector Apparatus Cases

| Code No. | Equipment                                                                                                                                                                                                                                                                                   | Dimensions                                                                         | Used At                                                   |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-----------------------------------------------------------|
| 53A      | 2 No. 58BP Protectors.<br>2 No. 48 Protector Mounting.<br>2 No. 5AD Retardation Coils.<br>9 No. 21AA Condensers.<br>3 No. 18AK Resistances.<br>1 No. 18G Resistance.<br>1 No. 35D Resistance.<br>1 No. 27A Relay.<br>1 No. 2A Circuit Breaker.<br>3 No. 709 Trumbull Switches.              | 1 ft. 4 $\frac{1}{8}$ in. x<br>2 ft. 7 $\frac{3}{4}$ in. x<br>12 $\frac{3}{8}$ in. | Dispatchers office on train dispatching circuits.         |
| 60A      | 2 No. 58BP Protectors.<br>2 No. 48 Protector Mounting.<br>2 No. 5AD Retardation Coils.<br>8 No. 21AA Condensers.<br>2 No. 18AK Resistances.<br>1 No. 18G Resistance.<br>1 No. 122EW Relay.<br>1 No. 26A Telegraph Relay.<br>1 No. 2A Circuit Breaker.<br>3 No. 709 Trumbull Knife Switches. | 1 ft. 4 $\frac{1}{8}$ in. x<br>2 ft. 7 $\frac{3}{4}$ in. x<br>12 $\frac{3}{8}$ in. | Dispatchers office on train dispatching circuits.         |
| 61A      | 1 No. 47A Repeating Coil.<br>2 No. 21AA Condensers.<br>1 700 ohm Ward Leonard Resistance DM 700 Type.<br>1 No. 78A Retardation Coil.<br>3 No. 709 Trumbull Porcelain Switches.<br>2 No. 9171 Bryant Porcelain Receptacles.<br>2 No. 12061 Ballast Lamps.                                    | 2 ft. 5 $\frac{5}{8}$ in. x<br>12 $\frac{5}{8}$ in. x 6 $\frac{7}{8}$ in.          | Battery stations on inter-communicating message circuits. |

### D14386 Time Sending Set

Used with No. 60A Selector Apparatus Case for sending time. Consists of the following apparatus:

- 1 Special No. 60AP Selector per D16647
- 4 No. 21AA Condensers
- 1 No. 710 Trumbull D.P.D.T. Switch
- 1 No. 1-H Resistance



Schematic Wiring of No. 60-A Selector Apparatus Case (as now furnished)

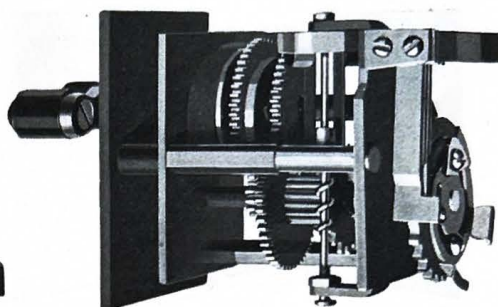
## SELECTIVE APPARATUS



No. 50-A Selector Key



No. 61-A Selector Key



No. 60-A Selector Key

## Selector Keys

| Code No. | Description                                                                                                                                                                                                                                                                                                                                                                         | Used in                                                                                                                                                  |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| *50A     | Individual key. Can be adjusted to select any station from 1 to 35.                                                                                                                                                                                                                                                                                                                 | Nos. 50A, B or C Selector Key Cases. At dispatcher's office. With No. 50A Selectors.                                                                     |
| *50B     | Individual key. Can be adjusted to select any station from 1 to 48.                                                                                                                                                                                                                                                                                                                 | Nos. 50A, B or C Selector Key Cases. At dispatcher's office. With No. 50A Selectors.                                                                     |
| 50C      | Individual key. Can be adjusted to select any station from 6-1 to 12-5.                                                                                                                                                                                                                                                                                                             | Nos. 50A, B or C Selector Key Cases. At dispatcher's office. With No. 50B Selectors.                                                                     |
| *50D     | Individual key. Can be adjusted to select any station from 13-1 to 18-5.                                                                                                                                                                                                                                                                                                            | Nos. 50A, B or C Selector Key Cases. At dispatcher's office. With No. 50B Selectors.                                                                     |
| *50E     | Individual key. Can be adjusted to select any station from 1 to 50.                                                                                                                                                                                                                                                                                                                 | Nos. 50A, B or C Selector Key Cases. At dispatcher's office. With No. 50C Selectors.                                                                     |
| *50F     | Individual key. Can be adjusted to select any station from 1-3 to 21-1.                                                                                                                                                                                                                                                                                                             | Nos. 50A, B or C Selector Key Cases. At dispatcher's office. With No. 50F Selectors.                                                                     |
| 51D      | Master calling key same as No. 51C except that the capacity of the stations is 1 to 35 inclusive.                                                                                                                                                                                                                                                                                   | Test boards in connection with No. 50A Selectors.                                                                                                        |
| 53A      | Master calling key. Capacity 55 stations. Mounts 2 No. 34B Resistances.                                                                                                                                                                                                                                                                                                             | Test boards in connection with No. 50B Selectors. Also at way stations on inter-calling circuits.                                                        |
| 60A      | Individual key. Can be adjusted to select any station from 1 to 78 and advancing all selectors to the time receiving position.                                                                                                                                                                                                                                                      | Nos. 60A, B or C Selector Key Cases. At dispatcher's office. With No. 60AP Selectors.                                                                    |
| 60B      | Individual key. Can be adjusted for calling any of the code settings given for the No. 60B Selectors.                                                                                                                                                                                                                                                                               | Nos. 60A, B, C or D Selector Key Cases. At dispatcher's office. With No. 60BP Selectors.                                                                 |
| 61A      | Master key to control the sequence of calling impulses for all codes totalling 17 steps. Consists of a driving mechanism and impulse wheel mounted on a shaft and control springs mounted on the base. It is furnished with a slotted cover thru which levers extend allowing changes to be made in the code settings to correspond with the codes of the Nos. 60A and B Selectors. | Circuits equipped with the Nos. 60AP and BP Selectors when set for a total of 17 steps to the first or A terminal. Also used on the inter-call circuits. |
| 61B      | Master key. Same as 61A except it is arranged for the code numbers given in table No. 2 on page 9.                                                                                                                                                                                                                                                                                  | On circuits equipped with 60AP and BP Selectors when set for a total of 27 steps to the first or A terminal. Also used on inter-call circuits.           |

**\*Note:** All No. 50 Type Keys can be removed separately from their key cases without disturbing the circuit of any other key in the case.



## SELECTIVE APPARATUS



No. 60-A Selector Key Case

## Selector Key Cases

| Code No. | Capacity Keys | Description                                                                                      | Dimensions                                                          |
|----------|---------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| 50A      | 24            | Cabinet for mounting No. 50 Type Selector Keys. 4 rows of 6 keys per row.                        | 15 $\frac{1}{4}$ in. x 5 $\frac{5}{8}$ in. x 12 $\frac{17}{32}$ in. |
| 50B      | 36            | Cabinet for mounting No. 50 Type Selector Keys. 4 rows of 9 keys per row.                        | 21 $\frac{1}{4}$ in. x 5 $\frac{5}{8}$ in. x 12 $\frac{17}{32}$ in. |
| 50C      | 50            | Cabinet for mounting No. 50 Type Selector Keys. 5 rows of 10 keys per row.                       | 23 $\frac{1}{4}$ in. x 5 $\frac{5}{8}$ in. x 15 $\frac{1}{32}$ in.  |
| 60A      | 24            | Same as No. 50A but designed to mount No. 60 Type Selector Keys.                                 | 12 $\frac{39}{64}$ in. x 15 $\frac{1}{4}$ in. x 5 $\frac{5}{8}$ in. |
| 60B      | 36            | Same as No. 50B but designed to mount No. 60 Type Selector Keys.                                 | 12 $\frac{39}{64}$ in. x 21 $\frac{1}{4}$ in. x 5 $\frac{5}{8}$ in. |
| 60C      | 48            | Similar to No. 50C but designed to mount No. 60 Type Selector Keys in 4 rows of 12 keys per row. | 12 $\frac{39}{64}$ in. x 27 $\frac{1}{4}$ in. x 5 $\frac{5}{8}$ in. |
| 60D      | 60            | Cabinet for mounting No. 60 Type Selector Keys. 4 rows of 15 keys per row.                       | 12 $\frac{39}{64}$ in. x 33 $\frac{1}{4}$ in. x 5 $\frac{5}{8}$ in. |
| 60E      | 12            | Cabinet for mounting No. 60 Type Selector Keys. 3 rows of 4 keys per row.                        | 12 $\frac{39}{64}$ in. x 5 $\frac{5}{8}$ in. x 5 $\frac{5}{8}$ in.  |

## Selector Key Spaces

| Code No. | Description               | Used in                                                                               |
|----------|---------------------------|---------------------------------------------------------------------------------------|
| 50A      | Key spaces, black finish. | Nos. 50A, B and C, and Nos. 60A, B and C, Key Cases in spaces not equipped with keys. |

## Selector Sets

The following selectors and associated apparatus are the older type D.C. and are listed for convenience in ordering sets for maintenance and extensions to existing circuits.

| Code No. | Equipment                                                                                                                                       | Dimensions                                                       | Used at                                                                      |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------------------------|
| *101A    | Box equipped with:<br>1 No. 101402 Bell.<br>2 No. 51F Retardation coils.<br>1 No. 21U Condenser.<br>1 No. 1F Resistance.<br>1 No. 50A Selector. | 13 $\frac{3}{4}$ in. x 9 $\frac{1}{4}$ in. x 6 $\frac{1}{4}$ in. | Way stations on train dispatching circuits operated on central energy basis. |

\*101B Same as No. 101A, except equipped with No. 50B Selector.

