

Western Electric

TELEPHONE APPARATUS *and* SUPPLIES



No. 5

Western Electric TELEPHONE APPARATUS AND SUPPLIES

Catalog No. 5



Aeroplane View of Hawthorne Works, Chicago, Ill.

Western Electric Company
Offices in All Principal Cities

THE *Western Electric Company*

In the telephone field there is probably no name so well known as that of the Western Electric Company. This in itself is cause for pride, but of more importance, both from the customer's standpoint and our own, is the reason for such an extended reputation. The Western Electric Company has been engaged in the manufacture of telephone apparatus for more than half a century.

History

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

Factory and Products

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

Coincident with the extension of its manufacturing facilities, it has developed a distributing organization which now embraces forty-eight houses located in the principal business centers of the United States. These houses with their extensive stocks assure the very best of service to the customers of the Western Electric Company.

But the Company is more than an American institution. It has an international scope. In Canada, in the principal capitals of Europe, and in Japan are companies in which the Western Electric Company is interested, manufacturing telephone apparatus, and coupled with these manufacturing organizations is a chain of selling offices that carry the products to the entire civilized world.

Experience

The Company's experience in the designing, manufacturing and testing of telephone apparatus enables it to offer a complete and attractive line of high quality apparatus of proven merit. Therefore, its customers avoid costly experiments with untried apparatus.

Permanent Source of Supply

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

Information for Customers Ordering Repair Parts

With very few exceptions, all Western Electric apparatus such as drops, generators, keys, ringers, combined jacks and signals, plugs, relays, receivers, transmitters, etc., are plainly marked with a code number.

Orders for duplicate apparatus or parts should state the code number of the apparatus for which the repair part is intended. It will further assist us if a sample of the part desired accompanies the order, at the same time giving code number of the piece of apparatus involved.

Engineering Services

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

Completeness of Catalog

This catalog lists only the types of telephone equipment which are in common use, since with a line so extensive, it is manifestly impossible to show all types and combinations. We strongly recommend the use of standard equipment as shown, wherever possible, but in case special requirements are encountered it is possible that apparatus not listed in this catalog may be adopted.

Prices

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

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

GENERAL INFORMATION

Ordering Telephone Apparatus Parts

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

First: Quantity desired.

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

Third: Name of the part required.

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

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

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

First: Quantity desired.

Second: Name of part.

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

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

Special Apparatus

The apparatus listed in this catalog will meet all the usual service requirements. In cases where unusual conditions are encountered we will be glad to receive inquiries on special apparatus. However, it is suggested that the use of special apparatus be avoided wherever possible on account of its higher cost and the greater length of time required to make delivery.

Special apparatus finished to match the woodwork of offices, hotels, steamships, etc., may be furnished. Such special finishes are, however, considerably more expensive than standard finishes and should be avoided where expense is a consideration. Orders or inquiries for specially finished apparatus should be accompanied by a sample of the finish to be matched.

Black Finish for Telephones

In the past, it was our practice to nickel plate the exposed metal parts of our telephones, but we have recently adopted a black finish for such parts. This change has been made practical by the development of a black finish, which has proved to be exceedingly durable.

Nickel plated parts, which become tarnished, require a buffing operation and in many cases replating to give them a satisfactory appearance. In the case of our black finished parts, it is in general possible to give them a satisfactory appearance, even after they have been in service a number of years, by merely rubbing them lightly with a cloth slightly moistened with "Carbona" or cleaning fluids used for furniture, and then drying them with a soft cloth.

New Apparatus

Experiments are continuously being conducted and new designs worked out with a view of improving our telephone apparatus. As soon as new types of apparatus are available, we will furnish them on orders calling for old apparatus, providing the new apparatus is interchangeable with the old.

TELEPHONE TERMS

Definitions of General Telephone Terms

The following definitions of the terms used in connection with the apparatus in this catalog may be of interest and helpful in selecting the instruments best suited to various conditions or requirements.

Telephone Lines

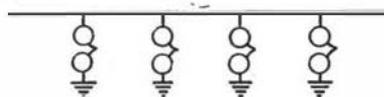
Grounded Lines. A grounded telephone line or system consists of only one wire, the ground being used for the return circuit—hence, the term “grounded line.”

Grounded lines give fairly good results, when properly constructed, provided there are no electric light, power or trolley wires in the immediate vicinity. The presence of such power wires is likely to cause objectionable humming and buzzing in the receivers, when the line is in use. Grounded lines are also subject to “cross talk;” that is, a telephone conversation on one line is liable to be heard in the telephones on adjacent lines. These objectionable features of a grounded line exist because the single wire of a grounded circuit cannot be transposed to overcome inductive influences from other circuits.

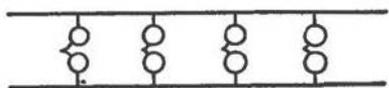
Metallic Lines. A metallic line is one consisting of two line wires, the ground not being used in this instance to complete the circuit. Metallic lines, under almost all conditions, are the most satisfactory to maintain and operate and are almost universally used, grounded lines being very rarely considered when high-class service is required.

Bridging Lines. Practically all telephones in present day use are known as “bridging telephones.” These telephones are connected in parallel across the line wires, when used on a metallic circuit, or from the single line wire to the ground, when used on a grounded line.

Series Line—Magneto. Early in the development of the telephone art, magneto telephones were connected in series—like telegraph instruments are connected in a telegraph line. It was later found that the voice currents by passing through all the ringers connected in the line were quite seriously impeded and lost much of their strength, thus making it impractical or impossible to telephone over long distances or to place large numbers of telephones on one line and, at the same time, secure satisfactory service. As mentioned above, nearly all telephones in present day use are bridging, the use of series apparatus being discouraged, except for necessary replacement purposes.



4 Ringers “Bridged” from the line to ground of a Ground Circuit



4 Ringers “Bridged” across the two Conductors of a Metallic Circuit



4 Ringers In series with a Grounded Circuit

There are two general classes of manually operated telephone exchange systems in present day use; namely “Magneto” (some times called “local battery”) and “Central Battery” (sometimes called “common battery” or “central energy”). These two systems differ principally in the details of operation, that is, in the method of signalling or calling the other telephones and “central” and in the method of furnishing current for talking. The use of the central battery system is practical in cases where the telephone lines are comparatively short and such systems are therefore usually used in towns where 300 or more telephones are located within 3 or 4 miles of the exchange. Central Battery (C.B.) systems are also operated by industrial concerns using a large number of telephones within a comparatively small area.

Magneto Systems. In magneto systems, the telephone user signals or calls the exchange or other telephones on the same line by turning the crank of a magneto generator, the current thus generated causing a signal to be displayed or sounded in the central office (or exchange) or the ringers of the other telephones on the line to ring.

In magneto systems, the current for talking is usually furnished by two or three dry cells, either located inside the telephone itself (in the case of a wall telephone) or nearby on a shelf or in a battery box (in the case of a desk telephone).

Telephone Systems

TELEPHONE TERMS

(Continued)

Central Battery Systems. In manual central battery systems, the exchange is signalled by merely lifting the receiver from the hook on the telephone. In these systems, the telephones cannot be rung except from the exchange as they are not equipped with magneto generators.

In central battery systems, the battery (usually 24 volts) which supplies current for talking, as the name implies, is located at the central office or exchange, one battery usually supplying all the telephones connected to the exchange.

Central Battery Signalling—Local Battery Talking. In this system, as the name implies, central battery signalling is employed but current for talking is supplied by dry cells as in magneto telephones. Telephones of this type are used only on long central battery lines where the current from the central office battery would be too weak (due to the high line resistance) to give the grade of transmission desired.

Private Lines. These are lines (either grounded or metallic) the telephones on which have no connection with telephones other than those on that particular line; that is, they are not connected to a switchboard.

Private lines are principally used by railroads, mines and for farm or rural lines.

Standard bridging magneto telephones are usually employed for private line work, although special designs of telephones are available for special classes of service such as for street railway telephone systems, mine telephone systems, etc.

Private lines, as above described, should not be confused with individual or direct lines, later described, which refer to exchange lines, equipped with only one telephone.

Intercommunicating Systems. These systems include a number of lines, which usually cover a very limited area, generally within the premises of a single owner or concern. Such systems in general are of an automatic nature; that is, the user performs his own switching by pressing a button or key, which rings the bell of the desired station and connects the two lines for talking. No operator is required for these systems and, in fact, no systems requiring a switchboard and attendants are considered under this classification.

As in the case of telephones for a railway train dispatching system, the instruments used in intercommunicating systems do not fall under either the magneto or central battery classification and they are best described and known as intercommunicating telephones. The Western Electric Company's trade name for intercommunicating telephones is "Inter-phone" and on the following pages will be found a very comprehensive line of this class of equipment, under the heading "Inter-phones."

Exchange Lines

Individual Lines. An individual or direct line may be metallic or grounded and has but one telephone connected to it.

Party Lines. A party line is one having two or more telephones connected to it. The number of telephones which can be connected to a party line varies all the way from two to forty or fifty, depending entirely on the ringing system employed, the character of service desired and the local conditions encountered. Under "Signalling Systems," party lines of different types and capacities are described.

Signalling Systems

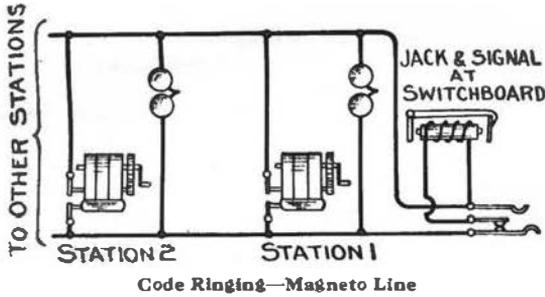
It is doubtful if any branch of the development of present day telephone systems has received as great an amount of attention as the problem of signalling or ringing on party lines.

Individual or direct lines present no ringing difficulties, as only one bell is rung when ringing current is sent out over the line from the switchboard. This is not true, however, with party lines and the question of the method of signalling that will best meet the existing service conditions is one to which the purchasers of telephone apparatus should give very careful consideration.

Code Ringing Non-selective. The most universal method of signalling parties on a magneto telephone line is by code ringing. This method is also occasionally used on central battery lines, but not frequently. In the code ringing system, rings of different codes are employed for signalling each telephone, such as 2 short, 3 short, or 1 long and a short, 2 long and 2 short rings or other combinations. This system has the advantage that it can be used with a large number of telephones on the same line, any number in fact, the number which can be placed on a line depending on conditions other than ringing. Again, it is a simple system, as no special apparatus has to be used, the undesirable feature being that when one telephone is called, all the other telephones on the line are also rung, making it necessary for the user to count every signal in order to know when he is being called. This system is most commonly used on rural or farmers' telephone lines.

TELEPHONE TERMS

(Continued)



Selective Signalling. In order to overcome the objections to code ringing, a number of methods have been developed whereby the operator can ring a limited number of telephones selectively or semi-selectively, as the case may be. Selectively means, of course, that the operator can select and ring any one telephone without disturbing any of the others; semi-selectively meaning that the operator can select and ring one-half of the telephones without disturbing the others, code ringing, of course, being employed for selecting out of the telephones rung, the one desired. Telephones arranged for this service can only signal the central office or exchange and cannot call each

other without the assistance of the central office operator.

In the case of central battery systems the service conditions are usually such that it is undesirable to place more than four telephones on a line.

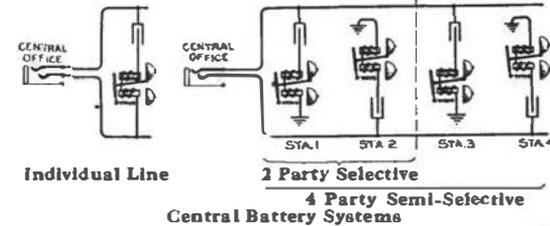
Standard telephones are listed in this catalog for the following classes of ringing.

Central Battery System	Ringing Current Employed	Magneto System	Ringing Current Employed
Single party.....	A.C.	Single party.....	A.C.
2 party selective.....	A.C.	2 party selective.....	A.C.
4 party semi-selective.....	A.C.	4 party semi-selective.....	A.C.
4 party selective..... (relay type)	P.C.	4 party selective.....	P.C.
8 party selective.....	Harmonic	Party line—non-selective..... (code ringing)	A.C.
8 party semi-selective.....	Harmonic		

Note: Although a number of systems have been devised for selectively ringing any one of a large number of magneto telephones, the systems that have so far come to our notice are not considered practical in that they violate the fundamental principle that the apparatus at the telephone stations should be as simple as possible. The addition of complicated mechanisms to sub-station apparatus introduces the possibility of trouble, which might not only cause the telephone user inconvenience, but result in excessive maintenance.

Single Party, 2 Party Selective or 4 Party Semi-Selective Systems Employing Alternating Current—Central Battery. On an individual line, the ringer is bridged across the two line wires. (In the case of central battery systems condensers are connected in series with the ringers, except in the case of ringers operated on pulsating or superimposed ringing current, as described below). On a two-party selective line, one ringer is connected from each side of the line to ground, and on a four-party semi-selective line, two ringers are connected from each side of the line to ground, the switchboard at the central office being so arranged that by means of a key, current can be sent out over either side of the line, through the ringers connected to that side of the line, to ground. In other words one terminal of the central office generator is connected to one of the line wires and the other terminal to ground.

It is the usual practice to temporarily ground the opposite side of the line from that to which the ringing current is connected. This is to prevent cross ringing when a receiver is lifted from the hook. (This class of ringing is often referred to as "divided circuit ringing.")

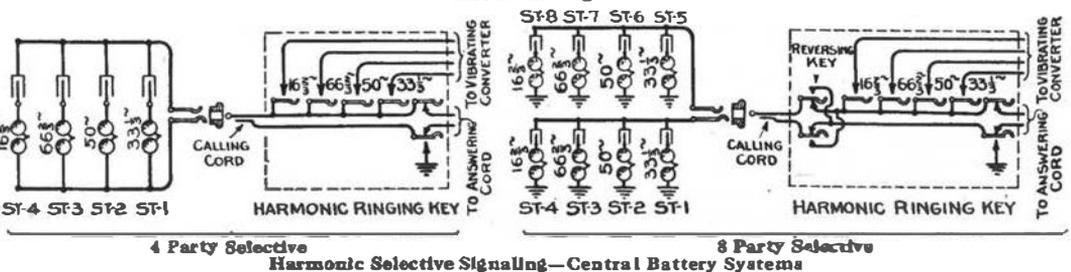


On a four-party selective line, each of the four telephones is equipped with a ringer which will operate on current of a different frequency than the others. These are bridged across the two-line wires. On an eight-party selective line, four ringers are connected between each side of the line and ground. A condenser is connected in series with harmonic ringers in all cases.

Harmonic—4 and 8 Party Selective—Central Battery. The telephones used with this system are equipped with special ringers which are so made that they will ring, only when alternating current of a given frequency is sent out over the line. The frequencies employed are 16 2/3, 33 1/3, 50 and 66 2/3 cycles, per second.

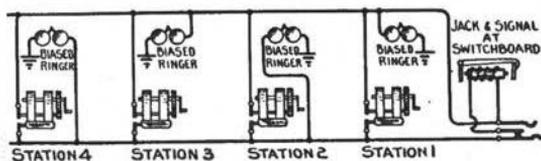
On a four-party selective line, each of the four telephones is equipped with a ringer which will operate on current of a different frequency than the others. These are bridged across the two-line wires.

On an eight-party selective line, four ringers are connected between each side of the line and ground. A condenser is connected in series with harmonic ringers in all cases.



TELEPHONE TERMS

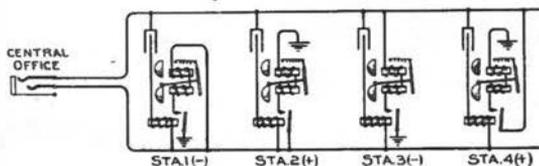
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Pulsating Current 4 Party Selective Signalling—Magneto Systems

Four Party Selective—Employing Pulsating Current—Magneto Systems. In this system, any one of four telephones on the same line may be rung without ringing the others. This is accomplished by sending positive or negative pulsating current out over either side of the line, (through the ringers connected to that side of the line) to ground. In other words the central office operator connects either the positive or the negative terminal of the ringing generator to either of the two line wires and as one terminal of the generator is permanently grounded a return circuit is established through the ringers. The ringers used in this service are equipped with bias springs and armature stop screws and are so adjusted that they will ring when negative pulsating current is connected to the terminal nearest the bias spring and will not ring when positive pulsating current is connected to this terminal. Two of these ringers are connected from each side of the line to ground, the ringers on the same side of the line being connected differently; in other words, one ringer is connected with its negative terminal (the terminal nearest the bias spring) to the line while the other ringer on the same side of the line has its positive terminal (the terminal opposite the bias spring) connected to the line. In view of this, it will be seen that when pulsating current is sent out over one side of the line, through the ringers, to ground only one of the two ringers will respond, depending on the polarity of the ringing current.

The generator (No. 22E) used in these telephones operates the central office drop but does not operate the ringers on the line.



Pulsating or Superimposed 4 party Selective Signalling Central Battery System

Four Party Selective—Central Battery Systems Employing Pulsating or Superimposed Current—Relay Type. Condensers cannot be connected in series with ringers operated on pulsating current, because if used, pulsating current would have the same effect as alternating current and the selective feature could therefore not be obtained. In view of this and the fact that a ringer cannot be permanently bridged across a central battery line or from the line to ground unless a condenser is connected in series with it, the following arrangement is employed where pulsating or superimposed current is used for four party selective signalling on central battery lines. Each of the four telephones is equipped with a high impedance relay, which is permanently bridged across the two line wires in series with a condenser. When ringing current is sent out over one side of the line to ground (and the opposite side of the line temporarily grounded) the armature of each of the relays pulls up thereby closing a contact. The ringers are connected to ground through these contacts; that is, the ringer of each telephone is connected to ground when the relay armature is pulled up and is cut out of the circuit as soon as the ringing current ceases. The ringers are connected as in the four party selective magneto system, described above; that is, two ringers are connected from each side of the line to ground, those connected to each side of the line being connected so that one will operate on negative pulsating current and the other on positive pulsating current.

TELEPHONE TERMS

(Continued)

Magneto Telephones

Service. The number of magneto telephones that can be connected on the same line varies, ranging from 1 to 40 or more. However, a line having more than 20 or 30 telephones connected to it, is usually very unsatisfactory from a service standpoint, except in a case of necessity or for temporary service, the reason for this being that a line having so many telephones is found to be in use almost continuously, the bells ringing at very frequent intervals and the users almost sure to be "rung in the ears" or otherwise interrupted during a telephone conversation.

The following definitions of what may be considered a lightly loaded, medium or heavily loaded line are submitted with the thought that the limits are conservative enough so that under all but extreme conditions the figures given can be relied upon. In the following pages will be found a complete catalog of telephones and opposite each a statement as to the maximum line load under which that telephone will give best service.

The telephone lines referred to are assumed to be well insulated, free from high resistance joints, and constructed of iron wire not smaller than No. 14 B. W. G. gauge.

Light Loaded Lines. A light loaded line is one less than 15 miles in length, and not equipped with more than twelve telephones.

Medium Loaded Lines. A medium loaded line is one between 10 and 30 miles in length and equipped with from 10 to 30 telephones.

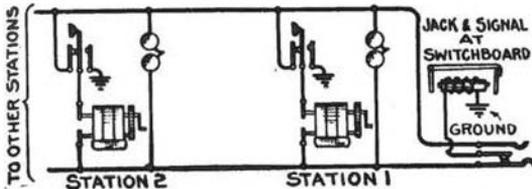
Heavy Loaded Lines. A heavy loaded line is one up to 40 or 50 miles long or equipped with up to 40 telephones. Lines loaded with this number of telephones are rapidly going out of use or are being broken up into shorter lines or equipped with fewer telephones. Lines of this length, loaded with this great number of telephones, should be discouraged in all cases except in cases of extreme necessity or for temporary service.

CENTRAL OFFICE SELECTIVE SIGNALLING

Telephones for this service are so wired that the switchboard drop or signal may be operated "secretly," that is without ringing the bells of any of the other telephones on the same line. This is accomplished by pressing a button while turning the generator crank. We are prepared to furnish three different telephones, each equipped with a different type of push button, which performs similar service, but in a slightly different manner, the results, however, being much the same.

Central Office Selective Signalling Using the 1006A Push Button and A.C. Generator.

Operating this push button connects the generator to one side of the line and to the ground. These telephones can be used only on metallic lines and where the switchboard drop is singly wound and has one terminal of its winding connected (or arranged so that it can be connected) to ground. When the generator is operated without pressing the push button, all the other telephones on the line are rung without operating the drop at the exchange. When the push button is pressed when turning the generator crank,



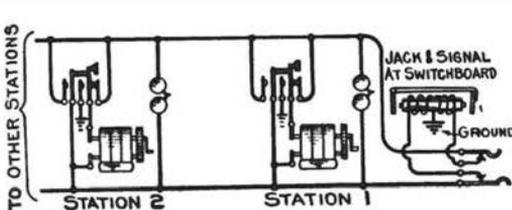
Wiring of Telephones and Switchboard Apparatus when No. 1006A Push Buttons Are Used

the drop is "thrown" (operated) but none of the other telephone ringers on the line are rung.

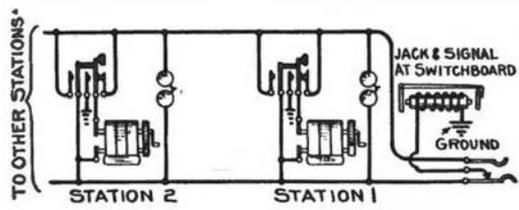
Central Office Selective Signalling Using No. 1002A Push Button and A.C. Generator. Operating this push button connects the generator to both sides of the line and to the ground. Telephones equipped with this push button may be used where the switchboard is equipped with a special double wound drop, having the middle of its winding brought out to a terminal which is connected to the ground.

Telephones equipped with this push button can also be used where the switchboard is equipped with regular single wound drops one terminal of which is (or can be) connected to ground. When so used, it is not necessary to pay any attention as to which way the telephone terminals are connected to the line wires as this push button connects one side of the generator to both sides of the line, and the other to ground.

The method of operating this telephone is the same as with those equipped with No. 1006A push buttons above described.



Double Wound Drop



Single Wound Drop

Wiring of Telephones and Switchboard Apparatus When No. 1002A Push Buttons Are Used

TELEPHONE TERMS

(Continued)

RINGERS—ALTERNATING CURRENT AND PULSATING CURRENT

Ringers intended for operation on pulsating current are provided with a bias spring which normally holds the armature so that it is free to move in one direction only. In view of this, the ringer will respond to pulsating current of one polarity, but will not respond to pulsating current of the opposite polarity. In addition to the bias spring, ringers designed for operation on pulsating current have a stop screw for limiting the movement of the armature, thereby facilitating the pulsating current adjustment.