\*Nos. 101A and 101B Sets are arranged for but not equipped with 2 No. 34A Resistances.



## SELECTIVE APPARATUS



No. 160 Type Selector Set—Open



No. 160 Type Selector Set—Closed

## Selector Sets

The following selectors and associated apparatus are the older type D.C. and are listed for convenience in ordering sets for maintenance and extensions to existing circuits.

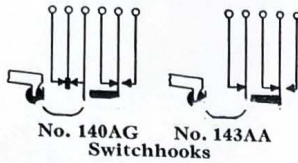
| Code No. | Description                                                                                                                                                                 | Used at                                                                                                                  |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| †102A    | Box equipped with:<br>1 No. 101404 bell.<br>2 No. 51F Retardation Coils.<br>1 No. 5G Resistance.<br>1 No. 50A Selector.<br>Arranged for, but not equipped with 2 dry cells. | 19 3/4 in. x 9 1/4 in.<br>x 6 1/4 in.<br><br>Way stations on train dispatching circuits operated on local battery basis. |
| †102C    | Similar to No. 102A. Box equipped with:<br>1 No. 50C Selector.<br>1 No. 101404 Bell.                                                                                        | 1 No. 190M Relay.<br>1 No. 5G Resistance.<br>2 No. 51F Retardation Coils.<br>1 spl. No. 43 Retardation Coil.             |
| †102E    | Similar to No. 102A. Box equipped with:<br>1 No. 50C Selector.<br>1 No. 101404 Bell.                                                                                        | 1 No. 190M Relay.<br>2 No. 51F Retardation Coils.                                                                        |
| †102F    | Similar to No. 102A. Box equipped with:<br>1 No. 50F Selector.<br>1 No. 5G Resistance.                                                                                      | 1 No. 190M Relay.<br>1 No. 12018 Bell.<br>2 No. 51F Retardation Coils.                                                   |

†Nos. 102A, B, C, E and F Sets are arranged for but not equipped with 1 No. 34A Resistance. These resistances are ordered separately in accordance with the circuit requirements.

## A. C. Selector Sets

## RECOMMENDED FOR ALL NEW INSTALLATIONS

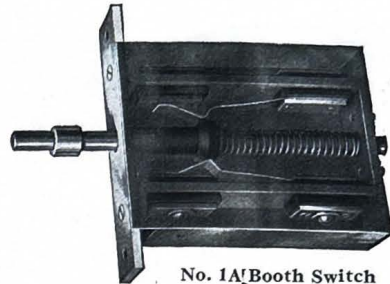
| Code No. | Equipment                                                                                                                                                                                          | Dimensions                     | Used at                                                                                                          |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------------------------------------------------------------------------------------------------------|
| 160AC    | Box equipped with:<br>1 No. 60AP Selector.<br>1 No. 60C Ringer.<br>2 No. 26A Gongs.<br>2 No. 51F Retardation Coils.<br>2 No. 21BA Condensers.<br>1 No. 21AA Condenser.<br>1 No. 21AL Condenser.    | 6 1/2 in. x 9 1/4 in. x 17 in. | Way stations on A.C. train dispatching and message circuits when condensers are desired in the selector circuit. |
| 160AR    | Box equipped with:<br>1 No. 60AP Selector.<br>1 No. 60C Ringer.<br>2 No. 26A Gongs.<br>2 No. 21BA Condensers.<br>2 No. 51F Retardation Coils.                                                      | 6 1/2 in. x 9 1/4 in. x 17 in. | Same as 160AC except it is used when selectors are operated through repeating coils.                             |
| 160BC    | Box equipped with:<br>1 No. 60BP Selector.<br>1 No. 60C Ringer.<br>2 No. 26A Gongs.<br>1 No. 21AA Condenser.<br>1 No. 21AL Condenser.<br>2 No. 21BA Condensers.<br>2 No. 51F Retardation Coils.    | 6 1/2 in. x 9 1/4 in. x 17 in. | Way stations on A.C. circuits.                                                                                   |
| 160BR    | Box equipped with:<br>1 No. 60BP Selector.<br>1 No. 60C Ringer.<br>2 No. 26A Gongs.<br>2 No. 21BA Condensers.<br>2 No. 51F Retardation Coils.                                                      | 6 1/2 in. x 9 1/4 in. x 17 in. | Same as 160BC except it is used when selectors are operated through repeating coils.                             |
| 161A     | Box equipped with:<br>1 No. 60AP Selector.<br>1 No. 47A Repeating Coil.<br>2 No. 21AB Condensers.<br>1 No. 21U Condenser.<br>2 No. 51F Retardation Coils.<br>1 No. 60C Ringer.<br>2 No. 26A Gongs. | 6 1/2 in. x 9 1/4 in. x 17 in. | Way stations in intercall circuits with No. 61A Selector Apparatus Case and No. 61A Selector Key.                |



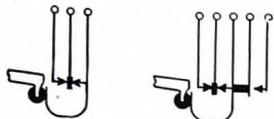
No. 140AG No. 143AA  
Switchhooks



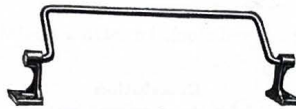
No. 1B Foot  
Switch



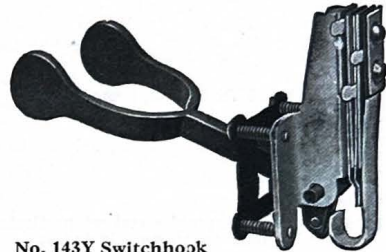
No. 1A Booth Switch



No. 140S No. 140W  
Nos. 143J, Y & AE No. 143AB  
Switchhooks



No. 1A Foot Switch  
Attachment



No. 143Y Switchhook

Code  
No.  
1A

Description  
For disconnecting siding telephone located in a booth, from the line when booth is locked.  
Operates when hasp is placed over the staple and held in place by padlock.

Code  
No.

1B

Springs  
Makes one contact.

3B

Makes two and breaks one contact.

3C

Makes three and breaks two contacts.

3D

Makes four and breaks two contacts.

### Foot Switches

Used

In dispatcher's telephone set.  
In way station telephone sets.  
In way station telephone sets with No. 501B Desk Set Boxes.  
In towers with 501B Desk Set Boxes and 6033A Amplifier.

Code  
No.

1A

Length,  
Ins.

1B

2A

12  
24  
23

### Foot Switch Attachments

Use and Description

With all types foot switches.  
With all types foot switches.

A 3/4 inch black enamelled conduit equipped with a 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.

### Knife Switches

Porcelain Base 25 Amperes Front Connection

Code  
No.

709

710

Type  
D.P.S.T.  
D.P.D.T.

Size, Ins.  
2 x 2 5/8  
2 5/8 x 3 1/8

Used In

Selector apparatus cases.  
Switching and testing panels.

### Switchhooks

Code No.

140S

140W

140AG

143J

143Y

143AA

143AB

143AE

Description  
Black finished, self contained switchhook. See illustration for spring arrangement.  
Black finished, self contained switchhook. See illustration for spring arrangement.  
Black finished, self contained switchhook. See illustration for spring arrangement.  
Same as No. 140S.  
Same as No. 140S.  
Black finished self contained switchhook. See illustration for spring arrangement.  
Same as No. 140W.  
Same as No. 140Y except that the hook is designed for use with the head band type of receiver.

### Push Buttons

Code  
No.

1003A

1006A

1013A

Description  
Breaks one and makes two contacts.

Breaks one and makes one contact.

One break before make and one break before two make contacts are operated.

Used In

Nos. 1293AD, AE, AK, AL, 1317W, AD  
AE, AW and 1336F Telephone Sets.  
No. 1317BA Telephone Set.  
No. 1317BU Telephone Set.



## Western Electric TELEPHONE SETS



No. 1278-G Telephone Set



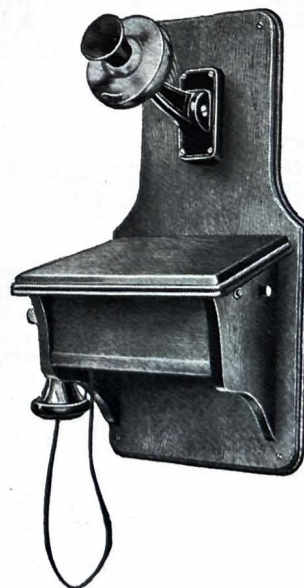
No. 1293-AD Telephone Set



No. 1305-AC Telephone Set

NOTE: Batteries are not supplied with telephone sets and should be ordered separately.

| Code No.                                                                                                                                                            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                     |                                                                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1278G</b>                                                                                                                                                        | Weatherproof metal set particularly adapted for street railway service. Five-bar A.C. generator and 1000 ohm unbiased ringer. Includes: <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top;">               1 No. 48C Generator.<br/>               1 No. 25E Repeating Coil.<br/>               1 No. 29 Induction Coil.<br/>               2 No. 1 Protector Blocks.<br/>               2 No. 2 Protector Blocks.<br/>               2 No. 3 Protector Micas.             </td><td style="vertical-align: top;">               2 500 volt, 1 ampere Fuses.<br/>               1 No. 5-B Lock.<br/>               1 door switch for opening circuit when door is closed.<br/>               1 No. 51AG Ringer.<br/>               1 No. 1001H Hand Set.<br/>               2 Blue Bell dry cells furnished only when ordered.             </td></tr> </table>                                               | 1 No. 48C Generator.<br>1 No. 25E Repeating Coil.<br>1 No. 29 Induction Coil.<br>2 No. 1 Protector Blocks.<br>2 No. 2 Protector Blocks.<br>2 No. 3 Protector Micas. | 2 500 volt, 1 ampere Fuses.<br>1 No. 5-B Lock.<br>1 door switch for opening circuit when door is closed.<br>1 No. 51AG Ringer.<br>1 No. 1001H Hand Set.<br>2 Blue Bell dry cells furnished only when ordered. |
| 1 No. 48C Generator.<br>1 No. 25E Repeating Coil.<br>1 No. 29 Induction Coil.<br>2 No. 1 Protector Blocks.<br>2 No. 2 Protector Blocks.<br>2 No. 3 Protector Micas. | 2 500 volt, 1 ampere Fuses.<br>1 No. 5-B Lock.<br>1 door switch for opening circuit when door is closed.<br>1 No. 51AG Ringer.<br>1 No. 1001H Hand Set.<br>2 Blue Bell dry cells furnished only when ordered.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                     |                                                                                                                                                                                                               |
| <b>1278H</b>                                                                                                                                                        | Same as No. 1278G, excepting a hasp and staple are substituted for the No. 5-B Lock so that standard switch locks may be used.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                     |                                                                                                                                                                                                               |
| <b>1293AD</b>                                                                                                                                                       | Small wall telephone set, having the battery mounted separately. Provided with high efficiency transmission circuit. For use as siding telephone on train dispatching circuits. Employs push button for use when talking. Contains: <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top;">               1 No. 4BG Ringer.<br/>               1 No. 21AA Condenser.<br/>               1 No. 29 Induction Coil.<br/>               1 No. 51A Retardation Coil.<br/>               1 No. 1003A Push Button for <math>\frac{3}{8}</math> in. mounting.             </td><td style="vertical-align: top;">               1 No. 143AA Switch Hook for <math>\frac{13}{16}</math> in. mounting.<br/>               1 No. 3E Transmitter Bracket.<br/>               1 No. 508W Receiver with 2 ft. No. 446 Cord.<br/>               1 No. 284W Transmitter.             </td></tr> </table> 2 No. 329 Cords, 6 in. | 1 No. 4BG Ringer.<br>1 No. 21AA Condenser.<br>1 No. 29 Induction Coil.<br>1 No. 51A Retardation Coil.<br>1 No. 1003A Push Button for $\frac{3}{8}$ in. mounting.    | 1 No. 143AA Switch Hook for $\frac{13}{16}$ in. mounting.<br>1 No. 3E Transmitter Bracket.<br>1 No. 508W Receiver with 2 ft. No. 446 Cord.<br>1 No. 284W Transmitter.                                         |
| 1 No. 4BG Ringer.<br>1 No. 21AA Condenser.<br>1 No. 29 Induction Coil.<br>1 No. 51A Retardation Coil.<br>1 No. 1003A Push Button for $\frac{3}{8}$ in. mounting.    | 1 No. 143AA Switch Hook for $\frac{13}{16}$ in. mounting.<br>1 No. 3E Transmitter Bracket.<br>1 No. 508W Receiver with 2 ft. No. 446 Cord.<br>1 No. 284W Transmitter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                     |                                                                                                                                                                                                               |
| <b>293AE</b>                                                                                                                                                        | For use on sidings. Contains: <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top;">               1 No. 284W Transmitter.<br/>               1 No. 186W Receiver.<br/>               1 No. 546 Cord, 2' long.<br/>               1 No. 4BG Ringer.<br/>               1 No. 21AA Condenser.<br/>               1 No. 143A Switch Hook.             </td><td style="vertical-align: top;">               1 No. 29 Induction Coil.<br/>               2 No. 329 Transmitter Cords, 6' long.<br/>               1 No. 1003A Push Button.<br/>               1 No. 51A Retardation Coil.<br/>               1 No. 3E Transmitter Bracket.             </td></tr> </table>                                                                                                                                                                                                                                        | 1 No. 284W Transmitter.<br>1 No. 186W Receiver.<br>1 No. 546 Cord, 2' long.<br>1 No. 4BG Ringer.<br>1 No. 21AA Condenser.<br>1 No. 143A Switch Hook.                | 1 No. 29 Induction Coil.<br>2 No. 329 Transmitter Cords, 6' long.<br>1 No. 1003A Push Button.<br>1 No. 51A Retardation Coil.<br>1 No. 3E Transmitter Bracket.                                                 |
| 1 No. 284W Transmitter.<br>1 No. 186W Receiver.<br>1 No. 546 Cord, 2' long.<br>1 No. 4BG Ringer.<br>1 No. 21AA Condenser.<br>1 No. 143A Switch Hook.                | 1 No. 29 Induction Coil.<br>2 No. 329 Transmitter Cords, 6' long.<br>1 No. 1003A Push Button.<br>1 No. 51A Retardation Coil.<br>1 No. 3E Transmitter Bracket.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                     |                                                                                                                                                                                                               |
| <b>1293AK</b>                                                                                                                                                       | Same as the No. 1293AD, less ringer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                     |                                                                                                                                                                                                               |
| <b>1293AL</b>                                                                                                                                                       | Same as the No. 1293AE, less ringer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                     |                                                                                                                                                                                                               |
| <b>1293BC</b>                                                                                                                                                       | Black finished wall type telephone for use in train dispatching circuits with central battery. Contains: <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top;">               1 No. 3E Transmitter Bracket.<br/>               1 No. 21AL Condenser.<br/>               1 No. 42 Induction Coil.<br/>               1 No. 1003A Push Button.<br/>               1 No. 143AE Switch Hook.             </td><td style="vertical-align: top;">               2 No. 547 Cords, 6' long.<br/>               1 No. 186W Receiver.<br/>               1 No. 349BW Transmitter.<br/>               1 No. 546 Cord, 2' long.             </td></tr> </table>                                                                                                                                                                                                                                                           | 1 No. 3E Transmitter Bracket.<br>1 No. 21AL Condenser.<br>1 No. 42 Induction Coil.<br>1 No. 1003A Push Button.<br>1 No. 143AE Switch Hook.                          | 2 No. 547 Cords, 6' long.<br>1 No. 186W Receiver.<br>1 No. 349BW Transmitter.<br>1 No. 546 Cord, 2' long.                                                                                                     |
| 1 No. 3E Transmitter Bracket.<br>1 No. 21AL Condenser.<br>1 No. 42 Induction Coil.<br>1 No. 1003A Push Button.<br>1 No. 143AE Switch Hook.                          | 2 No. 547 Cords, 6' long.<br>1 No. 186W Receiver.<br>1 No. 349BW Transmitter.<br>1 No. 546 Cord, 2' long.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                     |                                                                                                                                                                                                               |
| <b>1305AC</b>                                                                                                                                                       | Small, moistureproof, wall type telephone, having a transmitter bracket and switch hook with black finish. Consists of: <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top;">               1 No. 45BG Ringer.<br/>               1 No. 48S Generator.<br/>               1 No. 3E Transmitter Bracket.<br/>               1 No. 143Y Switch Hook for <math>\frac{13}{16}</math> in.             </td><td style="vertical-align: top;">               1 No. 144AW Receiver.<br/>               1 350BW Transmitter.<br/>               1 special No. 446 Cord, 2½ ft.<br/>               2 No. 385 Cords, 7 in.             </td></tr> </table> 1 special induction coil (D-757).<br>Arranged for but not equipped with No. 21 type condensers.                                                                                                                                                              | 1 No. 45BG Ringer.<br>1 No. 48S Generator.<br>1 No. 3E Transmitter Bracket.<br>1 No. 143Y Switch Hook for $\frac{13}{16}$ in.                                       | 1 No. 144AW Receiver.<br>1 350BW Transmitter.<br>1 special No. 446 Cord, 2½ ft.<br>2 No. 385 Cords, 7 in.                                                                                                     |
| 1 No. 45BG Ringer.<br>1 No. 48S Generator.<br>1 No. 3E Transmitter Bracket.<br>1 No. 143Y Switch Hook for $\frac{13}{16}$ in.                                       | 1 No. 144AW Receiver.<br>1 350BW Transmitter.<br>1 special No. 446 Cord, 2½ ft.<br>2 No. 385 Cords, 7 in.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                     |                                                                                                                                                                                                               |
| <b>1312A</b>                                                                                                                                                        | Standard wall type composite telephone set. Contains: <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top;">               1 No. 12G Retardation coil.<br/>               1 No. 21D Condenser.<br/>               1 No. 21U Condenser.<br/>               1 No. 21H Condenser.<br/>               1 No. 143AB Switch Hook.<br/>               1 Spec. No. 390B Push Button.             </td><td style="vertical-align: top;">               1 No. 1C Howler.<br/>               1 No. 5 Induction Coil.<br/>               1 Interrupter P-101495.<br/>               1 2½ ft. No. 521 Receiver Cord.<br/>               1 No. 286W Transmitter.<br/>               1 No. 144AW Receiver.             </td></tr> </table>                                                                                                                                                                                    | 1 No. 12G Retardation coil.<br>1 No. 21D Condenser.<br>1 No. 21U Condenser.<br>1 No. 21H Condenser.<br>1 No. 143AB Switch Hook.<br>1 Spec. No. 390B Push Button.    | 1 No. 1C Howler.<br>1 No. 5 Induction Coil.<br>1 Interrupter P-101495.<br>1 2½ ft. No. 521 Receiver Cord.<br>1 No. 286W Transmitter.<br>1 No. 144AW Receiver.                                                 |
| 1 No. 12G Retardation coil.<br>1 No. 21D Condenser.<br>1 No. 21U Condenser.<br>1 No. 21H Condenser.<br>1 No. 143AB Switch Hook.<br>1 Spec. No. 390B Push Button.    | 1 No. 1C Howler.<br>1 No. 5 Induction Coil.<br>1 Interrupter P-101495.<br>1 2½ ft. No. 521 Receiver Cord.<br>1 No. 286W Transmitter.<br>1 No. 144AW Receiver.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                     |                                                                                                                                                                                                               |
| <b>6023A</b>                                                                                                                                                        | Desk type composite telephone. Consists of: <table border="0" style="width: 100%;"> <tr> <td style="vertical-align: top;">               1 No. 311A Desk Set Box.<br/>               1 No. 1040U Desk Stand.             </td><td style="vertical-align: top;">               1 No. 8D Connecting Block.<br/>               1 No. 465C Key.             </td></tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1 No. 311A Desk Set Box.<br>1 No. 1040U Desk Stand.                                                                                                                 | 1 No. 8D Connecting Block.<br>1 No. 465C Key.                                                                                                                                                                 |
| 1 No. 311A Desk Set Box.<br>1 No. 1040U Desk Stand.                                                                                                                 | 1 No. 8D Connecting Block.<br>1 No. 465C Key.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                     |                                                                                                                                                                                                               |