The presence of a bias spring does not necessarily indicate that the ringer is adjusted for operation on pulsating current, as the bias spring is frequently used to prevent an alternating current ringer from tapping, due to inductive disturbances on the line and in some cases to prevent operation on pulsating current (see Center Checking System). Ringers designed for operating on pulsating current, may be operated on alternating current.

Transmission Circuits ("Talking Circuits")

Western Electric telephones are equipped with a number of different types of transmission circuits, four of which are listed below. (Interphone and short line telephone circuits are described under "Interphones.")

Type	One of the various transmitters used for this service	Receivers	Induction Coil	One telephone employing this type of transmission Circuit
A Central Battery	323BW	143AW 144AW	46	1533A
B Local Battery	323BW	143AW 144AW	*13	1317N
C Local Battery Talking-Central Battery Signalling	323BW	143AW 144AW	13	1533Y
D Series Central Battery	323BW	171W ("Magnetless" receiver)	None	1533K

*The No. 29 induction coil is used in place of the No. 13 induction coil in train dispatching circuits as it is designed especially for service where a number of telephones are "listening in" at the same time.

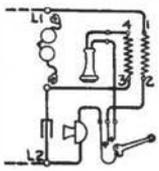
The circuit designated "A" in the above table is the Western Electric "standard" for Central Battery Service. This is the highest efficiency circuit for long line service and is used in all "Standard" Western Electric central battery telephones.

The circuit "B" is the Western Electric "standard" local battery circuit and is used in practically all Western Electric magneto telephones. This is the highest efficiency local battery circuit that has been developed up to the present time.

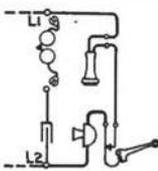
The circuit "C" is used on central battery lines which are so long that the current from the central office battery is not sufficient to provide satisfactory transmission. This circuit is the same as the standard local battery circuit, to prevent the flow of current from the central office battery through the ringer. The conditions under which this circuit is required are exceptional and it is therefore considered special.

In the circuit "D" the transmitter and receiver are connected in series across the line, no induction coil being employed. The receiver is the "magnetless" type, i. e., it has no permanent magnet. The transmission obtained with this circuit is satisfactory on short central battery lines, i. e., lines not exceeding two miles in length (using 22 B. & S. gauge cable) but on lines longer than this the transmission efficiency of this circuit is appreciably lower than that of circuit "A." In view of the fact that circuit "A" gives the best results on both short and long lines its use is recommended in preference to circuit "C."

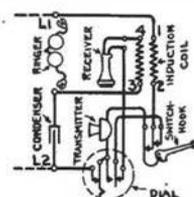
The following are diagrams of telephones employing the above transmission circuits.



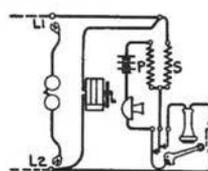
Standard Central Battery Telephone Circuit
Induction Coil Type)



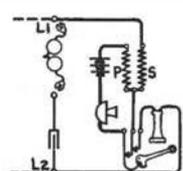
Series Type



Standard Central Battery Telephone Circuit with Dial



Standard Local Battery Telephone Circuit



Local Battery Talking and Central Battery Signalling Circuit

TELEPHONE TERMS

(Continued)

Telephone Switchboards and Systems

Western Electric telephone switchboards represent the result of over forty years experience in the manufacture and design of telephone central office equipment. By virtue of its position as the largest as well as the oldest manufacturer of telephone equipment, the Western Electric Company has been a big factor in the development of the telephone art to its present degree of perfection. As a result their switchboard equipment incorporates material, apparatus, circuits and design features which have been found essential for the successful operation of modern telephone systems.

These switchboards are the result of continuous efforts by this great organization to build equipment which is simple in operation, durable in construction, economical in maintenance, and highest in efficiency, incorporating such new features as experience suggests and modern telephone practice demands.

The smaller switchboards are fully described and will be found adequate to meet the requirement of every non-multiple central office. The larger central offices must of necessity be designed to care for the individual requirements of each exchange area. Western Electric engineers are equipped to make studies and recommend correct central office equipments for any part of the world.

AUDIBLE CODE SIGNALING

To enable the switchboard operator to distinguish various code rings on bridging lines an "audible code signaling" feature can be provided. This is accomplished by using No. 6 or No. 26 type combined jacks and signals, having a local contact which is closed during the ringing interval. This contact operates a local alarm bell circuit, which repeats the codes sounded.

CENTRAL OFFICE SELECTIVE SIGNALING

This signifies that the subscriber can signal the central office without ringing the other bells on a rural line, or signal the other parties on the line without operating the switchboard signal. For this service the No. 7 or No. 27 type combined jacks and signals are used, permitting one side of the signal winding to be connected to ground. Push button type telephones are used on these lines.

For diagram and information on telephones, see descriptive matter under "Magneto Telephone" sets.

COMBINED JACK AND SIGNAL

This is the term given to the Western Electric line signal where the jack is mounted immediately under its associated signal. These signals are automatically restored when the answering plug is inserted.

CORD CIRCUIT, COMBINATION

This type of cord circuit is so designed that one cord of the pair may be used on either central battery or magneto lines, the other cord being used for one class of service only. The latter may be either central battery or magneto, depending upon the class of service involved.

CORD CIRCUIT, UNIVERSAL

This type of cord circuit is so designed that each of the two connecting cords is adapted for making connections with either magneto or central battery lines. The circuit automatically adapts itself to either class of service by the operation of relays which form a part of the circuit. The circuit may be used for connecting two magneto lines and two central battery lines or one magneto line and one central battery line.

CORD CIRCUIT, JACK LISTENING TYPE

In this type of cord circuit the operator can listen in on a line by inserting the plug of the listening cord into a listening jack. One of these listening jacks is associated with each pair of connecting cords. Plugging in the listening cord bridges the operator's telephone set across the line.

TELEPHONE TERMS

(Continued)

Telephone Switchboards and Systems**CORD CIRCUIT, KEY LISTENING TYPE**

In this type of cord circuit the operator can listen in on a line by merely operating the listening key handle of a cord circuit key. One of the keys is associated with each pair of cords and the corresponding supervisory drop.

CORD CIRCUIT, NON-HANG-UP TYPE

In this type of cord circuit it is possible under all conditions for both subscribers, at the completion of a conversation, to operate the clearing-out signal on the operator's cord circuits.

CORD CIRCUIT, NON-RING-THROUGH TYPE

This type of cord circuit is so equipped that it is impossible for any subscriber in "ringing-off" to ring any of the bells on the connected line.

CORD CIRCUIT, NON-HANG-UP NON-RING-THROUGH TYPE

This type of cord circuit includes the features of the non-hang-up and the non-ring-through circuits.

LINES WITH LINE RELAYS

In central battery private exchanges and private branch exchange switchboards, it is necessary to use line relays in order to operate lines that have over 30 ohms resistance. This corresponds approximately to an 800 foot line of No. 22 or a 1600 foot line of No. 19 B.&S. gauge copper wire.

REPEATING COILS IN MAGNETO SWITCHBOARDS

These are sometimes used at the switchboard end of a grounded circuit to eliminate noise when connecting metallic circuits. They are also used in cord circuits to provide the "non-hang-up, non-ring-through" feature. Repeating coils are also used in connection with cord circuits to connect noisy or unbalanced lines.

RINGERS USED AS SWITCHBOARD LINE SIGNALS

Ringers are slightly more sensitive than drops or signals, and are sometimes used on extremely long lines. They are also used sometimes where audible code signaling is desired. The Western Electric audible code signaling drop provides this feature without the sacrifice of the additional space required in which to mount ringers.

RINGER INDICATORS

These are provided on the ringers used in place of signals or drops where the operator is not constantly at the switchboard. They indicate which line has been calling by means of a sliding shutter actuated by the motion of the clapper.

RINGING, ONE WAY

This provides for ringing on the calling (front or nearest the operator) cords only.

RINGING, TWO WAY

This provides for ringing on the calling (front or nearest the operator) and also upon the answering (back or farthest from the operator) cords.

RINGING KEYS, INDIVIDUAL, FOR PARTY LINES

In this case the various parties on the party line can be signaled selectively by means of the cord circuit key associated with each cord circuit.

RINGING KEYS, MASTER, FOR PARTY LINES

In this case, the various parties on the party line can be signaled selectively, only when a master ringing key operated in conjunction with a cord circuit key. There is one master key for each operator's position.

TELEPHONE TERMS

(Continued)

Telephone Switchboards and Systems**RINGING COMBINATIONS**

For further information on classes of ringing service see preceding pages of telephone terms.

Single party, one-way or two-way ringing provides for ringing one telephone only over the calling cord or over the calling or answering cord, respectively.

Two-party, one-way, selective individual or selective master key (divided circuit) provides for ringing one of two parties on the same line selectively over the calling cord only.

Two-party, two-way, selective individual or selective master key (divided circuit) provides for ringing one of two parties on the same line selectively over either calling or answering cord.

Four-party, one-way, pulsating individual or pulsating master key provides for signaling one of four parties on the same line selectively, over the calling cord only, by means of positive or negative pulsating current over either side of the line to ground.

Four-party, two-way, pulsating individual or pulsating master key provides the same service as the preceding combination except that ringing current can be sent out over either calling or answering cord.

Four-party, one-way, harmonic individual or harmonic master key provides for signaling one of four parties on the same line selectively, over the calling cord only, by means of harmonic current. In this case, the telephone ringers ring only when alternating current of a given frequency is sent over the line.

Four-party, two-way, harmonic individual or harmonic master key provides for the same service as the preceding combination except that ringing current can be sent out over either calling or answering cord.

Eight-party, one-way, harmonic individual or harmonic master key provides for the same service as the corresponding four-party combination except that any one of the eight parties on the same line can be signaled selectively over the calling cord only.

Eight-party, two-way, harmonic master key provides for the same service as the corresponding eight-party combination except that any one of the eight parties on the same line can be signaled selectively over either calling or answering cord.

SUPERVISORY SIGNAL, MAGNETO

This signal, also known as a clearing-out drop, consists of a drop bridged across each cord circuit to indicate when a conversation has been completed. The current for operating this drop is furnished by the ring-off signal from the subscriber's telephone set generator.

SUPERVISORY SIGNAL, CENTRAL BATTERY

This consists of a lamp associated with each cord of the cord circuit. This lamp lights when a conversation is completed and the subscriber hangs up his receiver. It remains lighted until the connection is taken down. When making a connection, the lamp on the calling cord remains lighted until the called-for subscriber answers.

SUPERVISION, SINGLE

This term is used to describe a telephone switchboard cord circuit having only one "clearing-out" or "ring-off" drop. (For diagrams see description of No. 1200 type switchboards.)

SUPERVISION, DOUBLE

This term is used to describe a cord circuit having two "clearing-out" or "ring-off" drops or two supervisory lamps, one per cord. (For diagrams see description of No. 1200 type switchboards.)

THROUGH TOLL LINES

These toll lines are those that loop through an intermediate office. For example, when a toll line connects A and C, and passes through an intermediate office B, code signaling is employed. A and C are called with one ring, and B with two rings.

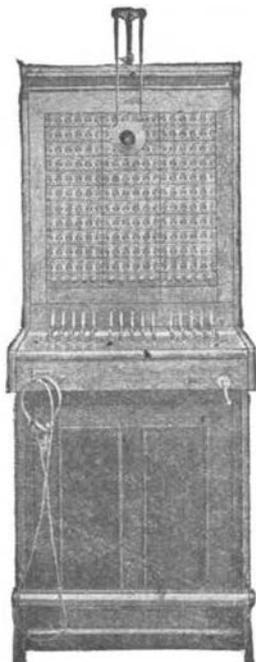
By means of "cutoff" jacks at B, the one line is made to act as three. That is, either as a through circuit between A and C, or as two local circuits; one between A and B and the second between C and B.

TRANSFER CIRCUITS

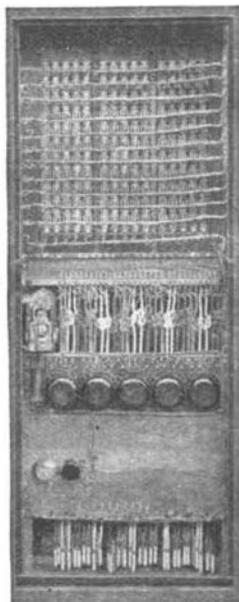
These are used where a switchboard consists of two or more positions and a number of the subscriber line jacks are out of the reach of any one operator. The transfer circuits provide a means of extending the cord circuits to the positions in which the jacks appear.

TRUNK, RECORDING TOLL

This is a trunk circuit between the local switchboard and the toll switchboard that makes it possible for subscribers desiring toll connections to get in direct communication with the recording toll operator. When it is known that it will take some time to complete the toll call, the operator calls the subscriber to hang up and can then call him back to the line over the trunk.

MAGNETO NON-MULTIPLE SWITCHBOARDS

Front View
No. 1240-D Switchboard



Rear View
No. 1240-D Switchboard

No. 1240-D Switchboard

Capacity 165 Lines 15 Cord Circuits

This standard efficient magneto switchboard has been giving universal satisfaction in all parts of the United States and foreign countries. Designed by the largest corps of telephone engineers in the world and equipped with reliable, efficient apparatus, it has met with the approval of operating companies requiring magneto switchboards that insure a long life of service, coupled with economical operating and maintenance.

Where more than 165 lines are required several sections may be lined up with good results. This has been done in numerous cases and the desired capacity obtained without any complications. All of the apparatus used in this switchboard has been proven reliable and efficient in operation, by many years of service, it being economical to maintain and exempt from repairs to an exceptional degree.

The operation of the No. 1240-D switchboard is simple and easily performed for the line jacks are so grouped as to be within easy reach of the operator, reducing that work to a minimum.

The Framework

The lumber used in the construction of the cabinet is red oak, thoroughly seasoned and kiln dried to prevent warping or cracking. All joints in the woodwork are tongued and grooved and securely fastened with the best quality of glue, no butt joints being used. Steel angles are installed inside of the cabinet at the corners giving additional strength to the cabinet.

The exterior of the cabinet is given a dull golden oak finish which is very serviceable. As an added precaution against warping, cracking or decay the interior surfaces are coated with shellac.

The steel framework which supports the face equipment is copper plated as a protection against corrosion or rust, also insuring a positive ground connection for the apparatus. This framework is fastened to the cabinet in a secure manner which insures a permanent, rigid support for the drops and jacks in the face of the board. The front panel, and the rear door are removable which permits easy access to all of the equipment.

The keyshelf is twenty-four (24) inches wide allowing ample space for the operator. The keys are mounted upon cold drawn galvanized steel bars which are supported at either end by steel reinforcing details and fastened to these bars with machine screws. Thus a perfect, rigid alignment is obtained for the keyboard equipment as the machine screws do not loosen by the operation of the keys.

MAGNETO NON-MULTIPLE SWITCHBOARD (CONTINUED)

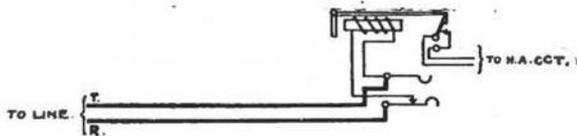
No. 1240-D Switchboard

The cordshelf, upon which the cord terminals are mounted, is located where inspection or repairs can be made conveniently. All terminals are plainly marked.

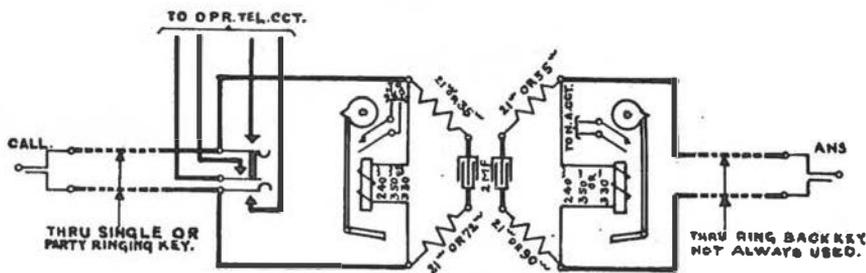
An apparatus and terminal board is mounted in the rear of the switchboard on which are mounted the repeating coils, night alarm bell, and large screw terminals where all power wiring such as power ringing, transmitter battery, night alarm battery, monitor tops, etc., are terminated.

The Line Circuits

The line circuits are equipped with the efficient No. 22-C combined jack and signal mounted five per strip consisting of the well known shutter type drop and cut-off jack which have been standard equipment on Western Electric magneto switchboards for many years. The drops are self restoring upon insertion of the plug in the jack, positive in action and will not stick. Removable number plates with large characters are mounted on the shutters of the drops. The night alarm springs are insulated from the jack springs and the design insures reliable operation of the night alarm circuit.



Line Circuit No. 1240-D Switchboard



Non-Ring Through Non-Hang Up Double Supervision Cord Circuit
No. 1240 Switchboard

The Cord Circuits

The local cable in this switchboard is so arranged that any of the various standard type of cord circuits may be equipped as follows:

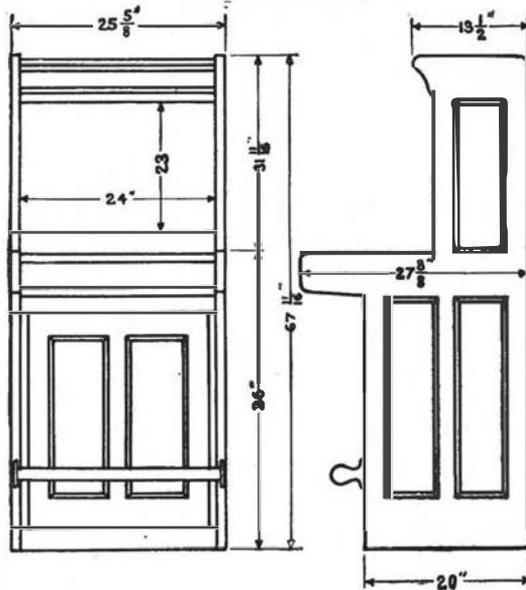
- Single supervision, without repeating coil.
- Single supervision, with repeating coil and cutout key (cords No. 1 to 5).
- Double supervision, "non-ring through," "non-hang-up" with repeating coil.
- Double supervision, "non-ring through," "non-hang-up" without repeating coil.

The supervisory (ring off) signals are of the manually restored shutter type drops equipped with number plates having large characters easily distinguishable by the operator. The cords are installed in accordance with the standard distinctive color scheme, each pair alternating red, white and green in the order named. This is a great help to the operator in locating cord pairs to take down connections corresponding to the "ring off" drop which has been operated, also reducing the possibility of error to a minimum.

The keys are of the type and design that have been giving service for years in the largest switchboards. They are so arranged that the springs are easily accessible for inspection when the keyshelf is open. These springs are constructed of metal having the proper resiliency which will insure good contact both in the normal and operated positions. They are positive in action and designed for long life service.

MAGNETO NON-MULTIPLE SWITCHBOARD

(CONTINUED)

**Dimensions No. 1240-D Switchboard****No. 1240-D Switchboard
OTHER CIRCUITS**

The ringing circuit is equipped with a powerful five bar hand generator. The local wiring is universal in that any of the following ringing combinations may be equipped as required:

Single party, two way	Four party, two way, pulsating master key
Two party, one way selective, individual key	Four party, one way, harmonic, individual key
Two party, two way, master key	Four party, two way, harmonic, master key
Four party, one way, pulsating, individual key	Eight party, two way, harmonic, master key.

The operator's telephone circuit is furnished with the standard receiver and transmitter known the world over for their high transmission efficiency. Ordinarily the suspended type transmitter is used although the chest type instrument can be used if desired as the wiring is in place for either type.

The night alarm circuit is equipped with a reliable loud ringing vibrating bell operated with dry batteries and a night alarm key for cutting the bell off or on as required. This key, together with the operators telephone jacks and ringing generator crank are located conveniently in the front of the keyshelf rail.

All of the following features are provided for and may be included without difficulty either before or after the switchboard is placed in service:

- Audible code ringing on subscribers
- Through toll lines
- Monitoring or transmitter cut-out
- Call wire circuits
- Duplicate set of operator telephone jacks for student operator
- Jack ended interposition trunks with lamp signal
- Buzzer equipment in positional ringing circuit (single or two party)
- Telephone switching key for connecting two positions together
- Plug ended switching trunks from toll switchboard

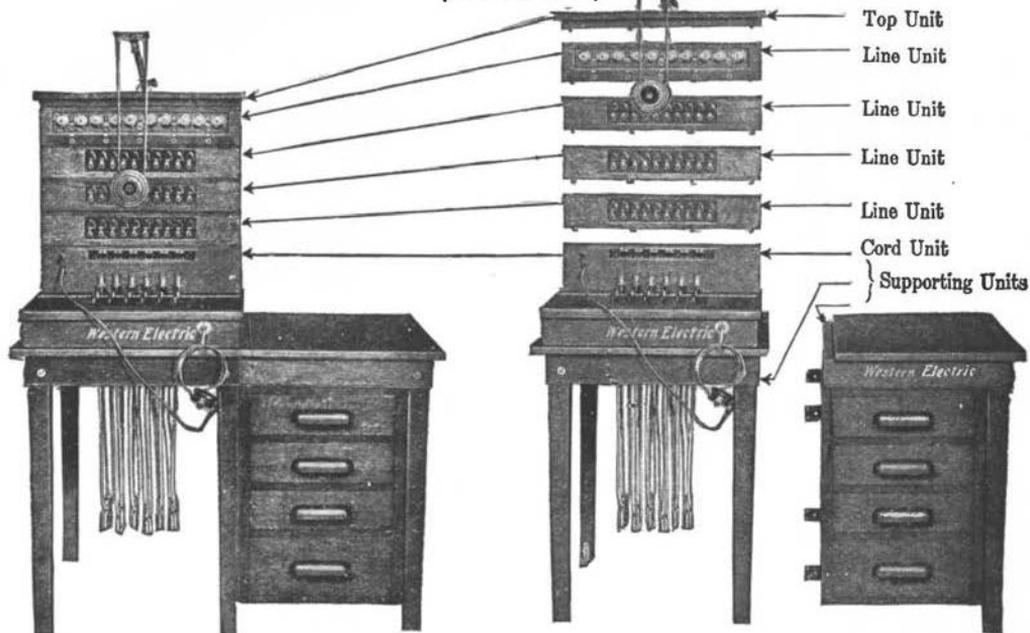
Battery current for the operator's telephone circuit is supplied from three dry cells or five Edison primary batteries and for the night alarm circuit from five dry cells or eight Edison primary batteries.