No. 1312-A Telephone Set



# TELEPHONE SETS

(Continued)



No. 1317 Telephone Set (Closed)



No. 1317 Telephone Set (Open)

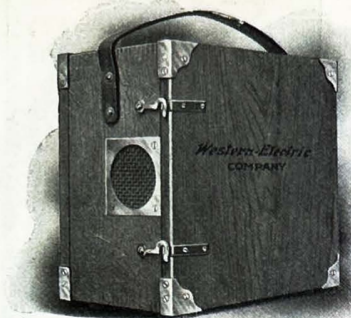
| Code No.      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>1317P</b>  | Local battery wall Telephone for heavily loaded lines where code ringing is employed. Contains:<br>1 No. 323BW Transmitter.<br>1 No. 143AW Receiver.<br>1 No. 521 Receiver Cord, 2½ feet.<br>1 No. 547 Transmitter Cord. } 2-T1A<br>1 No. 548 Transmitter Cord.<br>1 No. 13 Induction Coil.<br>1 No. 8A Transmitter Bracket.                                                                                                                                                                                    |
| <b>1317S</b>  | Same as No. 1317P, excepting that a No. 21W condenser is wired in series with the receiver.                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>1317W</b>  | 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:<br>1 No. 48A Generator.<br>1 No. 38BG Ringer.<br>1 No. 21AA Condenser.<br>1 No. 29 Induction Coil.<br>1 No. 51A Retardation Coil.<br>1 No. 143AA Switch Hook.<br>1 No. 8A Transmitter Bracket. |
| <b>1317AD</b> | Same as No. 1317W Telephone Set, excepting No. 38BG Ringer is omitted. Can be equipped with No. 38 Type Ringer if desired.                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>1317AE</b> | Same as No. 1317AW Telephone Set, excepting No. 38BG Ringer is omitted and set is equipped with head receiver.                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>1317AH</b> | Wall type local battery telephone for moderately loaded line where code ringing is employed. 3 bar A.C. generator and 1000-ohm unbiased ringer. Contains:<br>1 No. 22A Generator.<br>1 No. 38AG Ringer.<br>1 No. 143Y Switch Hook.<br>1 No. 13 Induction Coil.<br>1 No. 8A Transmitter Bracket.                                                                                                                                                                                                                 |
| <b>1317AW</b> | Same as No. 1317W, excepting that it is equipped with:<br>1 No. 143AC Switch Hook for ½ in. mounting.<br>1 No. 186W Head Receiver.                                                                                                                                                                                                                                                                                                                                                                              |
| <b>1317BK</b> | For use on telephone lines exposed to high tension wire. metal parts arranged for grounding. Contains:<br>1 No. 353BW Transmitter.<br>1 No. 144AW Receiver.<br>1 No. 521 Cord.<br>2 No. 540 Cords.                                                                                                                                                                                                                                                                                                              |
| <b>1317BU</b> | Contains:<br>1 No. 42 Induction Coil.<br>1 No. 21AL Condenser.<br>1 No. 143AE Switch Hook for ½ in. woodwork.<br>1 No. 1013A Push Button for ⅝ in. woodwork.<br>1 No. 48A Generator.<br>1 No. 8A Transmitter Bracket.                                                                                                                                                                                                                                                                                           |
| <b>1317CN</b> | For use on medium loaded code ringing lines. Contains:<br>1 No. 143Y Switch Hook for ½ in. woodwork.<br>1 No. 13 Induction Coil.<br>1 No. 8A Transmitter Bracket.<br>1 No. 53FG Ringer.<br>1 No. 50F Generator.<br>1 No. 323BW Transmitter.                                                                                                                                                                                                                                                                     |
| <b>1317CR</b> | Same as No. 1317CN, except equipped with 1 No. 21W Condenser in receiver circuit.                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>1317CP</b> | Same as No. 1317CR, except furnished with No. 53BG Ringer. For use on heavy loaded lines, code ringing.                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>1317CS</b> | Same as No. 1317CP, except equipped with No. 21W Condenser in receiver circuit.                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>1317CG</b> | Same as No. 1317CN, except furnished with No. 53AG Ringer. For use on light loaded lines, code ringing.                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>1317DU</b> | Contains:<br>1 No. 42 Induction Coil.<br>1 No. 21AL Condenser.<br>1 No. 143AE Switch Hook for ½ in. woodwork.<br>1 No. 1013A Push Button for ⅝ in. woodwork.<br>1 No. 8A Transmitter Bracket.                                                                                                                                                                                                                                                                                                                   |
|               | 1 No. 38BG Ringer.<br>1 No. 48A Generator.<br>1 No. 143Y Switch Hook.<br>2 No. 540 Cords.<br>1 No. 8A Transmitter Bracket.                                                                                                                                                                                                                                                                                                                                                                                      |
|               | 1 No. 1003A Push Button for ⅝ inch woodwork.<br>1 2 foot No. 446 Receiver Cord.<br>1 No. 349BW Transmitter.<br>1 No. 508W Receiver.<br>1 No. 547 Cord. } 2-T1A<br>1 No. 548 Cord. }<br>2 No. 540 Cords.                                                                                                                                                                                                                                                                                                         |
|               | 1 No. 546 Receiver Cord.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|               | Ringer is omitted and generator handle is insulated. All                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|               | 1 No. 21 Condenser.<br>1 No. 13 Induction Coil.<br>1 Spec. 48R Generator (D 13730).<br>1 Switch Hook D 19513 for ½ in. woodwork.                                                                                                                                                                                                                                                                                                                                                                                |
|               | 1 No. 349BW Transmitter.<br>1 No. 189W Receiver.<br>1 No. 546 Cord 2 ft.<br>1 No. 547 Cord 6 in. } 2-T1A<br>1 No. 548 Cord 6 in. }<br>2 No. 540 Cords.                                                                                                                                                                                                                                                                                                                                                          |
|               | 1 No. 143AW Receiver.<br>1 No. 521 Cord 2½ ft.<br>1 No. 540 Cord.<br>1 No. 547 Cord 6 in. } 2-T1A<br>1 No. 548 Cord 6 in. }                                                                                                                                                                                                                                                                                                                                                                                     |
|               | 1 No. 349BW Transmitter.<br>1 No. 189W Receiver.<br>1 No. 546 Cord 2 ft.<br>1 No. 547 Cord 6 in. } 2-T1A<br>1 No. 548 Cord 6 in. }                                                                                                                                                                                                                                                                                                                                                                              |
|               | 2 No. 540 Cords.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |



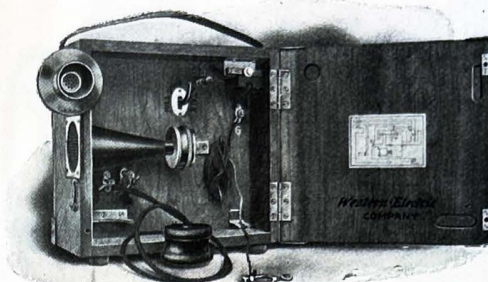
## Western Electric

### TELEPHONE SETS

(Continued)



No. 1314-A Portable Set



No. 1314-A Set Open (front view)

### Portable Telephone Sets

**Code No.**  
**1314A<sub>J</sub>**

Portable composite telephone set. Contains:

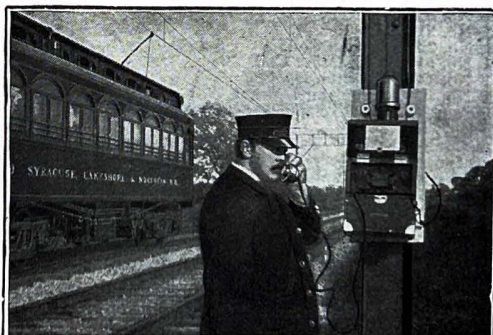
- 1 No. 12M Retardation Coil.
- 1 No. 140F Switch Hook.
- 1 Spec. No. 390B Push Button.
- 1 No. 21D Condenser.
- 1 No. 21U Condenser.
- 1 No. 21H Condenser.
- 1 No. 1B Howler.
- 1 No. 3B Binding Post.

- 3 No. 3C Binding Posts (special).
- 1 3 ft. No. 384 Cord.
- 1 5½ in. No. 179 Cord.
- 1 10 ft. No. 267 Cord with rail clamp.
- 1 No. 5 Induction Coil.
- 1 Interrupter P-101495.
- 1 No. 228W Transmitter.
- 1 No. 133W Receiver.

Arranged for but not equipped with 4 Standard "Blue Bell" dry batteries unless specified in order. The weight of the set complete is about 26 lbs. Approximate dimensions 11½ x 12 x 7½ inches. No. 4 Line Pole used but should be ordered separately.



No. 1330-E Telephone Set



No. 1330-F Portable Set

**Code No.**  
**1330E**

Portable railway magneto telephone set. For use on long heavily loaded lines. Used with Nos. 3 or 5 Line Poles. 5 bar A.C. generator and 2500 ohm biased ringer. Contains:

- 1 Spec. No. 48A Generator.
- 1 No. 32BG Ringer.
- 1 No. 21F Condenser.
- 1 No. 29 Induction Coil.
- 1 No. 1001C Hand Set.

- 1 No. 540 Cord.
- 2 Spec. No. 2C Binding Posts when specified in order.
- 2 Blue Bell dry cells furnished when specified in the order.

The weight of the set complete is about 28 lbs. The size is 12½ x 13½ x 5¼ inches.

**1330F**

Same as No. 1330E Telephone Set, except that it is equipped with:

- 1 No. 146 Plug and one 6 ft. No. 509 Cord for making connection with line through No. 186 Jack.
- Condenser furnished only when specified.

**1331E**

A local battery magneto portable railroad telephone set for lightly loaded lines. For use with Nos. 3 or 5 Line Poles 3 bar A.C. generator and 2500 ohm buzzer. Contains:

- 1 No. 3B 2500 ohm Buzzer.
- 1 No. 29 Induction Coil.
- 1 No. 22A Generator.
- 1 No. 21F Condenser.

- 1 No. 1001C Hand Set.
- 2 No. 2C Binding Posts when specified in order.
- 2 No. 790 Eveready dry batteries furnished only when specified in order.

The weight of the set complete is about 17 lbs. The size is 11½ x 10½ x 4¾ inches.

**1331F**

Same as No. 1331E telephone set, excepting that it is equipped with:

- 1 No. 146 Plug.
- 1 No. 509 Cord 6 ft. long, for making connection to the line through 186 or 187 Jacks.
- 1 No. 21F Condenser.
- 2 No. 790 Batteries

} If specified on order.

## TELEPHONE SETS (Continued)



No. 1332-A Portable Set



No. 1375-B Portable Set

### Portable Telephone Sets

| Code No. | Description                                                                                                                                                                                                                                                                                                                                                                                                               |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1332A    | Telephone Set in portable leather case with a shoulder carrying strap for use in connection with No. 3 or 5 Line Poles on train dispatching circuits. Contains:<br>1 No. 29 Induction Coil.<br>1 No. 21BW Condenser.<br>2 No. 2C Binding Posts.<br>The complete set weighs approximately 6 lbs. The size is $9\frac{5}{16}$ x $7\frac{7}{8}$ x 4 inches.                                                                  |
| 1332E    | Same as No. 1332A, excepting that it is equipped with a No. 3B 2500 ohm Buzzer.                                                                                                                                                                                                                                                                                                                                           |
| 1375B    | Telephone Set in portable leather case with adjustable hand or shoulder carrying strap. Apparatus moisture-proofed and mounted on an aluminum frame. Contains:<br>1 No. 1001H Hand Set.<br>1 Spl. No. 31 Induction Coil (D-17624)<br>1 No. 29E Generator.<br>Complete set weighs approximately $10\frac{1}{2}$ lbs.<br>The size is $9\frac{3}{4}$ inches high, $3\frac{3}{4}$ inches deep and $6\frac{7}{8}$ inches wide. |
| 1398A    | Local battery, portable, moisture-proof, magneto Telephone Set enclosed in wooden case and equipped with a hand or shoulder strap. Contains:<br>1 No. 29E Generator.<br>1 No. 31 Induction Coil (D-17624).<br>1 buzzer (D-21141).<br>1 No. 21K Condenser.<br>1 No. 703 Eveready battery.<br>1 No. 1001H Hand Set.                                                                                                         |



No. 1336-F Closed



No. 1336-F Open

### Weatherproof Telephone Sets

|       |                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                 |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1336F | An iron case set 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:<br>1 No. 48C Generator.<br>1 No. 143K Switch Hook.<br>1 No. 45BG Ringer.<br>1 No. 32 Induction Coil.<br>1 No. 51B Retardation Coil.<br>1 No. 21AA Condenser.<br>1 Special No. 1002A Push Button. | 1 No. 292W Transmitter<br>1 No. 508W Receiver.<br>2 No. 385 Transmitter Cords.<br>1 No. 384 Receiver Cord.<br>1 No. 540 Cord.<br>$3\frac{1}{2}$ x $\frac{3}{4}$ x $2\frac{1}{4}$ inch leather cable holders.<br>2 Blue Bell dry cells (when specified in order) |
| 1336H | Circuits are arranged so that it is unnecessary to use a push button for talking. Contains:<br>1 No. 144AW Receiver.<br>1 No. 292W Transmitter.<br>1 No. 540 Cord.<br>1 No. 384 Cord, $10\frac{1}{2}$ ins.<br>2 No. 385 Cords, 7 ins.                                                                                                                                                                                               | 1 No. 48C Generator.<br>1 No. 45BG Ringer.<br>1 No. 21AA Condenser.<br>1 Special No. 30 Induction Coil.<br>1 No. 143AA Switch Hook.                                                                                                                             |



## LOUD SPEAKING TELEPHONE OUTFITS

## No. 12A Loud Speaking Telephone Outfit

The No. 12A Loud Speaking Telephone Outfit is intended for use in train dispatching circuits at Dispatchers' Stations and consists of:

1 No. 519A Subscribers Set  
1 No. 216A Vacuum Tube

1 No. 543W Receiver

## No. 519A SUBSCRIBERS SET

The No. 519A subscribers set consists of an oak cabinet  $9\frac{1}{4}$  inches wide,  $16\frac{3}{4}$  inches high and  $6\frac{3}{8}$  inches deep in which is mounted the following apparatus (see Fig. 1):

1 No. 203B Vacuum Tube Socket  
1 No. 19DP Resistance  
1 No. 19DR Resistance  
1 No. 19DM Resistance  
1 No. 34A Resistance  
1 No. 100A Retardation Coil  
1 No. 43 Induction Coil

1 No. 44 Induction Coil  
1 No. 218F Input Transformer  
2 No. 21AK Condensers  
2 No. 21F Condensers  
1 No. 21D Condenser  
1 No. 272A Key

The No. 519A subscribers set functions similarly to the No. 502A subscribers set and in addition is equipped with one stage of amplification which is operated on a direct current power supply. This set operates with a No. 543W Loud Speaking Receiver.