CABLE

The standard method of running the line cables is through the top of the switchboard which is the best method since the cables are kept off of the floor away from moisture or mechanical injury. However, if local conditions are such that it is advisable to bring the line cables in at the bottom of the section they will be furnished accordingly.

Western Electric

MAGNETO NON-MULTIPLE SWITCHBOARD (CONTINUED)



Method of assembling No. 1800 Switchboard to 35 line capacity

No. 1800 Sectional Unit Type Switchboard

The unit or sectional type construction for the small switchboard was introduced by the Western Electric Company a number of years ago, and since that time has been supplying the demand of discriminating buyers for a small switchboard that would meet their traffic requirements and eliminate the necessity of buying an "oversize switchboard."

The capacity of the No. 1800 Unit Type Switchboard is from 10 to 50 lines. While 50 lines has been set as an arbitrary maximum it is safe to assume that with a normally low calling rate as many as 70 or 80 lines can be handled conveniently. While the No. 1800—Unit Type switchboard is small in size (Floor space required only 2 feet x 2½ feet), this does not mean that this board receives less consideration or care in manufacture than a larger switchboard, for the same quality of material, skilled workmanship and rigid inspection are applied to all of the Western Electric products regardless of size. Red oak lumber, which has been kiln-dried, thoroughly seasoned and given a dark rubbed finish, is used in the construction of the units. The inside of the units have been specially treated to preserve wood and prevent warping or cracking.

To meet various requirements, there are different types of base or supporting units, cord units, line units and top units. To assemble a switchboard of 10 lines capacity for example it is only necessary to select units as follows:

1 Supporting Unit	1 Line Unit
1 Cord Unit	1 Top Unit

These units are easily assembled into a complete switchboard which presents a neat, compact and serviceable appearance and can be arranged to meet any service condition. Line units can be added at any time.

All of the apparatus and terminals associated with the operator's cord and telephone circuits are mounted in the cord unit.

The circuits used are very simple. A diagram of each circuit is pasted to the inside of the rear doors for convenient reference. The back of each unit is hinged and when open, all of the wiring and equipment are easily accessible.

This switchboard is especially recommended for small, rapidly growing telephone exchanges where the ultimate capacity cannot be definitely determined.

MAGNETO NON-MULTIPLE SWITCHBOARD (CONT.)



No. D-3 Supporting Unit



No. D-4 Supporting Unit

No. 1800 Sectional Unit Type Supporting Units

The Nos. D-1 and D-2 supporting units are special heavy brackets for use in mounting the No. 1800 type switchboard in a convenient location on the wall. These brackets mount on a one inch polished red oak board which is fastened securely to the wall before the brackets are attached. One bracket in each of the Nos. D-1 and D-2 types is hinged to permit the swinging of the switchboard to a position at a right angle with the wall upon which it is mounted which makes the apparatus easily accessible. The No. D-1 unit has the hinged bracket at the right and the No. D-2 unit at the left.

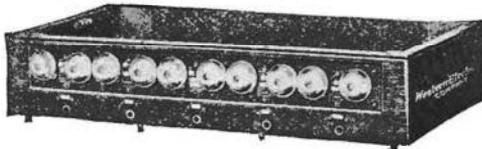
The No. D-3 Supporting Unit. Consists of a rigid skeleton table upon which the cord line units can be mounted.

The No. D-4 Supporting Unit. Consists of a tier of drawers designed for mounting next to the skeleton table unit No. D-3. The combination of the two units (No. D-3 & D-4) makes a very neat, compact, complete and sanitary switchboard support.

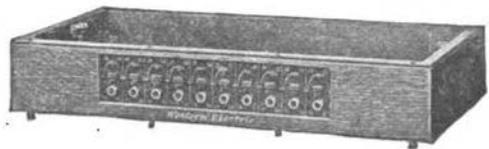
The No. D-5 Supporting Unit. Is an extension writing panel which is always required in connection with cord units Nos. CA-1, CB-1, and CA-5 when mounted on supporting unit No. D-3. This is necessary since the cord circuits in the Nos. CA-1, CB-1 and CA-5 units are not equipped with keys and the keyshelf is not as wide as the units in which keys are used in the cord circuits.

The Line Units

The line units are made in different types arranged to meet any possible line condition. Copper bars are used for mounting the combined drops and jacks in the face of the unit, and special drilled steel mounting plates for the ringer indicators, which insures perfect rigid alignment for the face equipment. The corners of the unit are neatly mortised together and reinforced on the inside with substantial steel brackets. The finished unit presents a very neat, compact and serviceable appearance.



No. BA-7, BB-7 or BC-7 Line Unit



No. BA-12 or BA-13 Line Unit

The following units are equipped with ringers (bells) and jacks. The bells are equipped with an indicator which shows which bell has rung. A very convenient arrangement where the operator is not always at the switchboard.

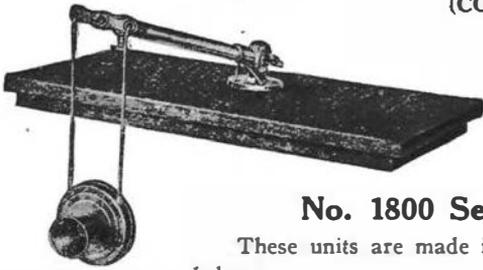
Code No. of Unit	Code No. of Ringer	Res. of Ringer in Ohms	Code No. of Jacks	Code No. of Unit	Code No. of Ringer	Res. of Ringer in Ohms	Code No. of Jacks
BA-7	40BG	2500	168	BC-7	40AG	1000	168
BB-7	40FG	1600	168				

The following units are equipped with self-restoring shutter type combined jacks and signals.

Code No. of Unit	Code No. Combined Jack and Signal	Resistance in Ohms	Code No. of Unit	Code No. Combined Jack and Signal	Resistance in Ohms
BA-12	22C	330	BA-13	26C	330

MAGNETO NON-MULTIPLE SWITCHBOARD

(CONTINUED)



No. AA-2 Top Unit



No. AA-1 Top Unit

No. 1800 Sectional Unit Type

These units are made in two types to meet the various conditions described below:

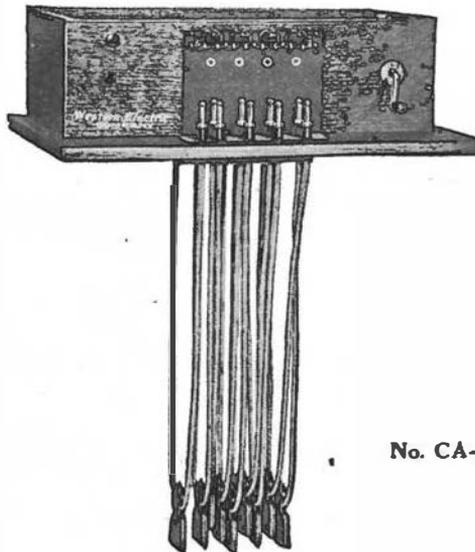
The No. AA-1 unit is merely a "cover" for the line units and is intended for use when the cord circuits are arranged for a hand set or desk set.

The No. AA-2 unit is similar to the No. AA-1 except that it is arranged for use with a suspended type transmitter. A No. 232-W transmitter and No. 19-D transmitter arm are furnished with this unit.

The Cord Units

These units are made up in different types to meet the operating requirements of any small magneto exchange.

The cord and operator's telephone circuit apparatus is all mounted in the cord unit. All connections to the line units are made under screw terminals and the only tool required for this work is a screw driver. The keyshelf is hinged and all terminals are accessible. The rear doors of the cord and line units are hinged and when opened, all of the wiring and apparatus is easily accessible. The circuits used are simple and a diagram of the circuit is pasted on the inside of the rear door of each unit.



No. CA-1 Cord Unit

No. CA-1 Cord Unit. This unit is equipped with 4 cord circuits arranged with ring off drops and listening jacks, the two left-hand circuits being wired for repeating coils which may be easily added if desired.

The operation of this unit is as nearly "fool-proof" as it is possible to make a switchboard. The 4 cord circuits can each be considered as being the same as a single length of cord with a plug on

MAGNETO NON-MULTIPLE SWITCHBOARD

(CONTINUED)

No. 1800 Sectional Unit Type**CORD UNITS (CONTINUED)**

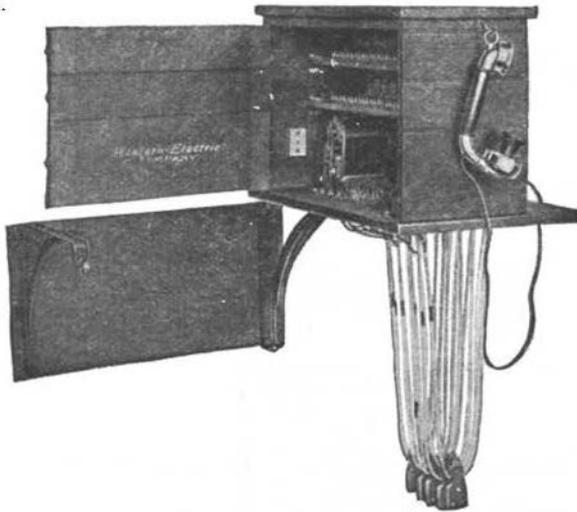
both ends and no other connection with the switchboard except the "ring off drop" and the "listening in jack" which are "bridged" across the line. The ring off drop operates when the subscribers have completed their conversation and "ring off." The "listening in jack" provides means for the operator to supervise the connections.

The operator's telephone set consists of a hand telephone set having the transmitter and receiver connected together as one unit.

The additional single cord at the left is the operators talking, ringing and listening cord. With this cord the operator answers the calling party, finds out who is to be called and rings them. The connection is then established with any one of the other cord circuits and left up until the ring off drop operates. Interference with a connection, after it is once established is reduced to a minimum.

No. CB-1 Cord Unit. This unit is the same as the CA-1 unit except that the operators' telephone circuit is arranged for a suspended type transmitter.

The No. CA-2 unit is equipped with four cord circuits, the two left hand cords of which are wired for repeating coils (repeating coils are not furnished unless specified) and is the same as the CA-1 unit except that No. 156-A two lever key is used in the cord circuit for ringing, listening and talking and is wired for ringing on both the front and rear cords. This unit is equipped with a suspended transmitter.



Rear View of 20-line Wall Type No. 1800 Switchboard

The No. CB-2 unit is the same as the No. CA-2 except that it is arranged for the use of a hand set or a desk telephone in operator's telephone circuit.

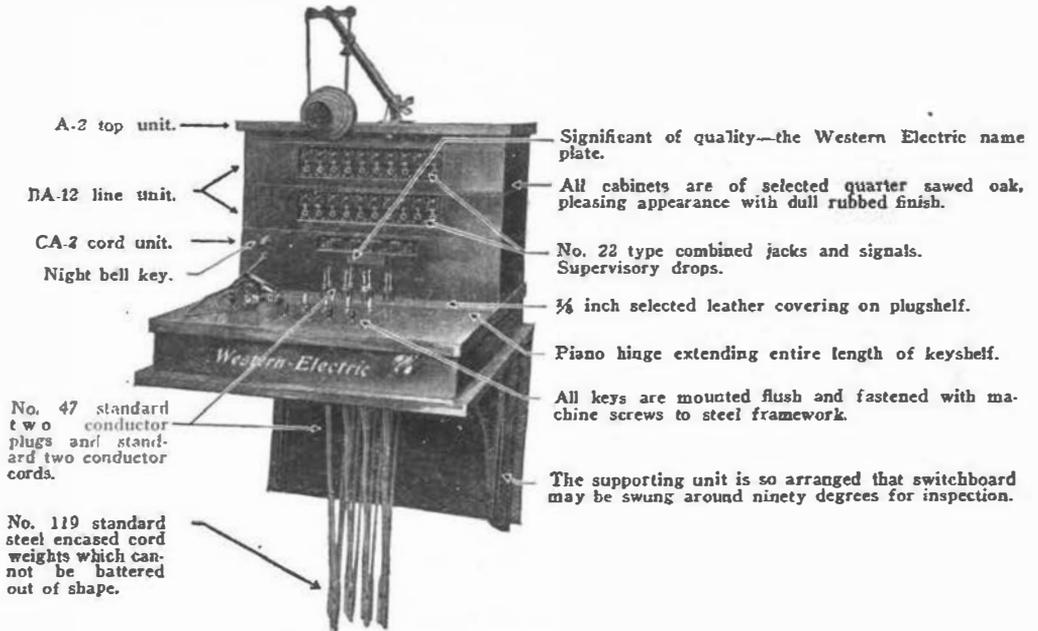
The No. CA-6 unit is the same as the No. CA-2 unit except that it is arranged for six cord circuits instead of four, and is provided with a suspended transmitter.

The CB-6 unit is the same as the CA-6 except the telephone circuit is arranged for use with hand set or desk telephone.

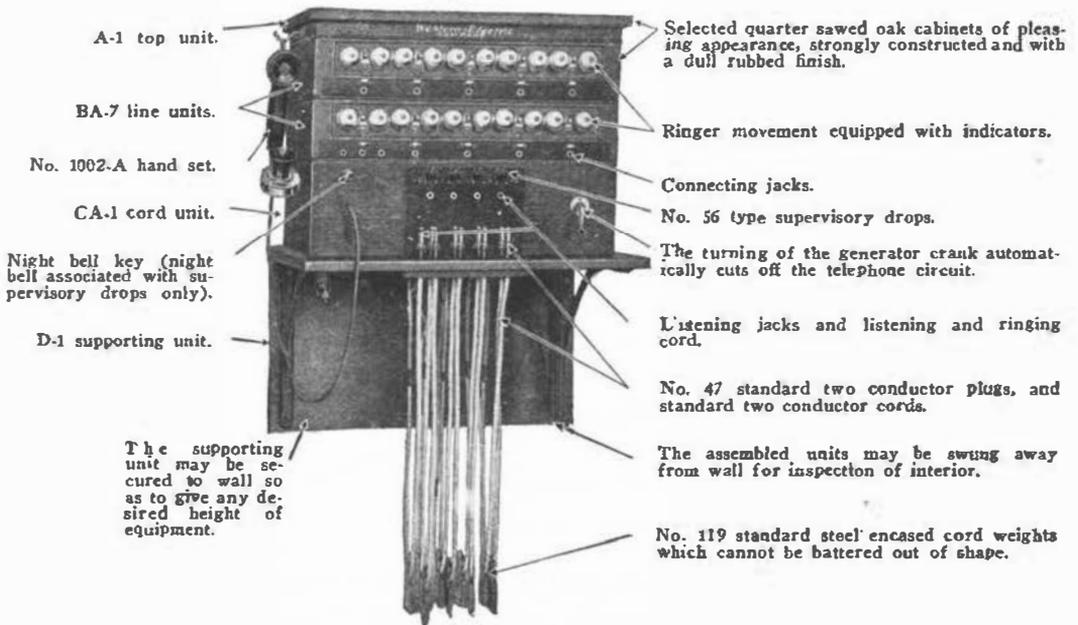
The units assembled into a wall type switchboard present a very neat and compact appearance. All of the wiring, terminals and apparatus are easily accessible when the switchboard is swung out and the rear doors opened for inspection. A convenient switchboard for use when the central office is located in a residence.

MAGNETO NON-MULTIPLE SWITCHBOARD
(CONTINUED)

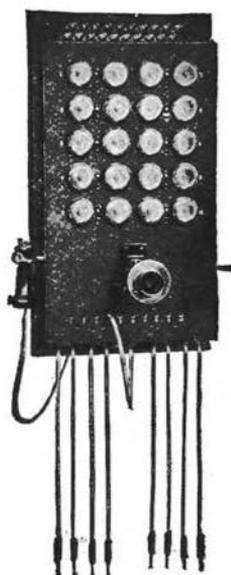
No. 1800 Sectional Unit Type



No. 1800 Sectional Switchboard



No. 1800 Sectional Switchboard

MAGNETO WALL SWITCHBOARDS**No. 1012 Switchboard****No. 1012 "Ringer Type"**

This switchboard is intended for use on exchanges having 10 lines or less, and where the number of calls does not warrant having a regular telephone operator in attendance. It has been installed by numerous rural companies who desire a switching station established in the country in which cases it is installed in a farmer's home and the calls are answered by members of the family. Being equipped with ringers, constant attendance at the switchboard is not necessary as the bells can be heard at some distance from the board. In addition to this ringer indicators are supplied with each ringer which gives a visible signal showing which bell has been ringing.

The cabinet is well constructed of thoroughly seasoned, quarter sawed oak, which is given a durable light finish. The front is hinged and the apparatus and wiring is within easy reach for inspection or maintenance.

Equipment. Each line is provided with a jack and a 1000 ohm ringer, although 1600 or 2500 ohm ringers can be furnished if required. Four-cord circuits, with a listening in jack bridged across the tip and ring, and a listening cord are provided for handling the calls, no supervisory or ring off signals being provided. A powerful five-bar hand generator is furnished for ringing purposes. The operator's telephone set consists of the regular long distance transmitter and receiver.

Operation. Subscribers are called by ringing with the hand generator over the listening cord with which the operator answers calls and listens in for supervisory purposes. Connections are made with the other cords, without the use of keys.

CENTRAL OFFICE SWITCHBOARD**No. 1948 "Sanitary Type" Switchboard****Capacity****240 Central Battery Lines****40 Toll or Rural Lines****20 Transfer Trunks****No. 1948 "Sanitary Type"**

The No. 1948 switchboard is designed to provide the small telephone companies who desire central battery service with modern efficient and reliable equipment. It is built along the lines of the modern office desk, having square lines generally, square legs (metal capped at bottom) and a clearance underneath for cleaning purposes, hence the term "Sanitary Type" and is the Western Electric Company's latest departure from old methods of small switchboard manufacture. Meeting the demands of exacting buyers as it does is evidence of the confidence enjoyed by this company in the development of a much needed small central battery switchboard which is easy to operate, economical to maintain and constructed of the same materials which enter into the construction of the larger boards upon which the Western Electric Company's reputation for quality products is built and maintained.

The Framework. The cabinet is constructed of durable red oak lumber, which has been kiln dried and thoroughly seasoned to prevent warping and cracking and provided with a dull rubbed dark finish. Each section is a unit by itself, although several sections can be lined up together as the end panels are removable. The keyshelf is a convenient height (30 inches) allowing the use of an ordinary chair for the operator.

The equipment, relays, resistances, retard coils, etc., associated with the various circuits are mounted on a swinging relay gate presenting a neat, compact appearance when closed and bringing the apparatus and wiring within easy reach when open.

CENTRAL OFFICE SWITCHBOARD No. 1948 Sanitary Type (Continued)

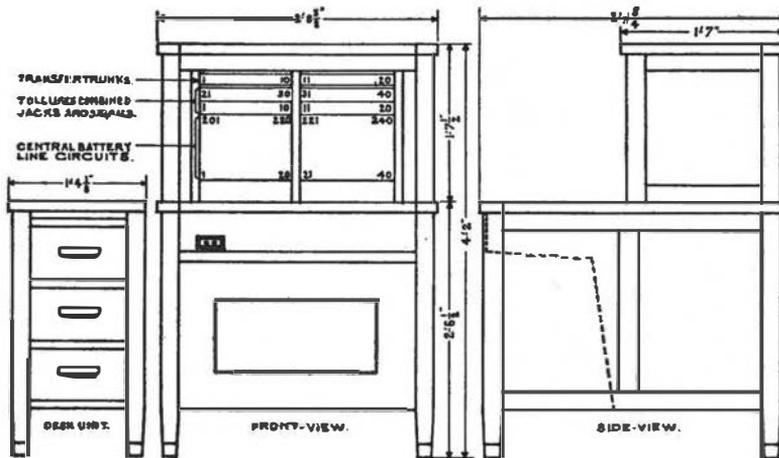
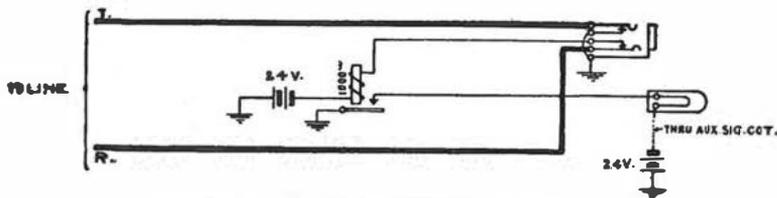


DIAGRAM SHOWING DIMENSIONS OF NO. 1948 SWITCHBOARD.

The Line Circuits. The line circuits are as simple as is consistent with modern practice. They are equipped with flat type relays which require a small mounting space and are especially adapted for use in a self contained switchboard of this type. These relays consume a comparatively small amount of current resulting in economy in storage battery equipment.



LINE CIRCUIT 1948 SWITCHBOARD.

The Cord Circuits. The local cables which contain all of the wiring inside of the switchboard, are universally wired and can be equipped to include any of the features listed below:—

(a) Subscribers central battery cord circuits.

(b) Rural universal, with or without repeating coils and cutout keys. Repeating coils and cutout keys not equipped unless specified. Cutout keys are used for cutting the repeating coil in or out of the cord circuit as required.

(c) Ringing combination for either central battery or universal cord circuit.

Single party, two-way.

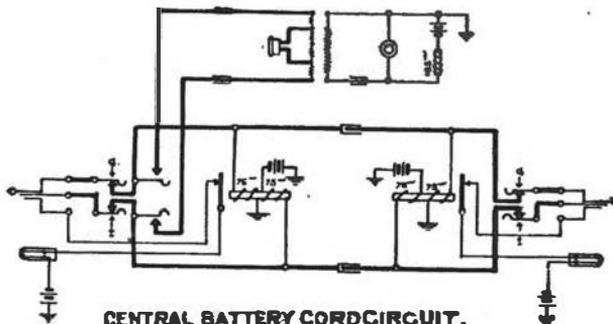
Two party, two-way, master key.

Four party, two-way, master key (pulsating).

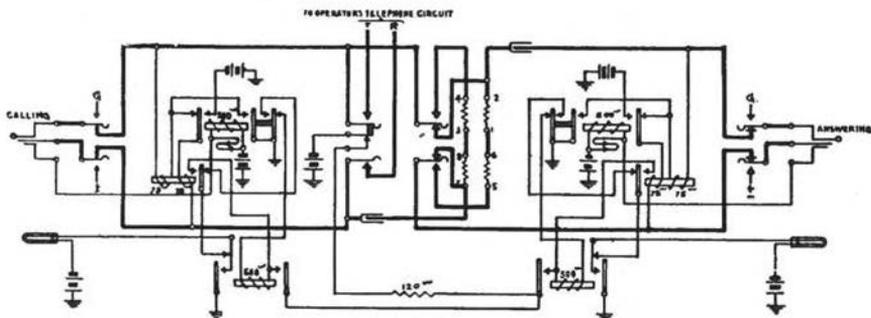
Four party, two-way, master key (harmonic).

Eight party, two-way, master key (harmonic).

**CENTRAL OFFICE SWITCHBOARD
No. 1948 Sanitary Type (Continued)**



CENTRAL BATTERY CORD CIRCUIT.



UNIVERSAL CORD CIRCUIT WITH REPEATING COIL AND CUT OUT KEY.

Power Plant. The proper battery supply for this switchboard is obtained from storage batteries. Since the storage battery is a very important part of the telephone system and the satisfactory operation depends upon a reliable battery supply, it is imperative that great care be exercised in the selection of this unit. In figuring the size of the charging machine and storage battery consideration should be given to the source of power supply with regards to its reliability. In ordinary cases provide not less than 36 hours reserve and up to 72 hours in cases of questionable power.

The size of batteries may be determined on the basis of the following example of calculation:

1000	total local and rural connections per 24-hour day.
.015	current in ampere hours per call (based on call of ordinary duration).
5000	
1000	
15,000	current in ampere hours for calls in 24 hours.

Since the rating of the storage battery is computed on an 8-hour capacity it is necessary to divide the ampere hour rating for 24 hours by 8 hours in order to determine the ampere rating of the battery required.

Thus 15,000 current in ampere hours for calls in 24 hours divided by 8-hour capacity
 Equals 1,875 ampere = ampere rating for battery 24 hours
 Plus .1875 10% safety factor

Equals 2,062.5 battery rating (basis 8-hour discharge rate)

4,125 Ampere rating for battery 48-hour supply (nearest battery E. S. B. Co.'s type ET couple (4½ amp.).

The charging medium required would be a 5 ampere D.C. motor-generator or a rectifier delivering this current at 30 volts. If it is desired to operate an interrupter ringing outfit from the storage battery the size of the latter should be increased from 1½ to 3 amperes depending on the amount of ringing to be done.

PRIVATE BRANCH EXCHANGE SWITCHBOARD

Front View No. 1962 Board—Showing Desk Unit

No. 1962 "Sanitary Type"

This switchboard is a result of the continuous efforts which the Western Electric Company is exerting in order to produce modern switchboards readily adapted to any operating conditions and at the same time maintaining the simplicity of operation, quality of material, skilled workmanship and maintenance economy which are characteristic of Western Electric products.

The No. 1962 switchboard being universally wired is adaptable to the varied requirements of private branch exchange service. It is designed to handle all practical service conditions which have arisen since the advent of the private branch exchange idea.

In addition to including all of the popular features adapted to private branch exchange service the No. 1962 switchboard is of the "Sanitary Desk Type" of construction which represents the Western Electric Company's most recent development and departure from old manufacturing methods. This cabinet has square lines generally, square legs (metal capped at bottom), plain panels and a clearance underneath the cabinet to provide for cleaning, hence the name "Sanitary." This switchboard is evidence of the continuous efforts being exerted by the Western Electric engineers toward the development of modern switchboards which will meet the exacting demands of discriminating buyers, and still retain the simplicity of operation, quality of material, skilled workmanship and low maintenance cost, which have been characteristic of Western Electric products in the past and upon which the company's reputation for service and quality has been built and maintained.

Built along the lines of modern office furniture it will harmonize with the surroundings in any modern office.

Capacity

Central Battery Local Lines.....	200
Trunk Lines	8
Cord Circuits	12

Framework. The framework is constructed of clear grained, red oak lumber, kiln dried and thoroughly seasoned to prevent warping and cracking and provided with a dull rubbed dark finish.

The stile strips, which hold the jacks and lamps in the face of the switchboard, and the key strips in the keyshelf by means of which the keys are held in place are made of cold drawn steel with a galvanized finish as a protection against moisture, also insuring perfect, rigid alignment of the face and keyboard equipment.

All relays are mounted on a swinging relay gate consisting of one piece of cold drawn galvanized steel equipped with mounting clips of the same material and brass machine screws. The mounting clips hold the relay mounting plates in place and eliminate the necessity of drilling holes in the relay gate. This is a typical Western Electric development which excludes the possibility of broken relay gates. The relay gate is mounted on a heavy steel bracket and presents a very compact appearance when closed as well as bringing the wiring within easy reach when open.

The Line Circuits. The line circuits terminate in jacks and lamps. This circuit is very simple reducing trouble to a minimum. Lines 1 to 20 are arranged for the use of a relay to light the line lamp where the telephone is located a considerable distance from the switchboard. In the remaining lines the relay is not provided for since these lines will be used for the telephones located nearer the switchboard. Ordinarily any stations located over 800 feet from the board require a line relay for lighting the line lamp.

PRIVATE BRANCH EXCHANGE SWITCHBOARD (CONT.)

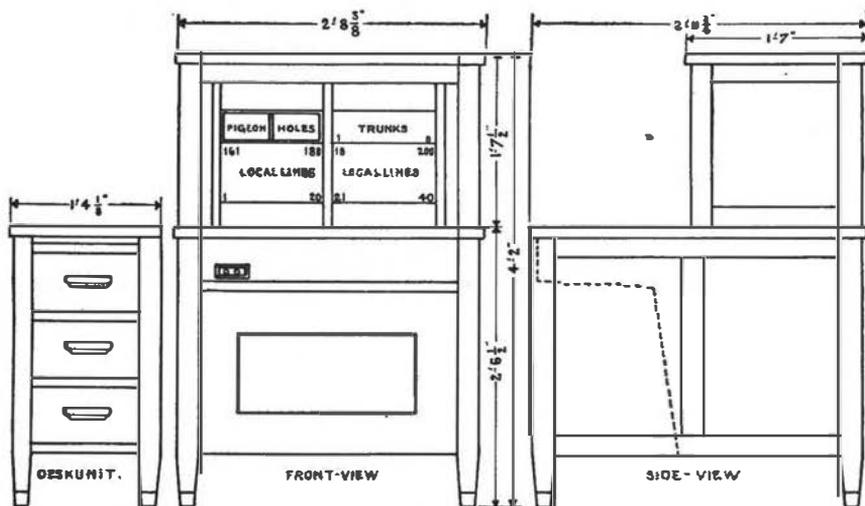
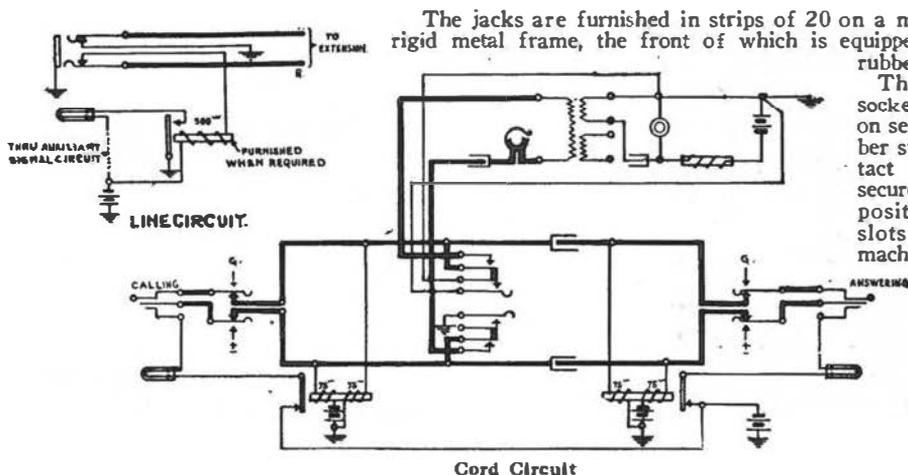


Diagram Showing Dimensions of No. 1962 Switchboard

No. 1962 "Sanitary Type"



The jacks are furnished in strips of 20 on a mounting with a rigid metal frame, the front of which is equipped with a hard rubber face strip.

The line-lamp sockets are mounted on selected hard rubber strips. The contact springs being securely fastened in position in milled slots by means of machine screws.

The Cord Circuits. The cord circuits are of the bridged impedance type which have the talking battery connected in series with two windings of the cord supervisory relay and fed through these windings to the tip and ring of either cord. Each cord has its own supervisory relay and lamp which is controlled by the switchhook in either the called or calling party's telephone, thus having what is technically termed "double supervision."

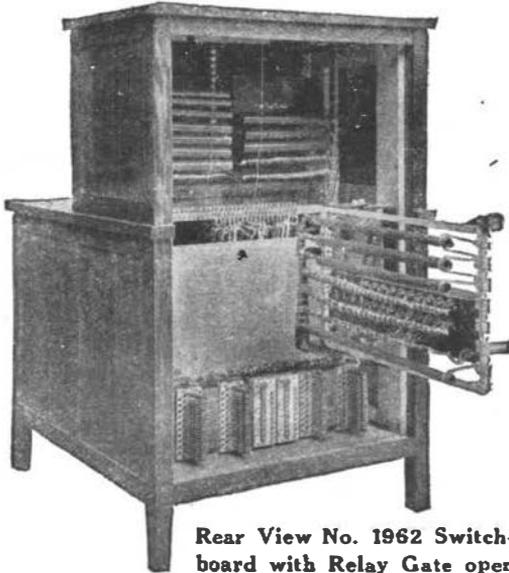
These are arranged for two-way ringing (ring on either cord) and with or without flashing recall on either cord. The flashing recall is a very desirable feature which speeds up the operator on answering recalls by flashing the supervisory lamp in the keyshelf. Some telephone men and the average layman have visions of a complicated mechanical device in connection with the flashing recall feature. Such is not the case, however, for this feature is accomplished by merely adding two relays in the cord circuit and three flashing recall relays which are common to all cord and plug ended trunk circuits in the switchboard. Their function is to interrupt the battery or ground supply to the supervisory lamps thus flashing them.

Fiat type relays requiring little mounting space and having spring contacts are used exclusively.

Universal type keys are used having key springs and spring combinations fastened to the key mounting by means of machine screws. The springs are resilient and of suitable length to give the proper contact pressures in the normal as well as operated positions. The action of the levers is smooth and positive, and the design throughout is such as to provide for maximum life. The entire key is easily removed for inspection or repairs.

PRIVATE BRANCH EXCHANGE SWITCHBOARD

(CONTINUED)



Rear View No. 1962 Switchboard with Relay Gate open

No. 1962 "Sanitary Type"

The Local Cable. The local cable is carefully constructed, well taped in exposed places as a protection against mechanical injury, and held securely in place by means of leather straps. Coatings of shellac are applied to preserve the insulation.

The Desk Units. This type switchboard is supplied with or without the tier of drawers depending upon the requirements of the purchaser. When furnished the drawer unit may be located at either side of the switchboard as desired. While the drawers are not an essential factor in the operation of the private branch exchange switchboard they are very convenient for keeping records or stationery where the private branch exchange operator has other duties than operating the switchboard. The finish of the woodwork is the same as the switchboard and when assembled as part of the switchboard compares with the usual office furniture.

The Power Plant. Storage batteries provide the best current for operating this switchboard. The storage battery has been rightly termed the heart of the telephone system, consequently great care must be used in the selection of the proper size of the storage battery and charging units.

The size of batteries may be determined on the basis of the following example of calculation:

1000	Total trunk and local connections per 24 hour day
.015	Current in ampere hours per call (based on call of ordinary duration)
<hr/>	
5000	
1000	
<hr/>	
15.000	Current in ampere hours for calls in 24 hours.

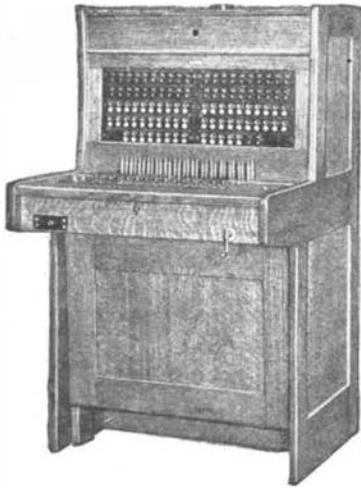
Since the rating of the storage battery is computed on an 8-hour capacity it is necessary to divide the ampere hour rating for 24 hours by 8 hours in order to determine the ampere hour rating of the battery required.

Thus	15.000	Current in ampere hours for calls in 24 hours
		Divided by 8
Equals	1.875	ampere-ampere rating for battery 24 hours
Plus	.1875	10 per cent. safety factor
<hr/>		
Equals	2.0625	Battery rating (basis 8-hour discharge rate)
	2	
<hr/>		
	4.1250	Ampere rating for battery 48 hour reserve
		(Nearest battery E.S.B. Co.'s type ET cells 4½ amp.)

The charging medium required would be a 5 ampere D.C. motor generator or a rectifier delivering this current at 30 volts. If it is desired to operate an interrupter ringing outfit with the storage battery the size of the latter should be increased from 1½ to 3 amperes depending on the amount of ringing to be done.

A satisfactory method of obtaining battery current for the private branch exchange is to have a direct connection to the main central office storage battery over several cable pairs. This is also true about the ringing current since this plan eliminates the necessity of maintaining the storage batteries and ringing equipment at the private branch exchange.

**PRIVATE BRANCH EXCHANGE SWITCHBOARD
No. 550 Type Switchboard**



80 Line No. 550B Switchboard

This switchboard has passed the Test of Service and proven Satisfactory and Reliable

This switchboard has the distinction of being a pioneer in the private branch exchange field since the adoption of the modern flat type relays, it being the first private branch exchange switchboard in which the new relays were used. The No. 550B switchboard in both the 30 and 80 line capacities makes an ideal installation in any city or town where the present equipment of the main central office is of the manual central battery type.

The compact cabinet design presents a neat appearance and compares favorably with the furniture in any modern office.

If there is a possibility of a change from manual to machine switching telephone equipment the purchase of the No. 550C switchboard, which has trunks arranged for connection to machine switching offices, including the necessary dialing features, is recommended.

TYPES AND CAPACITY

	550B(30)	550B(80)	550C(30)	550C(80)
Station lines total	30	80	30	80
†Station lines wired for relays	10	20	10	20
Trunk lines	10	15	10	15
*Cord circuits	10	15	10	15

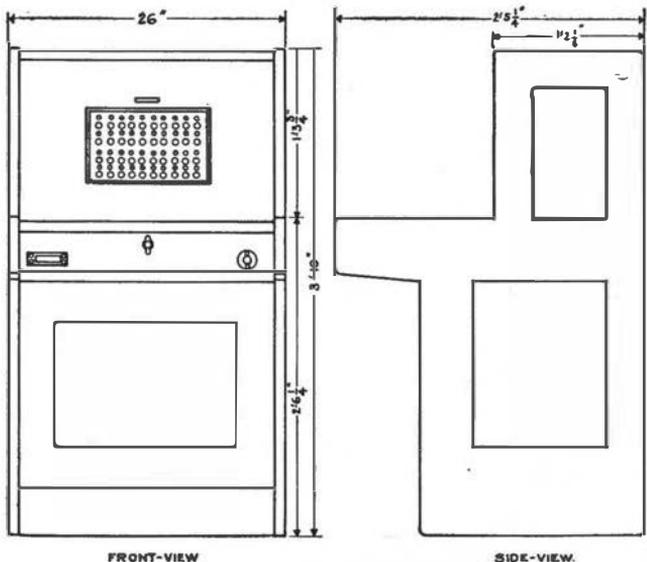
*The cord circuits in the No.550B board can be equipped for either single or double supervision while those in the No. 550C board are arranged for double supervision only.

†Certain lines are wired for relays to be used on lines where the telephone is located considerable distance (800 ft.) from the switchboard. Relays are not provided unless specified.

The Framework. Red oak lumber with a rich, dark finish or birch with a mahogany finish is used for all exposed woodwork parts. The lumber is kiln dried and thoroughly seasoned to prevent warping and cracking. Iron reinforcing brackets are placed on the inside of the cabinet at the corners giving added strength.

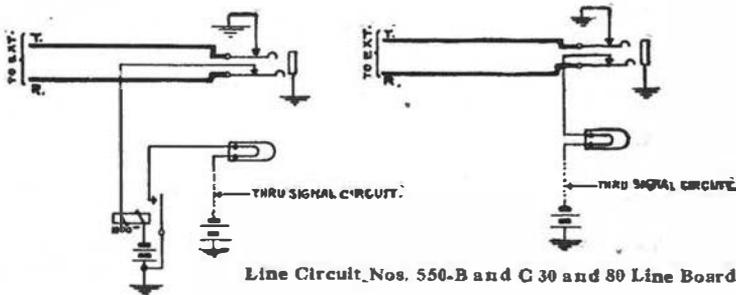
The stile strips which hold the line jacks and lamp sockets in place as well as the key mounting strips in the keyshelf consist of cold drawn galvanized steel. This insures perfect alignment of the face and keyboard equipment also prevents damage from moisture.

The equipment, such as relays, resistances, retard coils, etc., associated with the trunk, line, cord, night alarm, dialing, auxiliary and operator's telephone circuits, is mounted on a swinging relay gate which is constructed of a single piece of cold drawn galvanized steel bent in the proper shape and mounted on a heavy steel bracket securely fastened to the switchboard.



Dimensions of No. 550-80 Line Private Branch Exchange Switchboard

PRIVATE BRANCH EXCHANGE SWITCHBOARD (CONT.)



Line Circuit Nos. 550-B and C 30 and 80 Line Boards

No. 550 Type Switchboard

The gate is equipped with mounting clips and screws. The mounting clips hold the relay mounting plates on the relay gate and permit the use of the one piece relay gate.

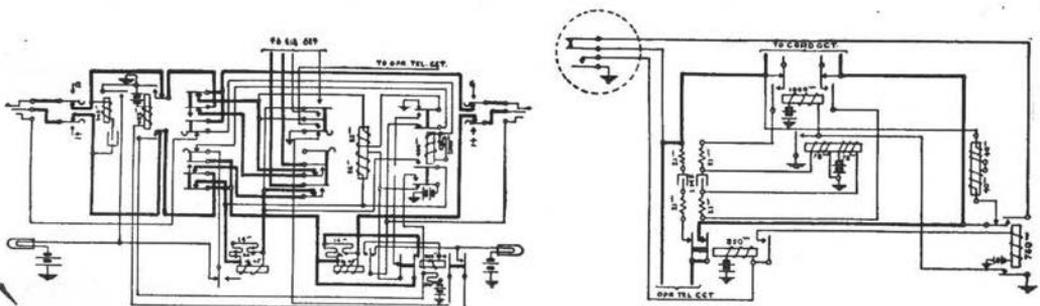
The cabinet is compact and all parts are easily accessible. These switchboards in the 80 line capacity are equipped with removable end panels. This permits the lining up of two boards and makes an ideal installation where several positions are required.

The Line Circuits. The line circuits are simple and terminate on screw terminals located on a hinged connecting rack which can be opened for inspection.

Certain lines are arranged for use with relays and intended to be used for the stations located considerable distance (800 ft.) from the switchboard. The latest standard flat type relays are used throughout which permits placing the maximum amount of equipment in a small space.

Individual line jacks and associated lamp sockets are used in all boards on trunk and line circuits. The number of jacks and lamps required are equipped and the remaining jack and lamp positions plugged with apparatus blanks. The blanks can be removed and jacks and lamps installed at any time. The panels upon which the individual jack and lamp sockets are mounted consists of one piece of dull finished black faced fibre which does not reflect the light. A designation strip is provided below each row of jacks for convenience in numbering. The black faced fibre panel presents a very neat appearance as well as insuring perfect alignment of the face equipment.

The Trunk Circuits. Jack ended trunks are used on all No. 550 type boards. The jacks and lamp sockets are individually mounted as in the line circuits.



CORD CIRCUIT NO. 550 PRIVATE BRANCH EXCHANGE SWITCHBOARD.

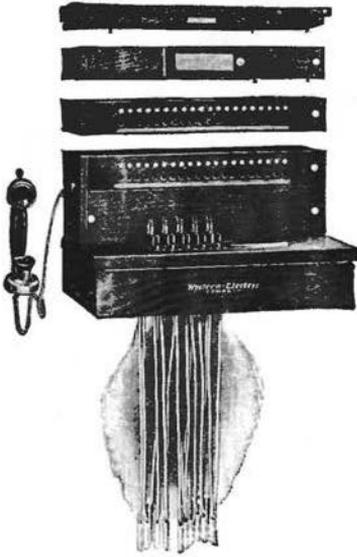
DIALING CIRCUIT NO. 550-C-PRIVATE BRANCH EXCHANGE SWITCHBOARD.

The Cord Circuits. The cord circuits embody all of the features required for the successful operation of the private branch exchange. Connections between stations and from stations to trunks are easily established. On the 550C board each cord circuit is arranged for dialing by the operator from the board and through dialing from any station on the private branch exchange to the machine switching exchange. This through dialing is accomplished by the operator throwing the night key and the through dialing key in the proper position after putting up the night connections. The function of the night key is to cut out all the equipment from the circuit which is not required for night service.

The Dial Circuit No. 550C Board. The dial may or may not be used as desired, it being easily installed when needed. It is connected to the local cable by means of a flexible cord and the dial itself held in place by a spring clip which is screwed to the keyshelf. When the dial is not equipped the hole for the cord is suitably covered with an apparatus blank.

PRIVATE EXCHANGE SWITCH-BOARDS

No. 1801 Sectional Unit Type



No. 1801 Switchboard
Showing Method of Enlarging

The No. 1801 has lamps for the line and supervisory signals. Birch lumber, with a mahogany finish, or quarter sawed red oak which has been kiln dried and thoroughly seasoned to prevent warping and cracking is used in the construction of the units.

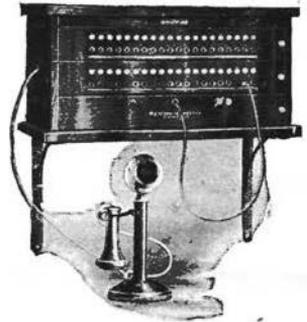
Four systems—"A," "B," "C" and "D" have been devised to handle the various classes of service required in this type of switchboard. Telephones which can be used with the systems are listed under heading: Central Battery Telephones.

SYSTEM "A"

This system provides for communication between the switchboard and stations only. There are no facilities for inter-communication between stations or for connections to a central office.

Direct current is used for ringing the telephone bells, hence a battery is required for ringing as well as for talking current.