The set is provided with a key to switch in either the loud speaker or a regular dispatcher's head receiver. The amplification is such that satisfactory volume may be obtained over a 200 or 300-mile line (open wire).

## DIRECTIONS

Make connections to line, foot switch, jack box, transmitter battery and amplifier "A" and "B" current supplies as indicated. Adjust current through filament of tube to approximate .95 amperes by means of R-3 and R-4. This current may be measured on an ammeter connected across terminals 13 and 14 with the strap between these two removed. After adjusting current, strap should be replaced. To adjust for loudness connect flexible leads from terminals 20 and 22 across different sections of R-1 until desired volume is obtained. Connect flexible lead from terminal 21 across enough of R-1 so that when foot switch is operated to talk, the set does not sing and the volume is not too great.

## No. 216A VACUUM TUBE

A No. 216A Vacuum Tube is required for this set but is not a part of it. The heating current for the filament of the tube may be derived from either 6 volt A.C. or D.C. source of energy. The tubes are sold only with the 12A Loud Speaking Telephone Outfit or as a replacing part.

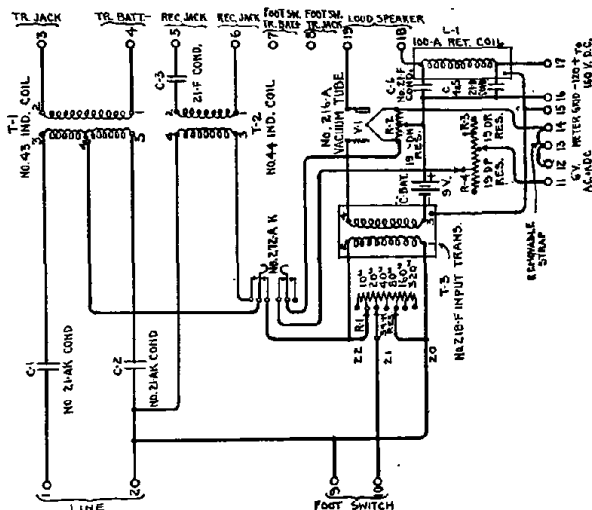


Fig. 1 Schematic of No. 519A Subscribers Set

## No. 6033A Amplifier.

The No. 6033A Amplifier is used in conjunction with a No. 501-B Desk Set Box at Way Stations and with a No. 502-B Desk Set Box at Dispatchers' Stations. Figure 2 shows the wiring of this amplifier installed at a Dispatcher's Station.

## No. 6040A Amplifier.

The No. 6040A Amplifier being electrically the same as the No. 6033A except for the frequency of the power source required for its operation may be used under otherwise identical conditions.

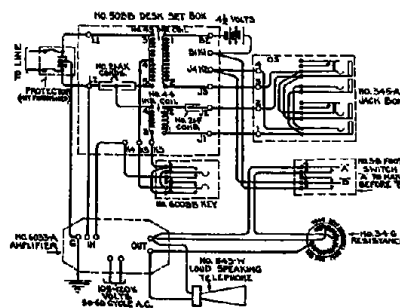
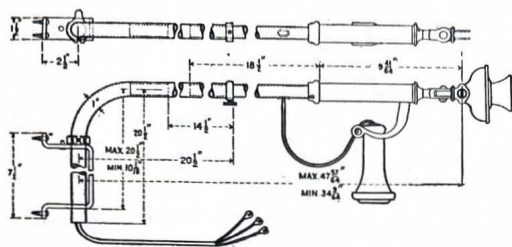


Fig. 2. Wiring Diagram of Loud Speaking Telephone Equipment

## TELEPHONE ARMS



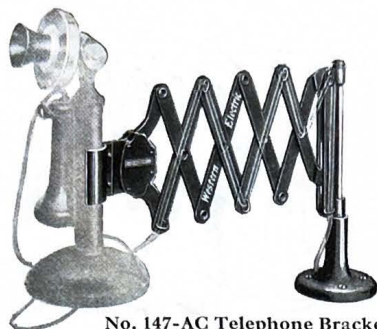
No. 1020-CC Telephone Arm

No. 1048  
DD Telephone Arm

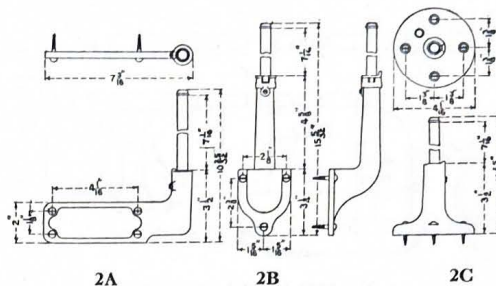
## Telephone Arms

| Code No. | Description                                                                                                                                                     |                                                                                                                                                                                  |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1020CC   | For regular local or central battery service. Used on flat top desks. Includes:                                                                                 |                                                                                                                                                                                  |
|          | 1 No. 20CC Transmitter Arm                                                                                                                                      | 1 No. D3A, 8 ft. Cord                                                                                                                                                            |
|          | 1 No. 323W Transmitter                                                                                                                                          | 1 No. R2A, 2 1/2 ft. Cord                                                                                                                                                        |
|          | 1 No. 143AW Receiver                                                                                                                                            | 2 No. T1A, 12 inch Cords                                                                                                                                                         |
| 1020C    | For way station use on train dispatching circuits. Includes:                                                                                                    |                                                                                                                                                                                  |
|          | 1 No. 20C Transmitter Arm                                                                                                                                       | 1 No. 409 Cord, 8 ft.                                                                                                                                                            |
|          | 3 No. 284W Transmitters                                                                                                                                         | 1 No. 554 Cord, 2 1/2 ft.                                                                                                                                                        |
|          | 1 No. 186W Receiver                                                                                                                                             | 1 No. 426 Cord, 12 in.                                                                                                                                                           |
|          |                                                                                                                                                                 | 1 No. 427 Cord, 12 in.                                                                                                                                                           |
| 1020E    | Includes:                                                                                                                                                       |                                                                                                                                                                                  |
|          | 1 No. 20E Transmitter Arm                                                                                                                                       |                                                                                                                                                                                  |
|          | 1 No. 284W Transmitter                                                                                                                                          | 1 No. 416 Cord, 8 ft.                                                                                                                                                            |
|          | 1 No. 186W Receiver                                                                                                                                             | 2 No. 427 Cords, 12 in.                                                                                                                                                          |
|          | 1 No. R2U Cord, 2 1/2 ft.                                                                                                                                       |                                                                                                                                                                                  |
| 1048DA   | Adjustable folding arm, having telephone set incorporated in it. Mounts on side of a roll top desk. Includes:                                                   |                                                                                                                                                                                  |
|          | 1 No. 148DA Transmitter Arm                                                                                                                                     |                                                                                                                                                                                  |
|          | 1 No. 280W Transmitter                                                                                                                                          | 1 No. 554 Cord, 2 1/2 ft.                                                                                                                                                        |
|          | 1 No. 186W Receiver                                                                                                                                             | 2 No. 427 Cords, 9 1/2 in. } 2-427                                                                                                                                               |
|          | 1 No. 409 Cord, 8 ft.                                                                                                                                           |                                                                                                                                                                                  |
| 1048DB   | Same as 1048DA, except mounts on sides of flat top desk or on wall.                                                                                             |                                                                                                                                                                                  |
| 1048DC   | Same as No. 1048DA, except mounts on top of flat top desk.                                                                                                      |                                                                                                                                                                                  |
| 1048DD   | Same as No. 1048DA except mounts on wall in way stations where it is desired to place a flat top desk against the wall.                                         |                                                                                                                                                                                  |
| 1048GA   | Equipped with a No. 280W Transmitter, No. 186W Receiver, 416 Cord, 8 ft. No. 554 Cord, 2 1/2 ft. No. 330 Cord, 9 7/8 in. long. Mounts on side of roll top desk. | Train dispatching at way stations with a desk set box employing a four conductor cord and an induction coil having the primary and secondary windings insulated from each other. |
| 1048GB   | Same as No. 1048GA except mounts on wall or side of flat top desk.                                                                                              |                                                                                                                                                                                  |
| 1048GC   | Same as No. 1048GA except mounts on top of flat top desk.                                                                                                       |                                                                                                                                                                                  |
| 1048GD   | Same as No. 1048GA except mounts on wall in way stations where it is desired to place a flat top desk against the wall.                                         |                                                                                                                                                                                  |
| 1120C    | Transmitter arm same as the No. 1020C except that the 189W Receiver is used instead of the 186W.                                                                | Used at way stations with the 501A and B Desk Set Boxes.                                                                                                                         |
| 1148DA   | Same as No. 1048DA except that it is equipped with low wound No. 189W Receiver.                                                                                 | Used with No. 501A and No. 501B Desk Set Boxes.                                                                                                                                  |
| 1148DB   | Same as No. 1048DB except that it is equipped with low wound No. 189W Receiver.                                                                                 | Used with No. 501A and No. 501B Desk Set Boxes.                                                                                                                                  |
| 1148DC   | Same as No. 1048DC except that it is equipped with low wound No. 189W Receiver.                                                                                 | Used with No. 501A and No. 501B Desk Set Boxes.                                                                                                                                  |
| 1148DD   | Same as No. 1048DD except that it is equipped with low wound No. 189W Receiver.                                                                                 | Used with No. 501A and No. 501B Desk Set Boxes.                                                                                                                                  |

## TELEPHONE BRACKETS



No. 147-AC Telephone Bracket



Telephone Arm Brackets

## Telephone Brackets

A strong collapsible arm arranged with a clamping device to hold a desk telephone stand.  
 Length of arm closed, 8 $\frac{1}{4}$  inches.  
 Length of arm extended, 23 inches.

The desk stand is not included in price of arm, and must be ordered separately.

| Code No. | Description                                                                                                     | Finish       |
|----------|-----------------------------------------------------------------------------------------------------------------|--------------|
| 147AA    | For mounting on either side of a roll top desk. Consists of a No. 47A Transmitter Arm and a No. 2A Arm Bracket. | Black Enamel |
| 147AB    | For mounting on the side of a flat top desk or on the wall. Similar to 147AA except using No. 2B Arm Bracket.   | Black Enamel |
| 147AC    | For mounting on top of a flat top desk. Similar to No. 147AA except using No. 2C Arm Bracket.                   | Black Enamel |

For way station use on train dispatching circuits.

## Telephone Arm Brackets

| Code No. | Description                                                                                                           | Use                                    |
|----------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| 2A       | Consists of an iron base equipped with a steel rod about which the arm rotates. Mounts on the side of roll top desks. | Used with the 147AA Telephone Bracket. |
| 2B       | Similar to 2A except that it mounts on wall or side of flat top desk.                                                 | Used with the 147AB Telephone Bracket. |
| 2C       | Similar to 2A, except that it mounts on the top of a flat top desk.                                                   | Used with the 147AC Telephone Bracket. |

## Transmitter Brackets

| Description                                                                  | Use                                                                                                                                 |
|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| 3E For mounting insulated transmitters.                                      | Nos. 1293AD, AE, AK, AL and 1305AC Telephone Sets.<br>Nos. 1317 P, S, W, AD, AH, AW, AE, BU, CN, CP, CR, CS, and CG Telephone Sets. |
| 8A Black finish bracket, for mounting transmitters on wooden telephone sets. |                                                                                                                                     |

## TOOLS



No. 48 Tool



No. 144 Tool



No. 115 Tool



No. 145 Tool

## Tools

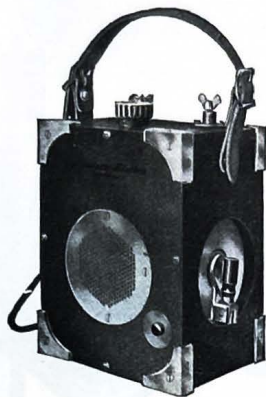
| Code No. | Description                                                                                                                                                                                               |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 48       | Used for adjusting Nos. 50A and 50B Selectors. Consists of a wrench and screw driver. Will fit $\frac{1}{4}$ inch and $\frac{1}{2}$ 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 small wire hook. |
| 144      | Used for changing No. 60A, 60B, 60AP and 60BP selectors to call different stations. Consists of a socket wrench and screw driver.                                                                         |
| 145      | Used for changing No. 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.    |



# Western Electric

## TESTING APPARATUS

83



No. 1017B Test Set



No. 1020A Test Set

### Lineman's Test Sets

#### NO. 1017 TYPE

A wooden box telephone test set equipped with a regular battery talking circuit consisting of a standard transmitter, induction coil, receiver and a special three cell dry battery unit.

Can be used either on magneto or central battery lines.

Size of case  $4\frac{13}{16} \times 6\frac{3}{32} \times 8\frac{15}{16}$  inches. Birch mahogany finish. Weight, 7 lbs.

| Code No. | Will Ring Through Ohms | Contains                                                                                                                                                                                        |
|----------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1017B    | 2500                   | 1 No. 2D Buzzer.<br>1 No. 29B Generator.<br>1 2 ft. No. 370 Cord.<br>1 No. 13 Induction Coil.                                                                                                   |
| 1017C    | 5000                   | 1 special switch.<br>3 No. 595W Receivers.<br>1 No. 266W Transmitter.<br>3 No. 3C Binding Posts.                                                                                                |
| 1017E    | 5000                   | Similar to No. 1017B except equipped with No. 29F Generator and 572 Cord.<br>Similar to the No. 1017B except equipped for use on composited lines, being provided with a No. 6000A Interrupter. |

**Note:** The above sets are furnished without the No. 703 Eveready Tungsten Battery unless specified in order.

### Cableman's Test Set

#### NO. 16A

Size of case,  $7\frac{1}{16} \times 5\frac{1}{16} \times 7\frac{3}{4}$  ins. with carrying strap. Oak finish with nickel trimmings.

| Code No. | Contains                                                                   | Use                                                                                                         |
|----------|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| 16A      | 1 No. 31A Condenser.<br>1 No. 13115 Switch.<br>1 special buzzer No. 12036. | 4 No. 2A Binding Posts.<br>6 Columbia dry cells Type 111*<br>A tone testing set for use in splicing cables. |

#### NO. 1020A

Size of case,  $12 \times 6\frac{3}{8} \times 10\frac{1}{4}$  inches. Birch mahogany finish. Weight,  $12\frac{1}{2}$  pounds without batteries.

|       | Contains                                                                                                                                                                                    | Use                                                                                                                                                                                                                                                                                                                          |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1020C | 1 No. 18AC Resistance.<br>1 No. 21K Condenser.<br>1 induction coil vibrator unit.<br>1 electro-magnetic interrupter.<br>1 two-point battery switch.<br>1 No. 19C Test Set (exploring coil). | 1 instruction book.<br>1 No. 189W Receiver.<br>4 "Blue Bell" dry cells*.<br>1 4 ft. No. 747 Cord.<br>1 connecting plug (186).<br>A tone testing set for use in locating shorts and grounds in cable. Interrupted current is sent over wires in trouble and the fault located by exploring coil and receiver. Replaces 1020A. |

\*Batteries not furnished unless ordered.

## Western Electric

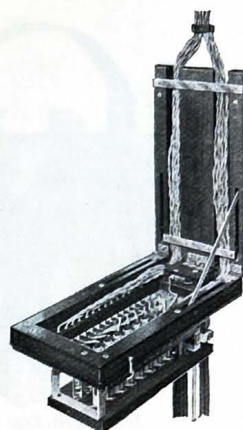
### TESTING APPARATUS



No. 2-B Test Board



No. 2-B Test Board (Cover Removed)



No. 2-B Test Board (Back Open)