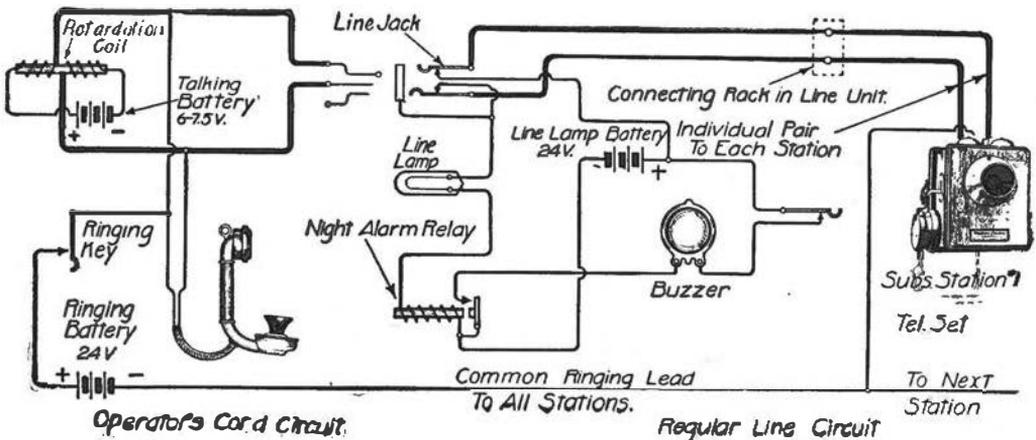
This is a three-wire system, a third wire common to all sets being required in addition to the two wires individual to each station. When a station is being rung, ringing current passes out over the tip side of the line through the bell in the telephone and back over the third wire.



No. 1801 Switchboard
System "A"

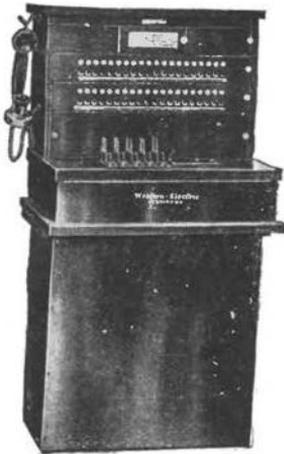
Consisting of:

- 1—G-1 Top Unit
- 1—HD-1 Line Unit
- 1—JD-1 Cord Unit
- 1—K-1 Supporting Unit



PRIVATE EXCHANGE SWITCHBOARD (CONT.)

No. 1801 Sectional Unit Type



No. 1801 Switchboard System "B"

Consisting of:

- 1—G-1 Top Unit
- 1—HA-7 Simultaneous Talking and Ringing Unit
- 1—HD-1 Line Unit
- 1—JC-2 Cord Unit
- 1—K-2 Supporting Unit

Since the operator is a party to all conversations, no supervision is required.

The telephones used on the lines of this system are equipped with direct current vibrating bells.

The switchboard can be arranged for simultaneous ringing of and talking to all stations.

SYSTEM "B"

This system embodies all of the features of System "A" and in addition has facilities for intercommunication between stations. Five pairs of connecting cords with ringing and listening keys are provided for this purpose.

The method of wiring to the sets is the same as System "A" and the stations are rung in the same manner.

As soon as a connection is set up, the line lamps of the lines connected become supervisory lamps and remain dark as long as the parties have their receivers off the hook and light when they hang up.

Note the simplicity of the cord and line circuits. Since the circuits are simple in design the possibility of trouble is reduced to a minimum. It is to be noted that there are no relays in the line circuits with the exception of the night alarm relay.

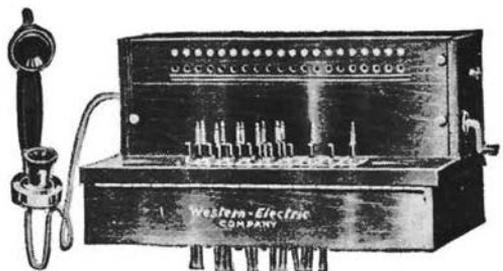
Simultaneous ringing and talking feature can be furnished with this system.

SYSTEM "C"

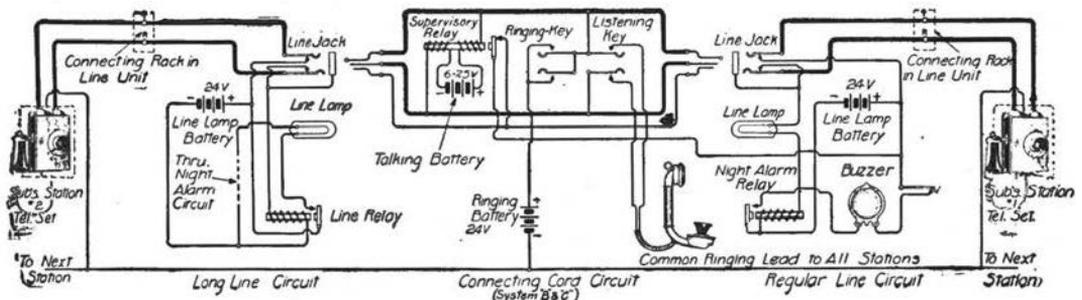
This system embodies all of the features of system "B," and in addition two plug ended trunks are provided which may be equipped for connections to either magneto or central battery central offices.

These trunk circuits are provided with holding, ringing and listening keys and the operators' telephone circuit is equipped with an induction coil to insure good transmission on trunk connections. The stations are rung, and supervision obtained in the same manner as in system "B."

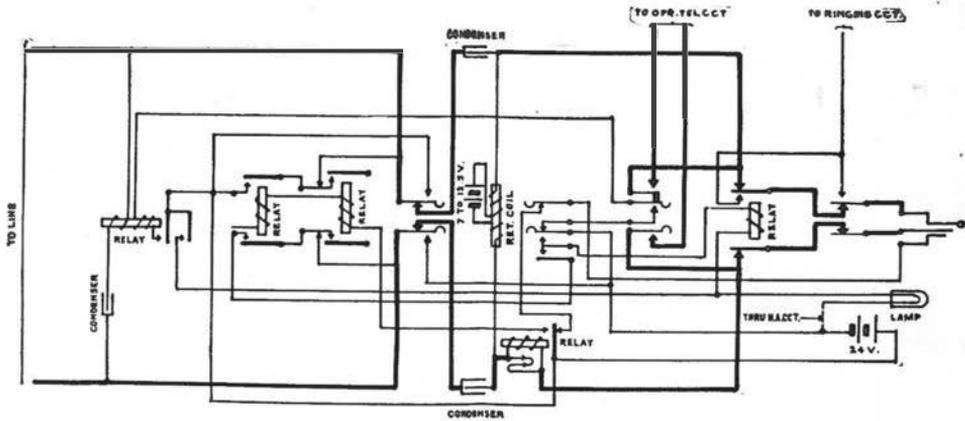
When trunk circuits to central battery central offices are equipped they are connected to a regular subscribers' line circuit at the central office. When the trunk is plugged into a line on which the party has removed the receiver from the hook, the central office operator will receive the signal in the usual manner. The private exchange operator can also signal the central office operator by manipulating the holding key.



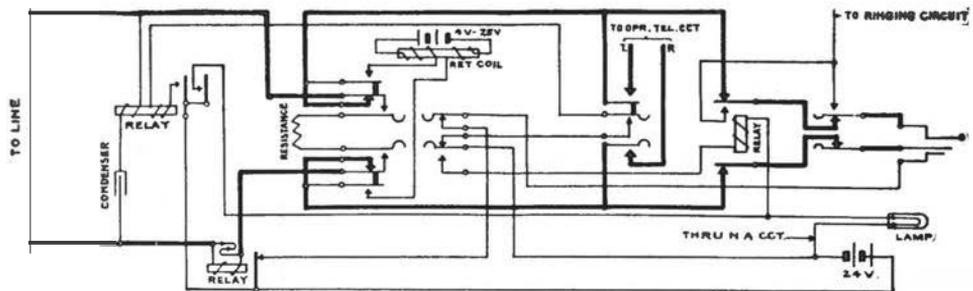
No. JC-5 Cord Unit



PRIVATE EXCHANGE SWITCHBOARD (CONT.)
No. 1801 Sectional Unit Type



TRUNK CIRCUIT TO MAGNETO CENTRAL OFFICE.
NO. 1801 SWITCHBOARD.



TRUNK CIRCUIT TO CENTRAL BATTERY CENTRAL OFFICE,
NO. 1801 SWITCHBOARD.

To signal the private exchange operator, the central office operator rings out on the line in the usual manner. This action lights the trunk lamp which remains lighted until the listening key is operated. Talking current is obtained from the central office on trunk connections, except when the holding key is operated.

The holding key enables the operator to hold a trunk connection while she converses with the party desired or until the party desired can be connected.

A night key is provided to prevent battery from flowing when the trunk is set up for night or thru connections.

When the trunks are arranged to handle connections to a magneto central office, the central office operator signals the private exchange by ringing on the line in the usual manner. Talking current for the stations is furnished by the trunk circuit, and supervision is the same as when a connection is made with a cord circuit. A key is provided to ring the stations and a separate key to signal the central office. A night key is provided which has the same function as the night key in the central battery trunks. The trunk circuit is so arranged that on a thru or night connection the action of removing the receiver from the hook will kick down the drop at the central office.

The telephone sets used with this system are similar to those used with systems "A" and "B" except that they are also equipped with an induction coil.

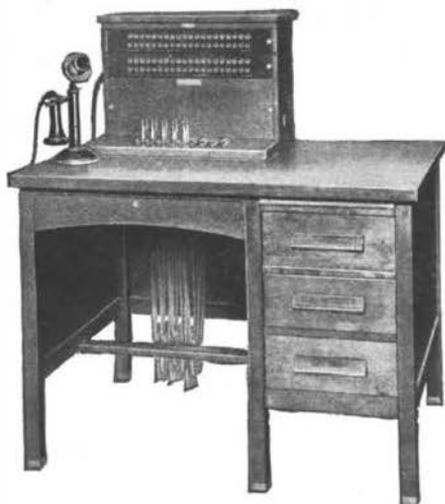
The simultaneous ringing and talking feature can be furnished with this system.

PRIVATE EXCHANGE SWITCHBOARD

(CONTINUED)

No. 1801 Sectional Unit Type

SYSTEM "D"



No. 1801 Switchboard System "D"

Consisting of:

- 1—G-1 Top Unit
- 1—HD-1 Line Unit
- 1—JD-7 Cord Unit
- 1—K-3 Supporting Unit

This system has all of the features of system "C" except that it employs the regular two wire line circuit, and alternating current is used for ringing purposes. A ringing interruptor can be supplied for furnishing alternating ringing current. All cord units are equipped with a No. 22 hand generator.

The telephone sets used with this system are the regular central battery sets used with central office systems.

The operation of trunk circuit either to Central Battery or magneto exchanges is the same as for System "C" except that no No. 127A set is required at the stations for night or through connections.

If no trunk circuits are desired, the cord units are furnished with wiring only for those trunks and the apparatus spaces properly blanked.

Description of Units. To make up a complete No. 1801 switchboard one supporting unit, one cord unit and one top unit are required. If line or miscellaneous units are required to handle the service they can be added at any time.



G-1 Top Unit



HD-1 Line Unit

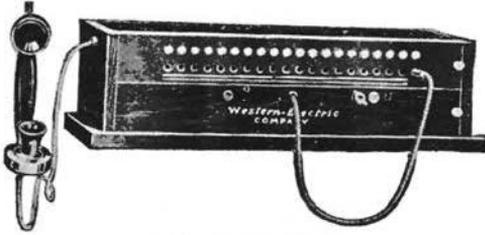
(Used with all top and cord units)

Line Units. The line units are all wired for twenty lines, the only difference being in the number that are equipped. All unequipped jack and lamp positions are plugged with apparatus blanks. The jacks and lamp sockets are singly mounted and are easily installed when a few lines are to be added. The following shows the equipment of the various units:

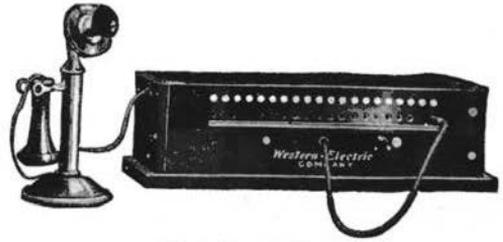
Code No.

- HA-1 wired for 20 lamp signal line circuits, with equipment for 5
- HB-1 wired for 20 lamp signal line circuits, with equipment for 10
- HC-1 wired for 20 lamp signal line circuits, with equipment for 15
- HD-1 wired and equipped for 20 lamp signal line circuits.

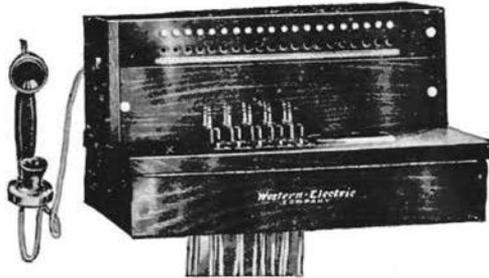
PRIVATE EXCHANGE SWITCHBOARD
No. 1801 Sectional Unit Type (Cont'd)



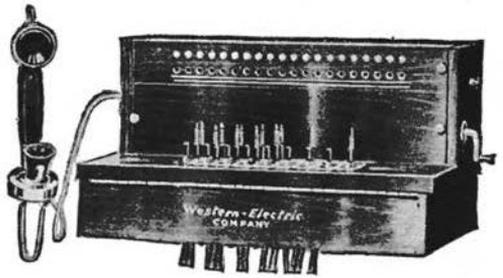
JC-1 Cord Unit



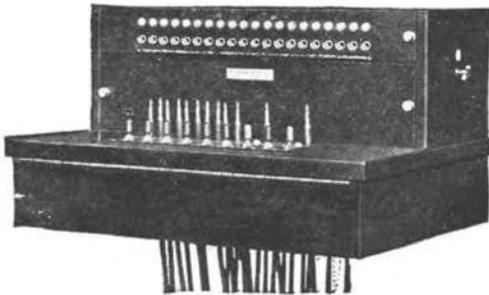
JD-1 Cord Unit



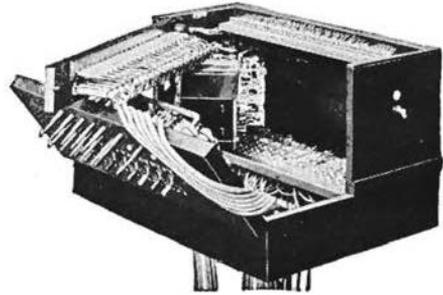
JC-2 Cord Unit



JC-4 Cord Unit



No. JD-3 Cord Unit



No. JD-3 Cord Unit—Showing Gate

Cord Units. Each cord unit is equipped with an operator's telephone circuit (either hand set or desk stand) and night alarm circuits as well as the equipment outlined below. All cord units are adapted for use with all line and line relay units.

On units which are equipped with five cord circuits, five simultaneous connections may be established.

Care is used in the construction of the units to attain the maximum degree of accessibility. The keyshelf is mounted with a piano type hinge, a feature which insures perfect keyshelf alignment. The trunk and cord relays are mounted on a swinging gate which screws rigidly in place by means of brass machine screws.

All battery fuses are located in the cord unit.

Code No.	System	Operator's Ans. and Call Cords	Conn. Cord Cts. with 1 Way Ring and List Keys	Operator's Set Type	Central Battery Lines	Plug Ended Trks. to C. B. Exchange	Plug Ended Trks. to Mag. Exchange
JC-1	A	1	..	Hand set	20	..	..
JD-1	A	1	..	Desk stand	20	..	..
JC-2	B	..	5	Hand set	20	..	..
JD-2	B	..	5	Desk stand	20	..	..
JC-3	C	..	5	Hand set	20	2	..
JD-3	C	..	5	Desk stand	20	2	..
JC-4	B	..	5	Hand set	20	2	..
JD-4	B	..	5	Desk stand	20	2	..
JC-5	C	..	5	Hand set	20	..	2
JD-5	C	..	5	Desk stand	20	..	2
JC-6	D	..	5	Hand set	20	..	2
JD-6	D	..	5	Desk stand	20	..	2
JC-7	D	..	5	Handset	20	..	..
JD-7	D	..	5	Desk stand	20	..	..

PRIVATE EXCHANGE SWITCHBOARD
(CONTINUED)
No. 1801 Sectional Unit Type



No. HA-7 Simultaneous Ringing and Talking Unit, Open

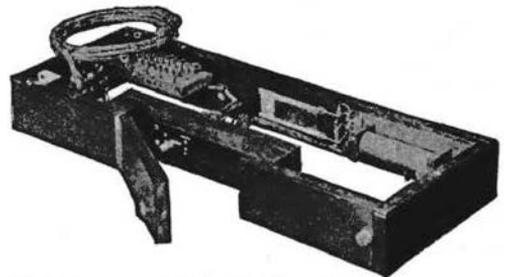


No. HA-7 Simultaneous Ringing and Talking Unit, Closed

SIMULTANEOUS TALKING AND RINGING UNIT FOR USE WITH SYSTEMS A, B and C

It is sometimes desirable to have facilities for ringing and communicating with all stations at once. This unit provides the feature of "simultaneous ringing, listening and talking" which has proven to be of great value at the time of a fire or at any time when it is necessary to send out a "general alarm." This feature has also been used with very good success in schools for ringing the bells at the end of study periods, and in sanitariums and prisons for "spreading an alarm" when one of the inmates has escaped. The only operation necessary to communicate with all stations is the manipulation of the ringing and listening keys. No cords and plugs are used with this feature which reduces the time required for sending an alarm and incidentally reduces the cost of construction. Fire insurance companies consider the simultaneous ringing, listening and talking features very favorably. Since this is a feature which will increase the value and efficiency of the system as a whole, it is advisable that it be included in each installation.

Line Relay Unit. The question of furnishing adequate service, particularly signaling, to stations located a considerable distance (over 800 ft.) from the switchboard frequently arises. The HA-2 line relay unit takes care of this condition. Five relays constitute the equipment in each unit and since the first five lines circuits in each cord unit are wired for conversion to long line equipment it is a simple matter to change to long lines as required. The relays are wired to screw terminals in the rear of the unit.



No. HB-6 Incoming Call Transfer Unit (Open and Closed Views)



No. K-2 Supporting Unit

Incoming Call Transfer Unit. The incoming call and transfer unit is arranged so that all calls can be received at a designated station when an operator is not on duty at the switchboard. This increases the flexibility of the switchboard and makes the system more valuable to the owner. Adapted for use with systems "A," "B," "C" and "D."

Supporting Units. No. K-1. Consists of two japped iron brackets for supporting the switchboard against a wall.

No. K-2. A shelf supported by two brackets and a casing for enclosing the cords. Used when the switchboard is mounted against the wall.

No. K-3. A flat-topped desk with one tier of drawers, so arranged that the cores are concealed by a wooden panel.

PRIVATE EXCHANGE SWITCHBOARD

(CONTINUED)

No. 1801 Sectional Unit Type

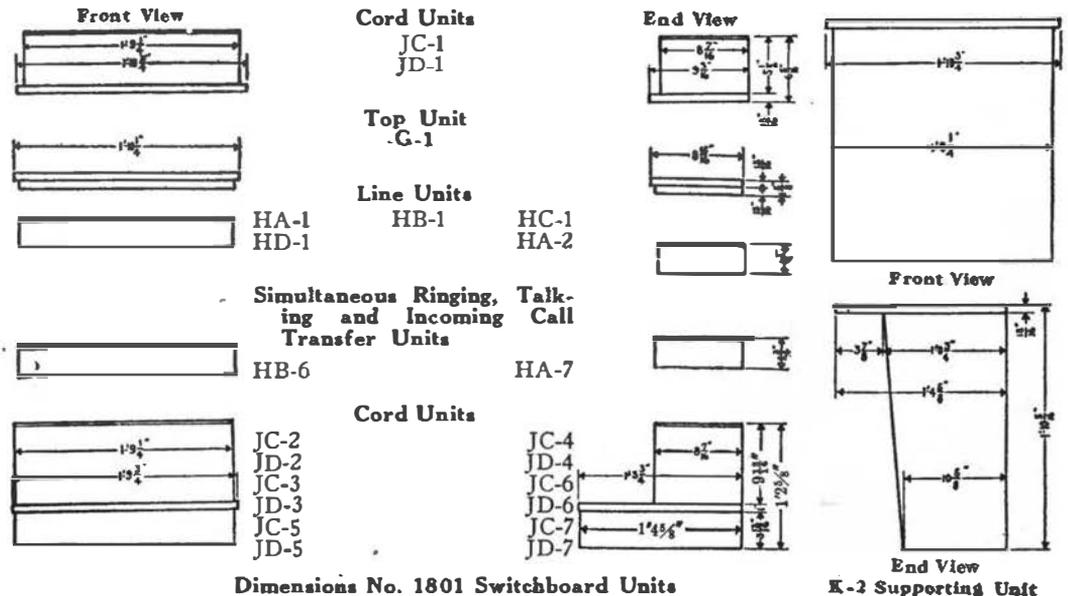
TABLE OF UNITS AND PARTS

	System "A"	System "B"	System "C"	System "D"
Top unit.....	G-1	G-1	G-1	G-1
Line unit.....	HA-1	HA-1	HA-1	HA-1
Line unit.....	HB-1	HB-1	HB-1	HB-1
Line unit.....	HC-1	HC-1	HC-1	HC-1
Line unit.....	HD-1	HD-1	HD-1	HD-1
Line relay unit.....	HA-2	HA-2	HA-2	HA-2
Simultaneous Talking and ringing..	HA-7	HA-7	HA-7	—
Incoming call transfer	HB-6	HB-6	HB-6	HB-6
Cord unit.....	JC-1	JC-2	JC-3	JC-4
Cord unit.....	JD-1	JD-2	JD-3	JD-4
Cord unit.....	—	—	JC-5	JC-6
Cord unit.....	—	—	JD-5	JD-6
Cord unit.....	—	—	—	JC-7
Cord unit.....	—	—	—	JD-7
Supporting unit.....	K-1	*K-1	*K-1	*K-1
Supporting unit.....	—	K-2	K-2	K-2
Supporting unit.....	—	K-3	K-3	K-3
Talking battery.....	6 dry cells in series	6 dry cells in series	‡6 dry cells in series	‡6 dry cells in series
Ringing battery.....	†20 dry cells in series	†20 dry cells in series	†20 dry cells in series	—
Line lamp battery....	†20 dry cells in series			
Ringing interrupter...	—	—	—	62A
Telephone sets—Wall.	1527A	1527A	1533M	1533A
Telephone sets—Desk.	6034AU	6034AU	6000AE	6054A

*While the K-1 unit can be used with systems "B," "C" and "D," it does not conceal the cords and one of the other units is recommended.

†If 60 to 100 lines are equipped, furnish 2 strings connected in parallel, each string consisting of 20 cells in series. One battery may be used for both ringing and line lamps in System "A," "B" and "C."

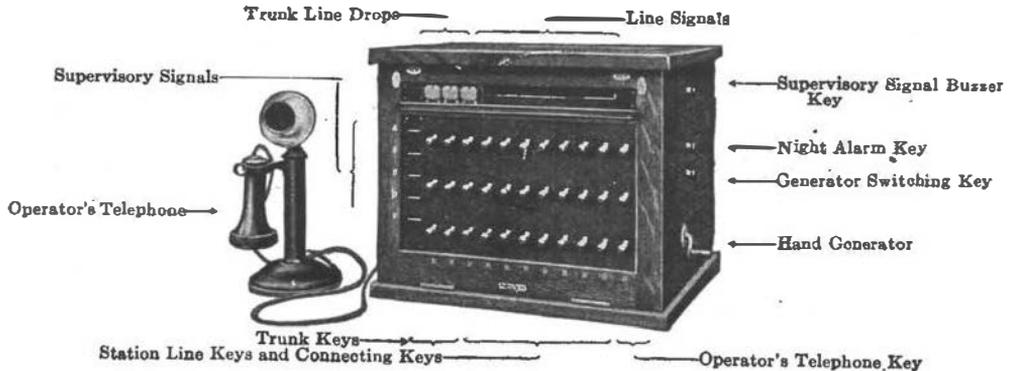
‡8 cells in series (instead of 6) should be provided if trunks to magneto central office are equipped. Cord units used with system "D," are equipped with a No. 22 hand generator for ringing.



Dimensions No. 1801 Switchboard Units

K-2 Supporting Unit

MAGNETO AND CENTRAL BATTERY SERVICE



No. 505B Switchboard

NO. 505 Cordless Type

These switchboards are designed for both central battery and magneto service and can be used either as private branch exchanges or private exchanges as desired. They are manufactured in three types, the cabinets all being the same size as pictured above. (Height $14\frac{1}{8}$ inch., length $16\frac{3}{4}$ inch., depth $15\frac{3}{8}$ inch.) and equipped to meet service requirements as follows:

No. 505B Private Branch Exchange Switchboard (central battery) equipped with three trunk lines and seven station lines. Commonly called a 3 x 7 cordless switchboard. Trunks are arranged for connection with manual central battery offices.

No. 505C Private Branch Exchange Switchboard (central battery) is the same as the No. 505B Switchboard except the trunks which are arranged for connection to a machine switching office.

The third type is known as the "10 Line Cordless Magneto Switchboard" and is equipped with 10 magneto station lines, any of which may be connected with a line from a magneto office for trunking purposes. This makes an economically operated and convenient private exchange for any isolated factory or institution where inter-department communication is desired.

Compactness in size of cabinet, accessibility of apparatus enclosed and serviceability, have been realized in the design of this switchboard. It has been standardized in light finished quarter sawed oak and birch finished to match mahogany and can be mounted upon an ordinary desk or table making a very desirable equipment where the operator has other duties to perform, such as stenographic or clerical work, etc.

Equipment. Keys operated by cam levers are employed for establishing connections. These permit of rapid operation and a reduction in floor space as no cabinet, desk or special stand must be provided to accommodate cords and weights. The keys provide for five simultaneous connections.

Three push button type keys mounted on the side of the board control the operation of the night alarm buzzer in connection with the line signals, the supervisory signal buzzer, and ringing current from either the central office or hand generator in the board.

The trunks from the central office terminate on drops. This enables central to recall the P.B.X. operator at any time.

Supervision of connections in the central battery type boards is maintained by means of signal targets that are displayed when the parties have finished talking; drops are used for supervision in the magneto type board.

The operator's telephone set includes a desk set with black finish complete with receiver, transmitter and cord and is operated by the key at the extreme right.

Standard central battery telephones are used for the 505 type board and standard magneto telephones for the magneto type boards.

NON-MULTIPLE TOLL SWITCHBOARDS

"Sanitary Type"

Toll service is a very important factor to consider in the layout of any telephone system regardless of the size, it being the class of service to the public which is recognized as absolutely indispensable and exemplifies the character of the telephone service in the community. It is reasonable therefore that particular care be used in the selection of switchboards to handle this service. The development of the "Sanitary Type" Toll board is the Western Electric Co.'s latest departure from old methods in small switchboard manufacture and is evidence of the efforts being exerted toward the production of modern switchboards that retain the qualities which are characteristic of Western Electric Products upon which the Company's reputation for reliability is built and maintained.

The Framework

The Sanitary Type cabinet is built along the lines of the modern office desk having square lines generally, square legs (metal capped at bottom), plain panels and a clearance underneath for cleaning purposes, hence the term "Sanitary." Red oak lumber, thoroughly seasoned, kiln dried and given a dark durable finish is used in the cabinet construction. Thoroughly glued tongue and groove joints fit the cabinet neatly and securely together. Steel brackets are placed inside of the cabinet at the corners giving additional strength. Cold-drawn galvanized steel is used for stile strips to support the face equipment as well as the keyshelf bars upon which the keys are mounted. This insures permanent, rigid alignment of the face and keyboard equipment.

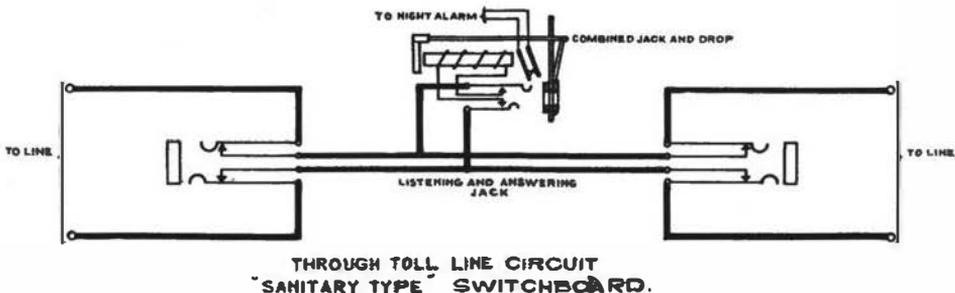
The relays, resistances, retardation coils, etc., associated with the various circuits are mounted on a swinging relay gate consisting of a single piece of undrilled cold-drawn galvanized steel bent into the proper shape and mounted on a substantial steel bracket permitting easy access to apparatus and wiring when open and presenting a neat compact appearance when closed. Plugshelf and piling rail are covered with dull finished non-reflecting durable semi-hard rubber.



Sanitary Type Toll Board

The Apparatus

The well-known No. 23C type combined jack and signal is used in the line circuit. The drop is self-restoring upon insertion of the plug into the jack. The jack springs are well insulated from the drop and night alarm contacts and constructed of metal of the proper resiliency, to insure perfect contact, without unnecessary wear, when the plug is inserted. Universal type keys, which are adaptable to nearly any condition, positive in action, insuring good contact in the normal as well as the operated position, are used in the cord circuits.



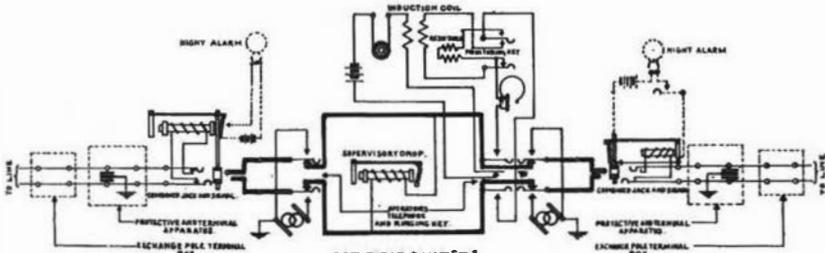
The Line Circuit

Two types of toll line circuits are used, namely the through toll line and the terminating toll line. The through toll line loops through the office and appears in the face of the board in three double cutoff jacks and a signal.

The terminating toll line ends in a combined jack and signal which is of the double cutoff type.

NON-MULTIPLE TOLL SWITCHBOARDS

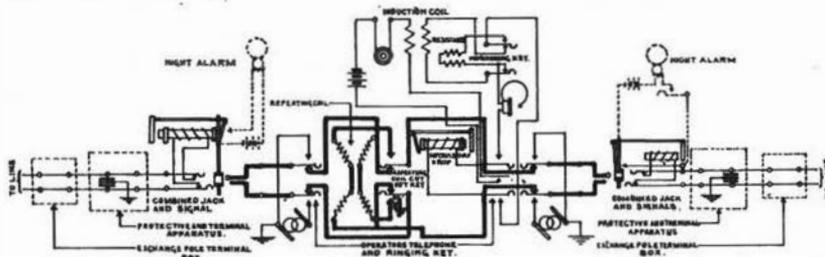
(Continued)



CORD CIRCUIT "D"
SANITARY TYPE TOLL SWITCHBOARD.

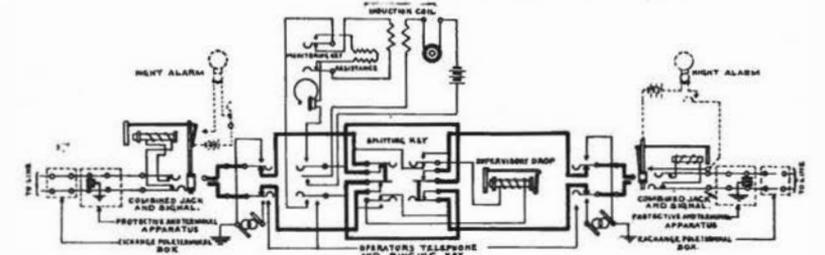
The Cord Circuits

To meet the various requirements four standard cord circuits designated "D," "E," "F" and "G" have been developed. Cord circuit "D" is a simple toll cord circuit arranged for single supervision, two-way ringing and monitoring. Monitoring is an essential feature in all toll cord circuits since it is necessary to listen in for supervisory purposes without interfering with the established connection.



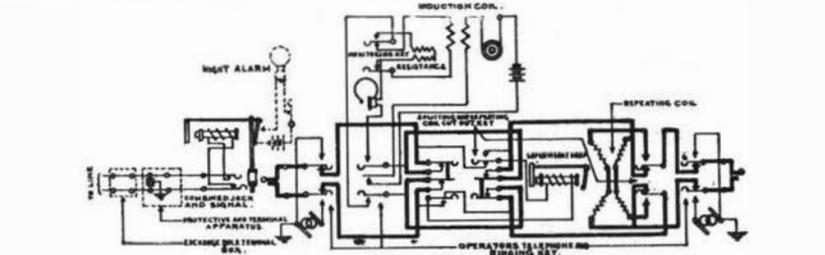
CORD CIRCUIT "E"
SANITARY TYPE TOLL SWITCHBOARD.

Cord circuit "E" is the same as cord circuit "D" except that a repeating coil wired to a cut-out key has been added. The repeating coil is required in the cord circuit when used to connect a toll line to a grounded, common return or rural line to eliminate noise and is not needed for connections between toll lines, hence the cut-out key.



CORD CIRCUIT "F"
SANITARY TYPE TOLL SWITCHBOARD.

Cord circuit "F" is arranged for single supervision, two-way ringing, monitoring and splitting, without repeating coil. The splitting key enables the operator to talk to either party on a connection without being heard by the other. This is an advantage in that confusion is avoided in handling connections.



CORD CIRCUIT "G"
SANITARY TYPE TOLL SWITCHBOARD.

Cord circuit "G" is the same as cord circuit "F" except the repeating coil and cut-out key have been added.

NON-MULTIPLE TOLL SWITCHBOARDS AND TOLL TEST BOARDS

Non-Multiple Toll Switchboards—Continued

Other Circuits

Automatic recording trunks from central battery board are jack ended with a lamp signal and provide means of connecting local subscribers through the central battery board to the toll board. These circuits are automatic in operation, the signal in the toll board lighting when the plug is inserted in the trunk jack at the local board.

Outgoing trunk circuits are jack ended in the toll board and plug ended in the local board. The operation is simple as the toll operator requests the local operator, over a call wire, for an outgoing trunk to be assigned for use with each call. The local operator assigns the trunk and plugs the trunk plug into the line desired while the toll operator plugs in to the assigned trunk jack with one of the cord circuit plugs.

Call wire circuits are used in conjunction with the outgoing trunks in establishing connections between the local and toll boards. By pressing a call wire key the toll operator is connected directly with the local operator's telephone set.

The operator's telephone circuit is wired so that the circuit through the transmitter, induction coil and battery is closed only when the operator has a listening key open. A standard long distance transmitter and receiver is used.

Each switchboard is wired for an operator's telephone switching key circuit which is used for switching the operator's telephone from one position to another when several positions are lined up together.

Toll Test Boards

21 and 41 Wire 2 and 4 Jack

The toll line is commercially and physically one of the most important factors in the telephone communication system. It receives first attention when in need of repairs in order that the revenue from it will not be stopped and that towns or cities to which it extends will not be isolated from the rest of the world.

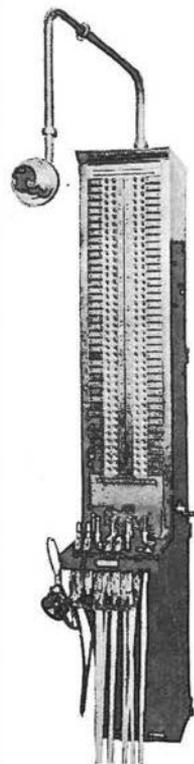
It is reasonable, therefore, that ability to provide efficient, accurate tests is a prime requisite.

The 21 or 41 wire, 2 or 4 jack toll test boards provide sufficient testing equipment and circuit flexibility to insure prompt location of toll line trouble. Reference to 2 or 4 jack circuits, means the number of jacks in the test board through which the toll line conductors are looped for testing purposes. The lines are wired at the jacks in such a manner that they can be opened, closed, grounded or patched through. Each board is equipped with a cord circuit having twin plugs arranged for ringing listening, talking or patching circuits through.

These boards are adapted for use by either large or small operating companies.

They are suited to the small companies' needs in that they work in conjunction with the No. 1407C testing cabinet and the No. 1407A bridge unit as simple, efficient and reliable wire chief's equipment, where the necessary ground, short circuit, Varley loop or Murray loop tests can be applied as desired.

For the large companies these boards make an ideal test station to be located at a strategic point in the toll line system, from a circuit as well as transportation standpoint, for instance at a toll line junction, where the lines can be opened, grounded or short circuited for testing or patched through for temporary service.



View of 41 Wire 4 Jack Toll Test Board

TOLL TEST BOARDS

(Continued)

Capacity

- 21 wire 2 jack—Equivalent of 10 physical toll lines (2 jacks per wire, 1 ground jack)
- 21 wire 4 jack—Equivalent of 10 physical toll lines (4 jacks per wire, 1 ground jack)
- 41 wire 2 jack—Equivalent of 20 physical toll lines (2 jacks per wire, 1 ground jack)
- 41 wire 4 jack—Equivalent of 20 physical toll lines (4 jacks per wire, 1 ground jack)

The odd jack at the bottom, that is the 21st or the 41st jack, is intended for use as a ground jack and should be connected direct to ground which will prove convenient for use while making tests.

While the capacity of these boards is limited to 20 physical toll lines additional line capacity may be obtained by installing extension test board units which are panels of the same line jack capacity but have no cord circuits or operators telephone circuit.

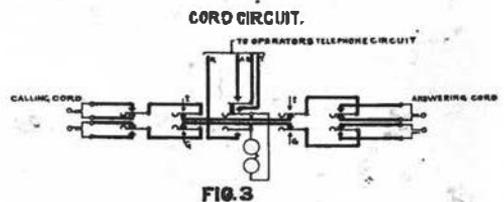
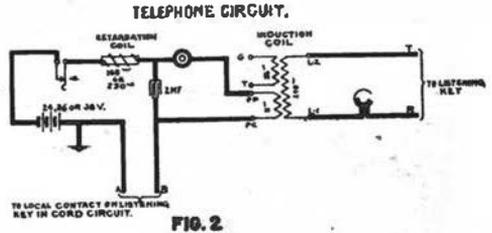
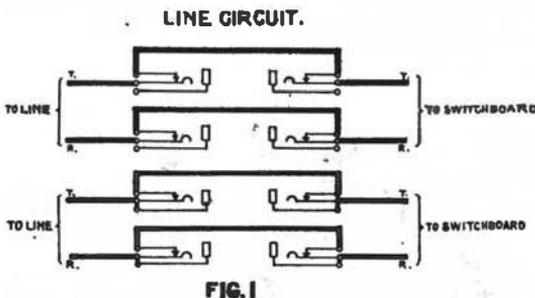
In large toll centers where it is necessary to handle and test more complicated circuits such as simplex, phantom, composite, duplex, telegraph, polar duplex, telephone and telegraph repeater circuits we recommend the installation of our No. 4 toll test board.

The Framework

The cabinets are substantially constructed of thoroughly seasoned, kiln dried mahogany lumber which is given a rich, durable finish. Hard rubber panels of highest insulating qualities are used, on which are mounted the toll line jacks. The rubber panels are securely supported by iron details insuring permanent, rigid alignment of the face equipment. A standard long distance transmitter mounted on a transmitter arm, which is fastened to the top of the cabinet, and a standard head receiver are required with each test board. Designation strips are provided by which each toll line looping through the test board can be properly designated.

The Toll Line Circuits

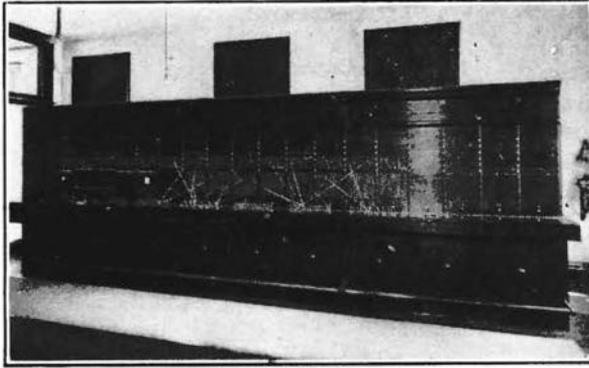
Toll line circuits on toll test boards are generally referred to and designated by the number of jacks each wire in the circuit is looped through. That is 2 and 4 jack circuits would have each wire of the circuit looped through 2 or 4 jacks respectively. The line circuit is very simple, merely providing means of opening, short circuiting or grounding the lines for testing in either direction and is the standard toll line circuit used in toll test boards. Ordinarily the line jacks are cabled to terminal strips located conveniently on the wall near the board, or to the Distributing Frame where they can be cross connected to any line desired or to phantom or simplex coils if such are installed.



Other Circuits

A cord circuit equipped with twin plugs and arranged for ringing listening, patching and talking on any of the lines for testing purposes is provided. Single plugs are also provided to be used in testing. Patching cords equipped with either twin or single plugs may be obtained as extra equipment.

The operator's telephone circuit is equipped with the standard long distance transmitter and receiver.

CENTRAL BATTERY MULTIPLE SWITCHBOARDS

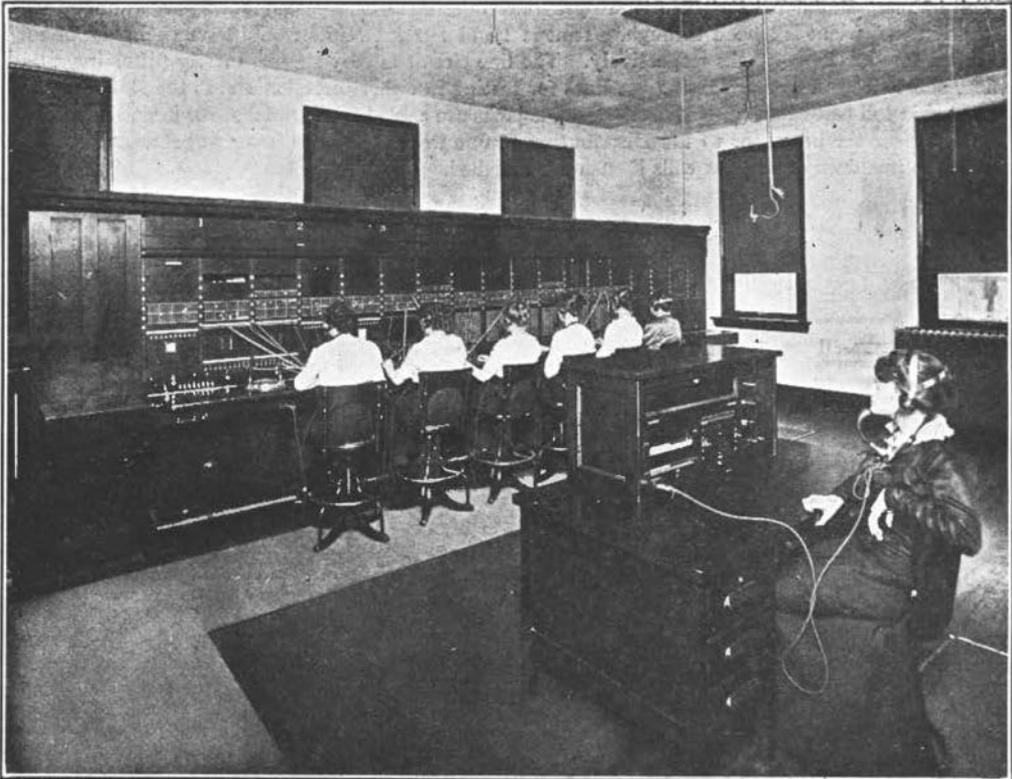
Main Switchboard
Three Sections of 6 Panel No. 1 Type

GENERAL

The idea of using a multiple of the subscriber's switchboard lines to speed up telephone service, by eliminating the transfer trunk system was originated by the Western Electric Company and has been applied to the manufacture of large switchboards for a number of years. Flexibility is provided since a complete multiple of every line in the exchange appears before each operator permitting any line to be called from any position of the switchboard.

These boards are built to handle efficiently the traffic on exchanges having from 300 to 10500 lines. Since the service features required in a multiple switchboard vary with the conditions peculiar to different localities in which installation takes place, they are built to meet the individual requirements of each exchange. This permits the incorporation of features found desirable after a careful study has been made of the traffic and other conditions.