### Test Boards

| Code No.                              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                                   |                  |                             |                                       |                               |                                     |                                               |  |                                                 |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------------|------------------|-----------------------------|---------------------------------------|-------------------------------|-------------------------------------|-----------------------------------------------|--|-------------------------------------------------|
| 2A                                    | A test board designed for use in train dispatching circuits. For two metallic circuits. Contains: <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">9 No. 170 Jacks.</td><td style="width: 50%;">2 No. 519 Cords (red) 2 ft. 6 in.</td></tr> <tr> <td>1 No. 272F Key.</td><td>8 No. 39B Apparatus Blanks.</td></tr> <tr> <td>4 No. 116 Plugs (one for each cord).</td><td>1 No. 6B Apparatus Blank.</td></tr> <tr> <td>2 No. 519 Cords (white) 2 ft. 6 in.</td><td></td></tr> </table>                                                                                                                 | 9 No. 170 Jacks.   | 2 No. 519 Cords (red) 2 ft. 6 in. | 1 No. 272F Key.  | 8 No. 39B Apparatus Blanks. | 4 No. 116 Plugs (one for each cord).  | 1 No. 6B Apparatus Blank.     | 2 No. 519 Cords (white) 2 ft. 6 in. |                                               |  |                                                 |
| 9 No. 170 Jacks.                      | 2 No. 519 Cords (red) 2 ft. 6 in.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                    |                                   |                  |                             |                                       |                               |                                     |                                               |  |                                                 |
| 1 No. 272F Key.                       | 8 No. 39B Apparatus Blanks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                                   |                  |                             |                                       |                               |                                     |                                               |  |                                                 |
| 4 No. 116 Plugs (one for each cord).  | 1 No. 6B Apparatus Blank.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                    |                                   |                  |                             |                                       |                               |                                     |                                               |  |                                                 |
| 2 No. 519 Cords (white) 2 ft. 6 in.   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |                                   |                  |                             |                                       |                               |                                     |                                               |  |                                                 |
| 2B                                    | A test board designed for use in train dispatching circuits. For four metallic circuits. Same as No. 2a except it is fully equipped. Contains: <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">17 No. 170 Jacks.</td><td style="width: 50%;">2 No. 519 Cords (black).</td></tr> <tr> <td>2 No. 272F Keys.</td><td>2 No. 519 Cords (red).</td></tr> <tr> <td>8 No. 116 Plugs (one for each cord).</td><td>2 No. 519 Cords (green).</td></tr> <tr> <td>2 No. 519 Cords (white) 2½ ft.</td><td></td></tr> </table>                                                                                      | 17 No. 170 Jacks.  | 2 No. 519 Cords (black).          | 2 No. 272F Keys. | 2 No. 519 Cords (red).      | 8 No. 116 Plugs (one for each cord).  | 2 No. 519 Cords (green).      | 2 No. 519 Cords (white) 2½ ft.      |                                               |  |                                                 |
| 17 No. 170 Jacks.                     | 2 No. 519 Cords (black).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                                   |                  |                             |                                       |                               |                                     |                                               |  |                                                 |
| 2 No. 272F Keys.                      | 2 No. 519 Cords (red).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                                   |                  |                             |                                       |                               |                                     |                                               |  |                                                 |
| 8 No. 116 Plugs (one for each cord).  | 2 No. 519 Cords (green).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |                                   |                  |                             |                                       |                               |                                     |                                               |  |                                                 |
| 2 No. 519 Cords (white) 2½ ft.        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |                                   |                  |                             |                                       |                               |                                     |                                               |  |                                                 |
| 3A                                    | A test board designed for train dispatching circuits. For six metallic circuits. Contains: <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">25 No. 233D Jacks.</td><td style="width: 50%;">2 No. 519 Cords (black) 3 ft.</td></tr> <tr> <td>3 No. 272F Keys.</td><td>2 No. 519 Cords (red) 3 ft.</td></tr> <tr> <td>12 No. 116 Plugs (one for each cord).</td><td>2 No. 519 Cords (green) 3 ft.</td></tr> <tr> <td>2 No. 519 Cords (white) 3 ft.</td><td>2 No. 519 Cords (red with black tracer) 3 ft.</td></tr> <tr> <td></td><td>2 No. 519 Cords (white with black tracer) 3 ft.</td></tr> </table> | 25 No. 233D Jacks. | 2 No. 519 Cords (black) 3 ft.     | 3 No. 272F Keys. | 2 No. 519 Cords (red) 3 ft. | 12 No. 116 Plugs (one for each cord). | 2 No. 519 Cords (green) 3 ft. | 2 No. 519 Cords (white) 3 ft.       | 2 No. 519 Cords (red with black tracer) 3 ft. |  | 2 No. 519 Cords (white with black tracer) 3 ft. |
| 25 No. 233D Jacks.                    | 2 No. 519 Cords (black) 3 ft.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                                   |                  |                             |                                       |                               |                                     |                                               |  |                                                 |
| 3 No. 272F Keys.                      | 2 No. 519 Cords (red) 3 ft.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                                   |                  |                             |                                       |                               |                                     |                                               |  |                                                 |
| 12 No. 116 Plugs (one for each cord). | 2 No. 519 Cords (green) 3 ft.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                                   |                  |                             |                                       |                               |                                     |                                               |  |                                                 |
| 2 No. 519 Cords (white) 3 ft.         | 2 No. 519 Cords (red with black tracer) 3 ft.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                    |                                   |                  |                             |                                       |                               |                                     |                                               |  |                                                 |
|                                       | 2 No. 519 Cords (white with black tracer) 3 ft.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |                                   |                  |                             |                                       |                               |                                     |                                               |  |                                                 |

We furnish test boards for all classes of service.

### Switching and Testing Panels

We are prepared to furnish switching and testing panels to take care of any requirements. These panels are equipped with switches and are used for testing and patching purposes on train dispatching and simplex block circuits.

Prices furnished on request.



# Western Electric TRANSMITTERS

85



No. 323BW Transmitter



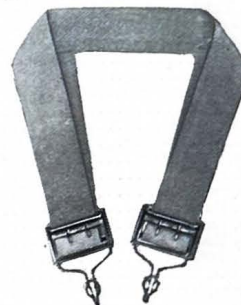
Head Telephone Set with No. 386W Transmitter



No. 285W Transmitter



No. 353BW Transmitter



No. 3A Transmitter Attachment

## Code No. Description Transmitters

|       |                                                                                                                                                                                                                                                                                                         |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 228W  | A non-insulated high resistance nickel finish transmitter without transmitter lug. It is provided with a bushing at the side and a No. 7 Button.                                                                                                                                                        |
| 244W  | An insulated high resistance nickel finish transmitter. Consists of a cylindrical brass case with a perforated metal mouth piece and an inner case. Provided with No. 16 Button.                                                                                                                        |
| 266W  | An insulated high resistance nickel finish transmitter, provided with aluminum punch cover, but without a mouth piece so it can be mounted inside box. Cords enter through brass bushing on the lower side. Equipped with No. 9 Button.                                                                 |
|       | A low resistance insulated black finish transmitter. Provided with bell and slotted lug and special No. 18 Button. Mouthpiece is reinforced.                                                                                                                                                            |
| 282W  | A low resistance insulated short arm bracket type nickel finish transmitter. Mouthpiece does not project beyond edge of writing shelf. Equipped with special No. 18 Button. Nickel finish transmitter provided with bell, slotted lug clamping bolt, reinforced mouthpiece and a special No. 18 Button. |
| 285W  | An insulated low resistance transmitter similar to the No. 244W Set, uses a special No. 16 Button. Nickel.                                                                                                                                                                                              |
| 286W  | A high resistance insulated short arm bracket type black rust-proof finish transmitter, provided with No. 7 Button.                                                                                                                                                                                     |
|       | A high resistance, insulated nickel finish bridge type transmitter. Provided with a bell, slotted lug, bolt and lock washer.                                                                                                                                                                            |
| 292W  | An insulated low resistance bridge type, moisture-proof nickel finish transmitter. Equipped with bell, and special No. 18 Button.                                                                                                                                                                       |
| 323BW | A high resistance insulated Black Finish transmitter, provided with mounting lug and clamping bolt. Replaces 291W, 317W and 329W Transmitter.                                                                                                                                                           |
| 349BW | An insulated black finish transmitter similar to the 323W Transmitter except that it is equipped with a low resistance button. Replaces 280W. Also 282W, except for replacement purposes.                                                                                                               |
| 353BW | A high resistance insulated bracket type transmitter. Equipped with two T1A cords. 9 1/4 inches. Black finish case with black finish bracket and arms. Replaces No. 350W Transmitter.                                                                                                                   |
| 359BW | A centrally damped transmitter similar to 323BW except it is equipped with a reinforced mouthpiece.                                                                                                                                                                                                     |
| 386W  | A low resistance insulated aluminum centrally damped local battery chest transmitter.                                                                                                                                                                                                                   |

## Transmitter Attachments Used for supporting chest type transmitter

| Code No. | Description                    | Code No. | Description                     |
|----------|--------------------------------|----------|---------------------------------|
| 2A       | Buckle only.                   | 3B       | Buckles and black colored tape. |
| 3A       | Buckles and slate colored tape | 3C       | Buckles and white colored tape. |

## Used

On No. 1314A Telephone Set.

With Nos. 1001C and H Hand Sets, 1278G, H, and 1375B Telephone Sets.

Used in Nos. 1017C, F and H Test Sets.

On Nos. 1020AB, BR and 1120AB Desk Sets, 1317W, AD, AW, AE Telephone Sets, 1048DA, DB, DC, DD, 1048GA, GB, GC, GD and 1148DA, DB, DC, DD Telephone Arms.

On Nos. 1317W, AD, AE, AW and BC Telephone Sets.

With Nos. 1020C, E, 1120C Telephone Arms and Nos. 1293AD, AE, AK, AL, Telephone Sets.

On No. 1001C Hand Set, 1330E, F, 1331E, F and 1332A, E portable Telephones.

On No. 1312A Telephone Set.

With No. 1305AC Telephone Set.

On Nos. 1336F and H Telephone Sets.

On Nos. 1317P, S, AH, BK, CN, CR, CP, CS, and CG; 6023A Telephone Sets, 1020AL and 1020U Desk Stand and 1020CC Telephone Arm. Replaces 329W Transmitter.

With the No. 1317BU Telephone Set. Is to replace the No. 280 and No. 284W Transmitters.

Magneto and Central battery wall Telephones, requiring insulated bracket type transmitter such as No. 1317BK Telephone Set.

With No. 1305AC Telephone Set.

With No. 375 Cord in dispatcher telephone sets. Replaces 283W Transmitter.



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## MEMORANDUM

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A NATIONAL ELECTRICAL SERVICE

DISTRIBUTOR FOR CANADA AND NEWFOUNDLAND

**NORTHERN ELECTRIC COMPANY, LIMITED**

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