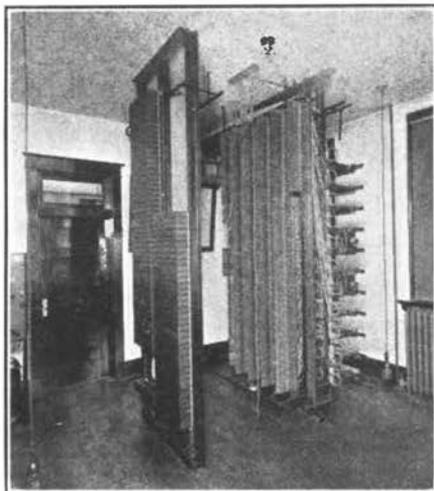
The layout of a multiple switchboard exchange warrants careful study as consideration must be given to the requirements of future growth, the installation of additional equipment, and other important details.



Operating Room. Showing Main Switchboard and Chief Operator's Desk

CENTRAL BATTERY MULTIPLE SWITCHBOARDS

(Continued)



Terminal Room

Switchboard Framework

Each section is a unit and consists of 3 operators' positions. A rigid steel skeleton, constructed of steel angles and channels securely riveted and bolted together, constitutes the structure of the framework. This framework is coated with black rustproof paint. Selected mahogany thoroughly seasoned and kiln dried to prevent warping or cracking is used for the cabinet enclosing the steel framework.

All woodwork joints are of the tongue and groove type, thoroughly glued. All exposed outer surfaces are given a rich, durable finish and the inner surfaces coated with shellac as protection against the effects of moisture.

Cold-drawn galvanized steel is used for the stile strips, which support the face equipment, the key mounting bars that hold the keys in place in the keyshelf and the relay mounting supports to which the relay mounting plates are attached. Piano type hinges extending the full length of the keyshelves are used on all boards.

The end panels are removable as well as the front panels that conceal the cords. Rear roller curtains which operate easily allow free access to the back of the section.

Each lineup of switchboard requires a cable turning section at one end to enclose the cables entering the switchboard. Lineups can be straight or with angles as required.

The relays, resistances, retardation coils, condensers, etc., associated with the cord, operator's telephone, supervisor, night alarm and auxiliary signal circuits are mounted in the rear of the board, the line relays being mounted on a separate relay rack.

The plugshelf and piling rail are covered with durable, non-reflecting, semi-hard rubber.

Distributing Frames

A main distributing frame is essential with any switchboard, but in a multiple central office the importance of a properly designed main frame is manifold. Consideration must be given the proper protection of all lines, accessibility of all terminals for the purpose of making cross connections, provision for future growth and strength and durability.

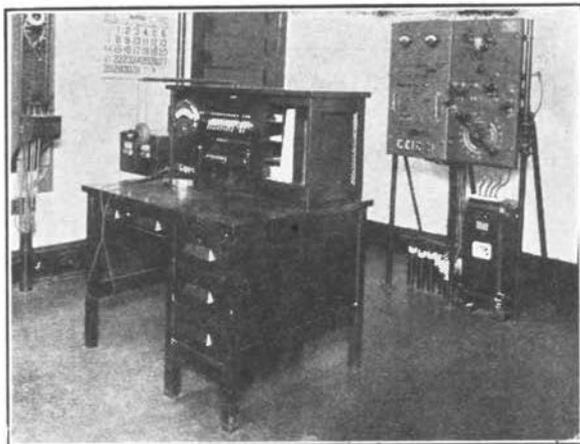
The Western Electric design of main frames takes all of these factors into consideration. The framework proper is of steel bars and angles carefully riveted and bolted together and finished with a rust resisting paint. The protectors afford uniform protection to all lines while all terminals of both protectors and terminal strips are strong and accessible.

Intermediate distributing frames are not always required or considered essential, but when furnished possess all the good points of main frames.

Relay Rack

The relays for the line circuits are mounted on a separate relay rack associated with the main distributing frame or the intermediate frame when the latter is furnished.

Western Electric relay racks are constructed of steel bars, I-beams and angles, carefully designed to provide ample strength and preserve alignment. All metal work is given a rust resisting finish.

CENTRAL BATTERY MULTIPLE SWITCHBOARDS

Wire Chief's Desk, No. 1309D, and Power Plant

Power Plant

A power plant for a multiple switchboard comprises—motor generator or rectifier charging equipment—power board—storage battery—ringing equipment—conduit and wiring, representing the heart of the entire exchange. Careful attention is given to ample capacity of all units as providing for the ultimate needs of the switch board as well as the immediate needs.

All units for the Power Plant of a Western Electric switchboard are selected for efficiency and ability to perform satisfactorily for the entire period of expected life.

Testing Equipment

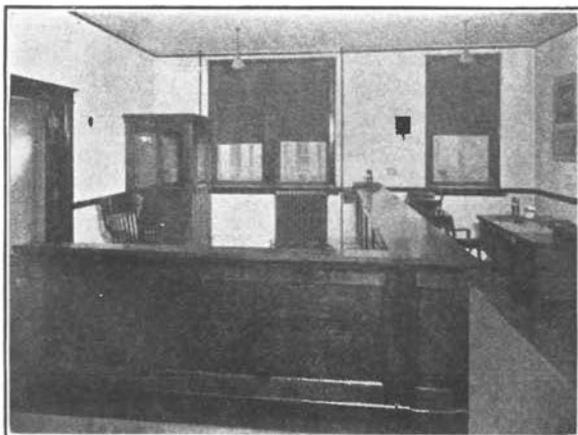
The Western Electric Company always recommends the adoption of testing equipment enabling a wire chief to keep an accurate check on the conditions of all line and switchboard circuits as well as insuring the prompt detection and location of all circuit troubles.

This equipment assumes different forms—i.e., a comprehensive type of wire chief's desk or a simple form of wire chief's turret suitable for mounting on a commercial desk as dictated by the desires of the telephone company.

Chief Operator's and Other Similar Desks

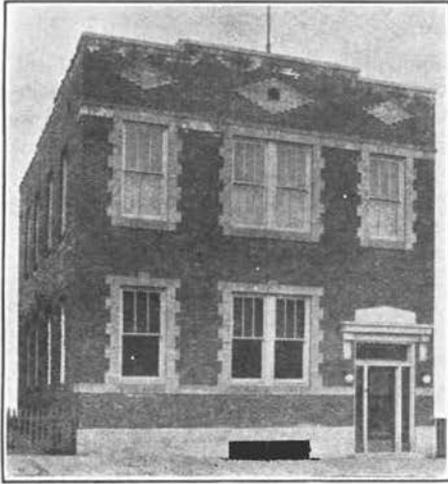
As providing suitable equipment for a chief operator enabling her to receive and originate calls with the subscribers it is customary to provide a chief operator's desk. In the case of large exchanges information desks and some times service observing desks are frequently desired.

The grade and finish of this equipment matches that of the switchboard with which it is used.

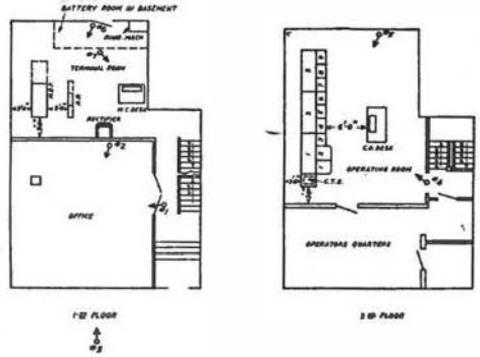


A Typical Central Office—Business Office

CENTRAL BATTERY MULTIPLE SWITCHBOARDS



Exchange Building



Floor Plan

Circuits

All circuits used in Western Electric switchboards, chief operator's, wire chief's and other desks are thoroughly standardized and represent the ideas of engineers, and traffic experts thoroughly versed in the telephone switchboard art. All circuits are designed for dependability and clean-cut operation. All apparatus is of the most modern type employing materials and designs conceived or selected by and worked out by the largest and most proficient body of telephone engineers in the world operating as one organization unit.

Of particular interest in these days of using mechanical and electrical devices to decrease manual effort at the same time insuring better and more expeditious results are the automatic features which the Western Electric Company has selected for the cord circuits of its central battery multiple switchboards. The principal features are those involving automatic ringing and automatic listening (insuring an increase in operating efficiency in most cases of from 25 to 30 per cent.) as follows:

- Automatic listening.
- Automatic ringing.
- Automatic ringing tone to calling subscribers.
- Automatic ringing cut off on abandoned calls.
- Automatic ringing cut off the instant the called party answers.
- Automatic flashing recall.
- Secrecy listening in.
- Listening out.



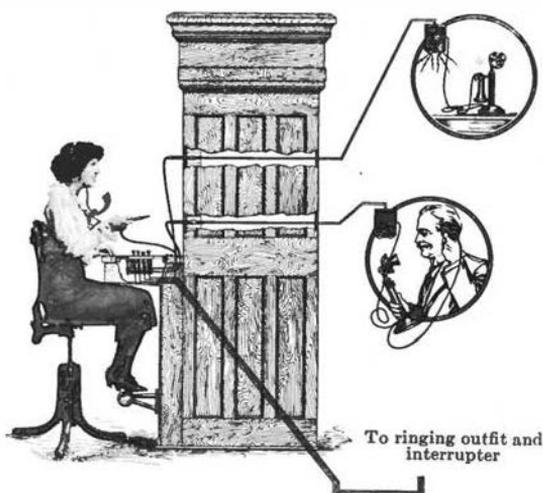
View of Multiple Switchboard in Chelsea Office, New York City, Cut in Over Eighteen Years Ago and Still in Operation.

CENTRAL BATTERY MULTIPLE SWITCHBOARDS

Description of Features

Automatic listening is desirable from an operating standpoint as it eliminates opening and closing the cord circuit listening key, after the answering cord has been inserted, to obtain the number desired from the calling party. With automatic listening the operator is in direct communication with the calling subscriber the instant the answering plug is inserted in the jack; when the calling plug is inserted in the called subscriber's line, the operator is automatically disconnected.

Automatic ringing relieves the operator of any responsibility regarding the ringing with the exception of setting the ringing key to select the proper current where selective ringing other than two-party jack per station is used. Ringing current supplied over the calling cord flows out over the line as soon as the calling plug is inserted in the called subscriber's line jack and the setting key operated. The ringing circuit is interrupted at regular intervals allowing the bell to ring two seconds and remain silent four seconds. This operation continues until the called subscriber answers or the calling party abandons the call. The economy effected by operator's time saved fully warrants the installation of this feature.



Automatic ringing tone to calling subscriber is a light, yet distinct, ringing tone which is carried back over the answering cord to the calling subscribers telephone. This allows the calling subscriber to "hear" his party being rung and to know that his call is getting all the attention possible.

Automatic ringing cut-off on abandoned calls is a feature that stops the ringing of the called subscriber the instant the calling party abandons the call. This eliminates any confusion which might be experienced if the called subscribers' bell were allowed to ring until the operator took the connection down.

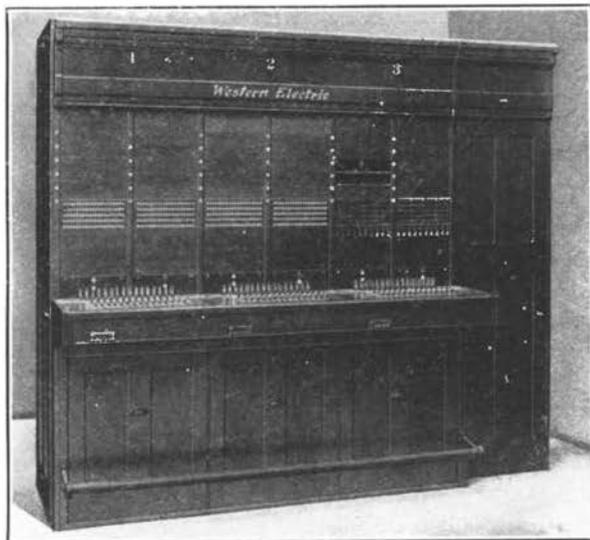
Automatic ringing cut-off the instant a call is answered is essential as it eliminates the possibility of making angry subscribers by ringing them in their ears. The ringing current is positively disconnected the instant the receiver is removed from the called telephone either during the silent or ringing interval.

Automatic flashing recall feature has become so popular with telephone users and telephone companies that it is considered indispensable in the modern switchboard. The flashing recall feature provides a persistent signal, demanding instant attention, by flashing the cord circuit supervisory lamp. A calling subscriber after completing one conversation and replacing the receiver on the hook, desiring to call another number, may do so by merely lifting the receiver, which will start the flashing recall and intermittently flash the supervisory lamp in the cord circuit insuring immediate attention by the operator who handled the previous connection. This feature raises the quality of service to the public and makes satisfied subscribers.

Secrecy (or emergency) listening-in provides a means for the operator to talk to a subscriber after the connection has been put up. This is an advantage in clearing up confusing service conditions that are the result of a misunderstanding or misinterpretation. The operator, however, can talk or listen to only one subscriber at a time and cannot listen in on a conversation between subscribers.

Listening out is desirable as a means of speeding up service for it provides a way for the operator to temporarily isolate the occasional subscriber, who does not articulate clearly and from whom the desired number is obtained with difficulty. By this method the operator can handle the traffic on her position without interfering with the subscribers that use their telephone properly.

CONVERTIBLE MULTIPLE SWITCHBOARDS



View of Convertible Multiple Switchboard

Convertible Multiple Switchboards

There comes a time in the life of most magneto telephone exchanges when it becomes necessary to replace the old magneto switchboard with larger, more modern equipment. If the traffic to be handled is such that three or more operators' positions are required or if it is desired to improve the service rendered, the installation of a central battery multiple switchboard is generally the logical step to take. The installation of central battery equipment, however, includes changing all local telephones to the central battery type and high grade outside plant construction to insure the satisfactory operation of the central battery system.

On account of the large immediate expense incidental to such a change it is sometimes advisable to install a convertible multiple switchboard which is in reality a central battery multiple equipment so arranged that the magneto lines can at the start be operated as such without change in the outside plant or substation equipment.

Any line or group of lines can then be changed over to central battery operation whenever desired by simply changing the telephone set at the subscribers station and making a few minor changes in the line connections at the central office, assuming that the outside construction of these lines is up to central battery standard at the time.

This system is frequently favored by many telephone men for the following reasons:—

1. The initial outlay is materially decreased as the first cost need cover only the new central office equipment and such equipment for new subscriber stations and lines as are desired to be operated central battery at the start.
2. The change from magneto to central battery may be brought about at such times and to such an extent as is found convenient or desirable by the operating company.
3. The question of increased rates for better service is more easily solved as those subscribers who do not favor an increased rate may be left on the magneto basis. Such subscribers very soon see that the central battery telephone is more convenient than the old magneto instruments and apply for the higher grade service at the higher rate applying thereto.

In appearance and design the convertible multiple switchboard is identical with a central battery multiple equipment except that the line relays are designed so that by a simple change in the connections they will provide a central battery or a magneto line operation depending on the way these connections are made. When they are connected to operate on a central battery line they function the same as line relays do in a regular central battery exchange.

The cord circuits in this type switchboard are equipped as universal cords instead of straight central battery cords. These universal cord circuits automatically adapt themselves to either central battery or magneto lines without special action on the part of the operator or change in the equipment or wiring.

Multiple convertible switchboards are manufactured in various sizes to care for small and medium sized exchanges, requiring multiple switchboard equipment.

SWITCHBOARDS

(Continued)

Multiple Magneto Switchboards.

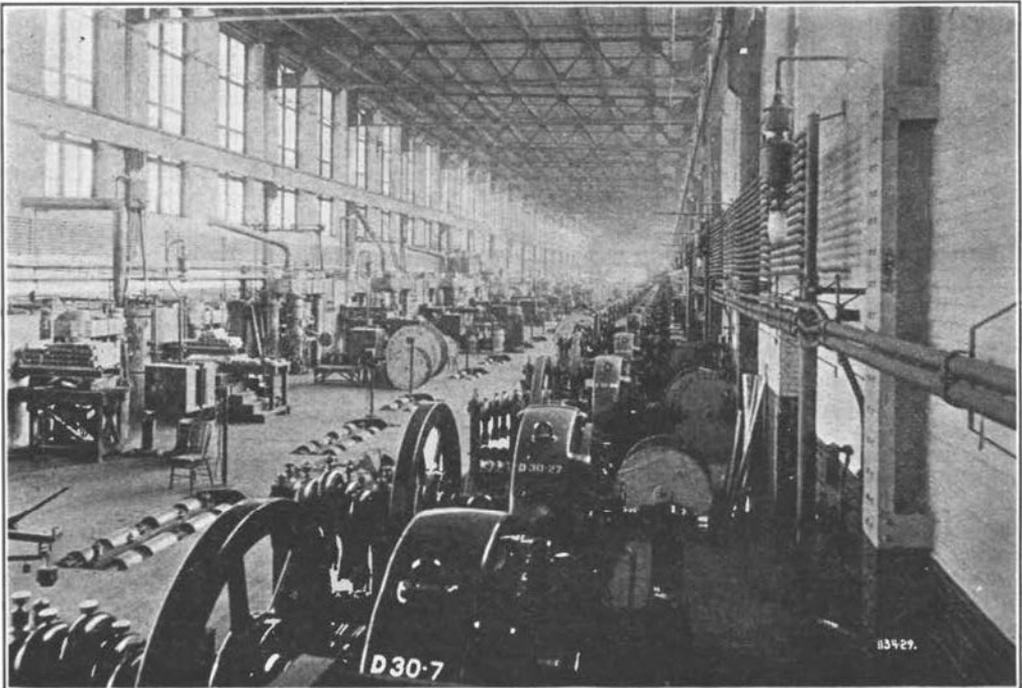
In those cases where an operating company desires to continue operating an exchange on the magneto basis because of peculiar local conditions but where the number of lines exceeds the number that can be handled satisfactorily on a non-multiple basis, the Western Electric Company is in a position to furnish multiple or partial multiple magneto equipment using the same type of six panel, three position sections as used for small size central battery multiple switchboards.

These equipments are economical considering the improvement in science they afford over that obtainable from several non-multiple sections operated with transfer circuits.

Combined jacks and signals of the same type employed in the non-multiple switchboard are used for line signals and answering jacks. Multiple jacks provide a terminal for each line before each operator in exactly the same manner as provided in central battery switchboards.

With this type of switchboard very simple power plant equipment is necessary since ringing current and current for pilot signals and the operator's telephone circuit must be furnished.

A main distributing frame is of course necessary and this may be of either the No. 1425 or 1430 types as listed under "switchboard accessories."



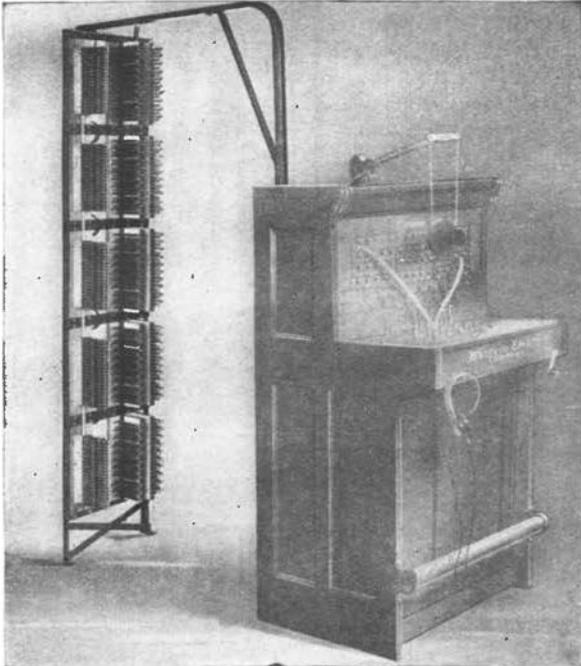
Lead Press Department, Hawthorne Works

SWITCHBOARD ACCESSORIES

Distributing Frames

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

No. 1430 and No. 1420 Types



No. 1430 Type Main Distributing Frame

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

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

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

These frames have the following important features:

1. Steel Framework. The framework is of steel, forming a rigid support for the apparatus. A rust resisting finish is applied.

2. Ease of Access. The framework is so constructed that cross connections and inspections can be easily made.

3. Unit Type. The framework is built in 100 line units and is so arranged that several units may be lined up to form a frame of larger capacity. It is only necessary to purchase enough frame to handle your present requirements, and later increase your frame capacity as the number of lines increases.

4. Universal Design. All of the vertical mountings are arranged so that our standard protector groups can be mounted. By the addition of a small steel supporting bracket, the No. 1430 type frame can be converted into the No. 1420 wall type frame described later.

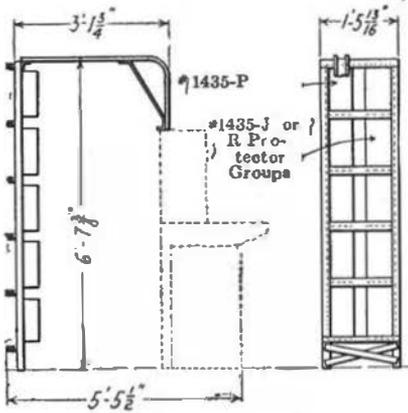
5. Minimum Floor Space. Due to their compact design, these frames occupy very little floor space.

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

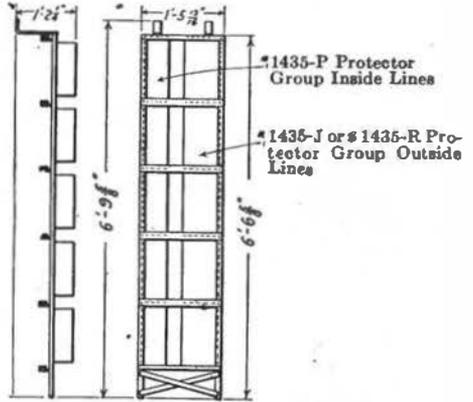
SWITCHBOARD ACCESSORIES

Distributing Frames

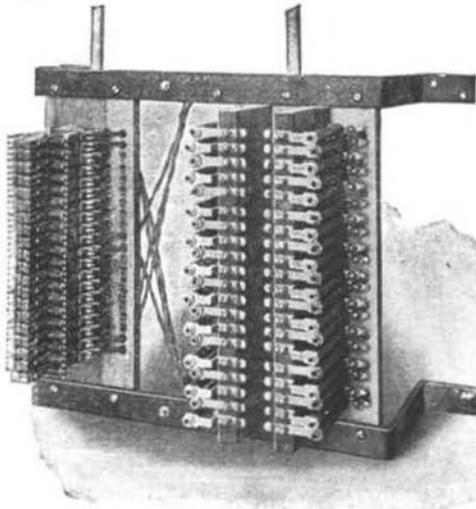
NOS. 1430 AND 1420 TYPES—Continued



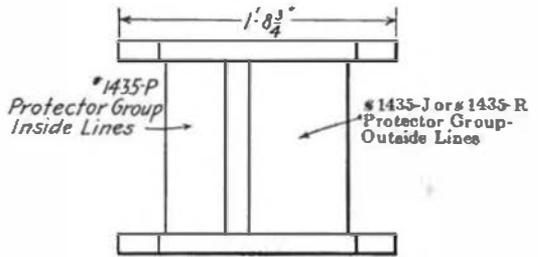
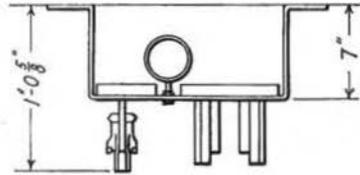
No. 1430F Distributing Frame



No. 1420B Distributing Frame



No. 1431A 20 Line Main



NOS. 1431A 20 LINE FRAME

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

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

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

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

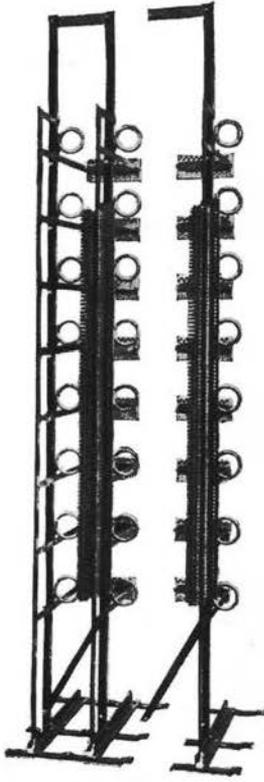
In ordering this frame specify the protector groups desired. (See description of protector groups.)

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

SWITCHBOARD ACCESSORIES

Distributing Frames

NO. 1425 TYPE



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

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

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

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

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

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

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

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

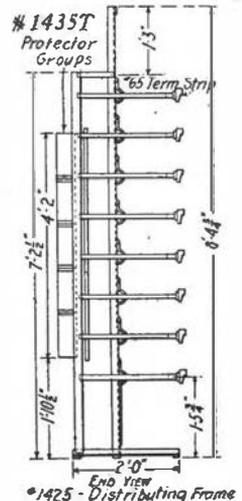
This shows two units of No. 1425C distributing frame lined up and bolted together. As many 100 line units as desired may be installed. Two units are necessary at the beginning of the frame; one unit for each additional 100 lines.

This is one 100 line unit of No. 1425C distributing frame. The Code No. 1425C covers the steel framework, distributing rings and fanning strip, but does not cover the protector groups and No. 65 terminal strips. The terminal strips for terminating 20 pair of outside cable may be ordered as follows: No. 65 terminal strips. The carbon, mica and heat coil protector may be ordered as follows: No. 1435T Protector groups each accommodating 20 inside or switchboard pairs. These protector groups are suitable for both Central Battery and magnetolines.

For Example:

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

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



INFORMATION

Protector Groups Used

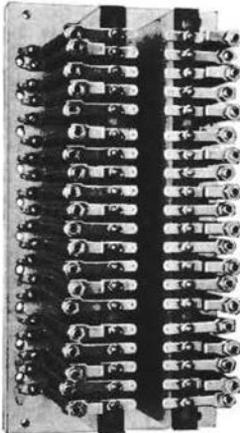
Code No. †1425C	"Vertical Side" Inside Lines Magneto or central battery lines—No. 1435T Misc. inside circuits—No. 53 terminal strip.	"Horizontal Side" Outside Lines No. 65 terminal strips
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†This Code number includes one vertical unit of this frame and distributing rings only. The protector groups and terminals must be ordered separately.

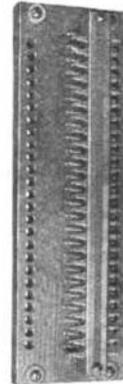
SWITCHBOARD ACCESSORIES

Protector Groups

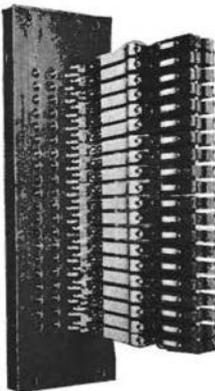
For Distributing Frames



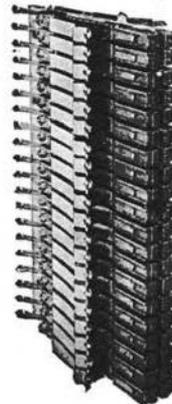
No. 1435U



No. 1435R



No. 1435W



No. 1435T

PROTECTOR GROUPS

These protector groups may be used for either central battery or magneto telephone lines and are intended to mount on various types of distributing frames and cabinets listed elsewhere in this catalog.

They consist of a mounting of proper size, for attaching to the frame, on which the protector apparatus as listed below is assembled:

Code No.	Protects	Consists of	Used With Distributing Frame No.
1435U	20 metallic outside lines against abnormal current.	20 protectors equipped with No. 7A fuses and mounted on a base which serves as a fanning strip.	1420B 1430D, E, F 1431A
1435R	25 metallic outside lines where fuse protection is unnecessary.	A terminal strip mounted on a base which serves as a fanning strip.	
1435W	20 metallic inside lines against high potential and sneak currents.	20 No. 1169A protectors mounted on a base which serves as a fanning strip.	
1435T	20 metallic inside lines against high potential and sneak currents.	20 No. 1169A protectors.	1425C

SWITCHBOARD ACCESSORIES

No. 1407-C Testing Cabinet



View of No. 1407-C Test Cabinet

This cabinet provides adequate, efficient, and reliable testing equipment, which is adaptable to either magneto or central battery systems. All classes of trouble, such as grounds, short circuits, crosses, open circuits, high resistance, can be tested for and the location calculated from the direct reading volt meter with no complicated mathematical calculations involved.

On exchanges where the installation of a regular wire chief's desk is not warranted, the installation of the No. 1407C testing cabinet is the ideal testing equipment. It can be installed at either side of the switchboard or at the end of the main frame, or any convenient place in the central office. The operation is simple and the operator can be trained to assist in making tests which would aid materially in clearing up trouble after a storm.

The consistent application of the simple tests featured in this cabinet will eliminate the guesswork from small exchange maintenance and tend to raise the service on the exchange to a higher level by clearing troubles with the utmost dispatch. The cabinet is compact (height 18 ins., width 12 ins., depth 9½ ins.) and constructed of quarter sawed oak with a durable finish.

Equipment

It is equipped with the standard "Weston Voltmeter" which is well-known for its accuracy and reliability. Also a full complement of testing keys, ringing keys, and taps for connecting in the Wheatstone Bridge unit. For convenience and to cover the various conditions several groups have been devised as follows:

Group No. 1

Consists of 1 No. 1407C testing cabinet for local battery (magneto) systems complete, ready for voltmeter testing (except 30 volt dry cell battery) including the following circuits:

1—Testing circuit, arranged for single or two-party ringing complete with 10000-ohm Weston voltmeter, keys for making tests, testing cord, and grounding cord.

1—Operator's circuit, complete with head receiver and chest type transmitter.

Note. The equipment covered by the following groups is not included under Group No. 1.

Group No. 2

Consists of hand generator equipment for single or two-party ringing.

This group is not necessary in all cases because ringing current can frequently be obtained from the hand generator on the switchboard, alongside of which the No. 1407C cabinet is sometimes mounted, or from the interrupter or ringing machine.

Group No. 3

Consists of one 10 foot cord and No. 147 plug (or shoe) for use in testing at the protector frame. This No. 147 plug fits only our Nos. 4, 65, 78, 84, 89, 1168 and 1169 type protectors. If protectors of other than Western Electric manufacture are used, a suitable plug should be obtained from the manufacturer who made the protector.

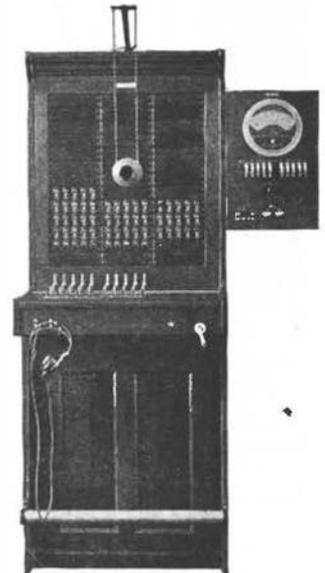
Group No. 4

Consists of 30 Blue Bell dry cells. It will usually be found advisable to furnish the dry cells separately and not to include this group with the cabinet.

Group No. 5

Consists of 1 No. 1407C testing cabinet for central battery systems, complete. This group includes all the apparatus covered by group No. 1, and in addition, such other necessary equipment as to make the No. 1407C testing cabinet applicable for use with central battery.

Note. The equipment covered by the preceding (except Group No. 1) or following groups is not included in Group No. 5.



Showing Cabinet Mounted on Switchboard

SWITCHBOARD ACCESSORIES

No. 1407-C Testing Cabinet—Continued

Group No. 6

Consists of apparatus necessary for placing howler current on the testing cord.

Group No. 7

Call circuit and telephone line equipment for ma neto system. This is used when the Testing Cabinet is located away from the switchboard, and enables the test man to receive and send calls.

Group No. 8

Cons sts of the necessary keys and apparatus to pr vide for four-party harmonic ringing.

Group No. 9

Consists of the necessary keys and apparatus to provide for four-party pulsating machine ringing.

Group No. 10

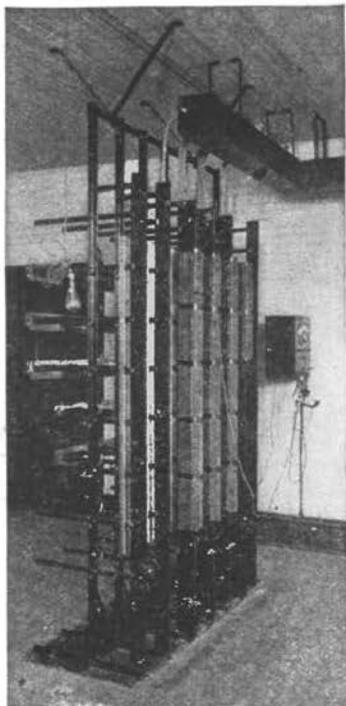
Consists of hand enerator equipment for four-party pulsating ringing. This group is not necessary in all cases of four-party pulsating ringing, as ringin current can frequently be obtained from the hand generator on the switchboard, alongside of which the cabinet is sometimes mounted, or from the interrupter or ringing machine.

Group No. 11

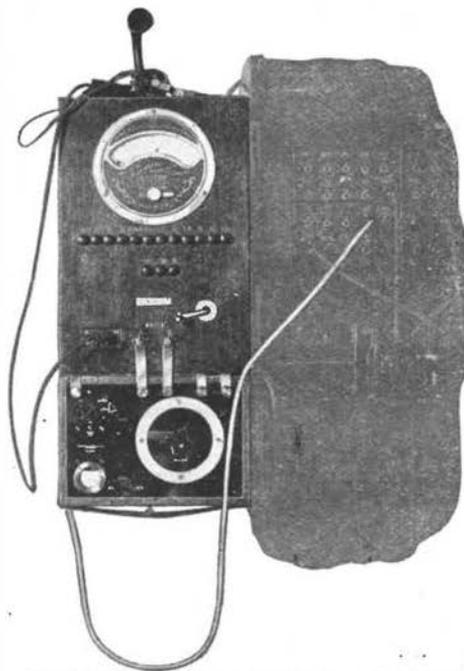
Call circuit and telephone line equipment for central battery system. This is used when the testing cabinet is located away from the switchboard, and enables the test man to receive and send calls.

Group No. 12

Consists of the necessary apparatus to provide for single or two party machine ringing using machine or interrupter.



No. 1407-C Testing Cabinet connected to Main Distributing Frame



No. 1407 Testing Cabinet with No. 1407 Bridge Unit Attached to the Side of a Switchboard

Auxiliary Equipment for Use With No. 1407-C Testing Cabinet

No. 1407-A Bridge Unit

For a more accurate means of makin resistance measurements than is possible with a voltmeter, the No. 1407A bridge unit was developed. It consists of a Wheatst ne bridge outfit and is so designed that it will line up and attach by means of No. 1407B bracket unit to the bottom of a No. 1407C testing cabinet.

With this equipment Murray and Varley loop tests as well as straight resistance measurements can be quickly made in addition to the regular voltmeter testing possible with the No. 1407C testing cabinet.

Unknown resistances can be read d rectly from the scale without referring to tables or other data, and such readings are accurate up to one-half of one per cent.

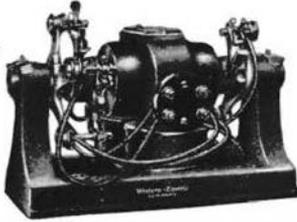
This bridge un t s easily detached from the testing cabinet by loosening the binding posts holding the bracket unit straps and moving the bridge about an inch to the right. When removed it can be used as a portable bridge. A cover and carrying strap are provided.

RINGING MACHINES

Western Electric ringing machines are recommended for furnishing ringing current where there is heavy exchange ringing and where the equipment is expected to grow rapidly. These ringing machines are of various types to meet various operating conditions and sizes of exchanges.

Ringing Dynamotors

Ringing dynamotors are for use in exchanges as reserve equipment operated from the central office battery or where direct current power is available. They are in effect rotary transformers or converters, which change the direct current into 20 cycle alternating current and positive and negative pulsating current.



No. 4A Ringing Dynamotor

Type	Length Without Interrupter Inches	Length With Interrupter Inches	Width of Base Inches	Height Inches
4	14	27 1/4	7 1/8	9 3/8
6	16 1/2	30 1/2	9 1/8	11 1/8
7	20 1/2	34 1/2	11	13 1/8
9	26 1/2	41 1/4	12	16 1/8

RINGING DYNAMOTORS

Code No.	Type	Primary		Secondary		Starting Box Data				App. Shpg. Wt. Lbs.	Speed Limits
		Im-print Vol ts Rated	Range Volts	Watts	Amps.	Code No.	App. Shpg. Wt. Res.	App. Shpg. Wt. Amp.	Hand Wheel		
4A	P-1/4	20	20-23	38	.5	172	8.6	2.33	121	125	950 to 1200 R.P.M.
4B	P-1/4	110	104.5-115.5	38	.5	173	34.3	.32	121	125	950 to 1200 R.P.M.
4C	P-1/4	220	209-231	38	.5	174	1160	.19	121	125	950 to 1200 R.P.M.
6A	P-1/2	20	20-23	75	1.0	172	9.1	2.2	121	170	950 to 1200 R.P.M.
6B	P-1/2	110	104.5-115.5	75	1.0	173	270	.41	121	170	950 to 1200 R.P.M.
6C	P-1/2	220	209-231	75	1.0	174	1130	.19	121	170	950 to 1200 R.P.M.
7A	P-1	20	20-23	150	2.0	176	7.2	2.78	121	325	950 to 1200 R.P.M.
7B	P-1	110	104.5-115.5	150	2.0	177	139	.79	121	325	950 to 1200 R.P.M.
7C	P-1	220	209-231	150	2.0	178	530	.41	121	325	950 to 1200 R.P.M.
9A	P-2	20	20-23	300	4.0	180	15.7	1.31	122	470	950 to 1200 R.P.M.
9B	P-2	110	104.5-115.5	300	4.0	181	313	.85	121	470	950 to 1200 R.P.M.
9C	P-2	220	209-231	300	4.0	182	900	.24	121	470	950 to 1200 R.P.M.

Dynamotors can be equipped with interrupters. The interrupters consist of a shaft driven mechanism for providing tone test, busy back, trouble test, howler, etc. Many standard types are available and the one used depends upon the requirements of the installation. Our engineers are always ready to recommend the proper machines to meet your requirements.

Orders or inquiries should read:—

One (4B type P-1/4) ringing machine, primary volts (110 D.C.) output (38) watts, equipped with (No. 173) starting box for (rear of board) mounting and (No. 121) hand wheel. If interrupter is desired, give detailed requirements.

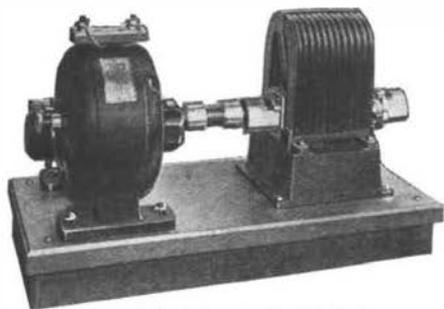
Direct Connected Ringing Sets

Direct Connected Motor Generator Ringing Sets can be furnished to provide alternating current of 20 cycle frequency or with provisions for providing positive and negative pulsating current. A few of these are listed below.

Motor Voltage	Generator Watts
Direct Current	
19 to 28	75
19 to 28	150
19 to 28	300
Alternating Current	
Single or Three Phase	
220	75
220	150
220	300

Other sizes and combinations can be furnished when desired. Write us fully outlining your requirements and we will recommend the set best suited to your needs. Be sure and specify the voltage and frequency of the current supply, the power output and voltage of the generator where known. If the required power output is not known give us the number of lines, number of operator's positions and the total number of calls per busy hour.

SWITCHBOARD ACCESSORIES Magneto Motor Generator Ringing Sets



Motor Generator Ringing Set

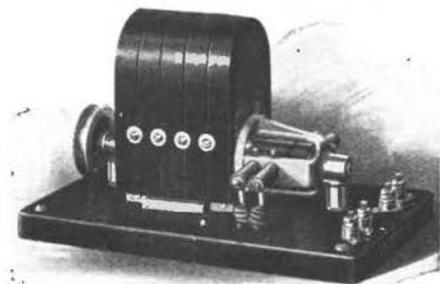
Motor generator ringing sets consist of direct current or single phase 60 cycle alternating current motors direct connected to magneto ringing generators. These sets furnish alternating ringing current only at 80 volts, 19 cycles. An attachment for obtaining positive and negative pulsating current is, however, available. These direct connected motor generator sets form a very compact, serviceable unit.

List No.	Volts Motor	Output Watts	Type
310087	110	15	} Motor—Single phase 60 cycles A.C., 1150 R.P.M. } Generator—80 volts, 19 cycles, single phase
310088	220	15	
310093	110	15	} Motor—Single phase, 25 cycles A.C., 1400 R.P.M. } *Generator—110 volts, 23 cycles, single phase
310094	220	15	
310081	115	15	} Motor—D.C., 1150 R.P.M. } Generator—80 volts, 19 cycles, single phase
310082	230	15	

List No.	No. Bars	Output Watts	Type
310110	12	15	Magneto Generator—80 volts, 19 cycles, single phase, 1150 R.P.M. Belt tighten ng sub-base and 2½ x 1½ inches p ay pu ey.

*This higher voltage is advisable on account of the higher frequency produced by the necessary excess speed of the 25-cycle over the 60-cycle.

Western Electric No. 16A Magneto Ringing Generator

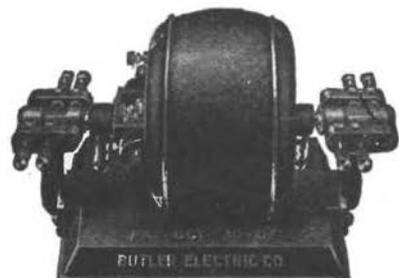


No. 16A

Code No.	Description
16A	A 5 bar, pulsating and alternating current, belt connected power generator. Delivers 106 volts A.C. and 72 volts pulsating at a speed of 1000 R.P.M. Used to furnish power ringing for telephone central offices. Mounted on a wood base 7 x 11 inches. Height, 7 inches. Has a cover for protection against dust and dirt. Equipped with a grooved pulley 2 inches n diameter.

Rotary Pole Changers

These rotary pole changers are in reality rotating interrupters, consisting of a direct or alternating current motor with a commutator for interrupting the current. They are suitable for use in telephone central offices, serving a maximum of 1500 subscribers.



Code No.	Voltage Required to Operate	Power Consumption	Special Transformer Required	Kind of Current Furnished
A-24	24 volts D.C.	8 watts	Yes	A.C. only
A-36	36 volts D.C.	8 watts	Yes	A.C. only
A-110 D.C.	110 volts D.C.	8 watts	No*	A.C. only
A-220 D.C.	220 volts D.C.	8 watts	Yes	A.C. only
A-110 A.C.	110 volts A.C.	8 watts	Yes	A.C. only
A-220 A.C.	220 volts A.C.	8 watts	Yes	A.C. on y
S-24	24 volts D.C.	8 watts	Yes	} A.C. and pos. and neg. puls.
S-36	36 volts D.C.	8 watts	Yes	
S-110 D.C.	110 volts D.C.	8 watts	No*	
S-220 D.C.	220 volts D.C.	8 watts	Yes	
S-110 A.C.	110 volts A.C.	8 watts	Yes	
S-220 A.C.	220 volts A.C.	8 watts	Yes	

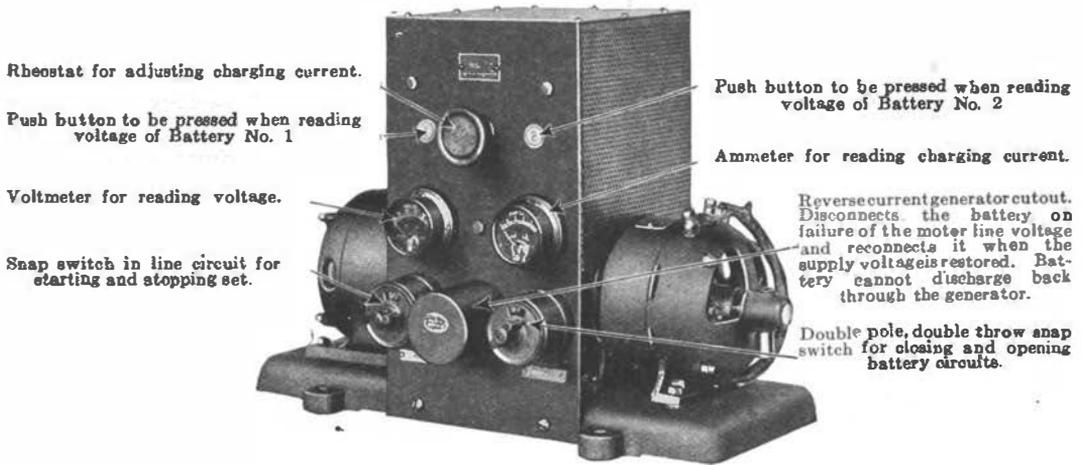
*Transformer required if one side of lighting circuit is grounded.

Ringing current for A.C. 110 and A.C. 220 must be taken from exchange batteries.

Orders should read:

No. rotary pole changer to operate from volts cycles with special transformer for volts D.C.

SWITCHBOARD ACCESSORIES



Battery Charging Set
(Front View)

Telephone Battery Charging Units

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

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

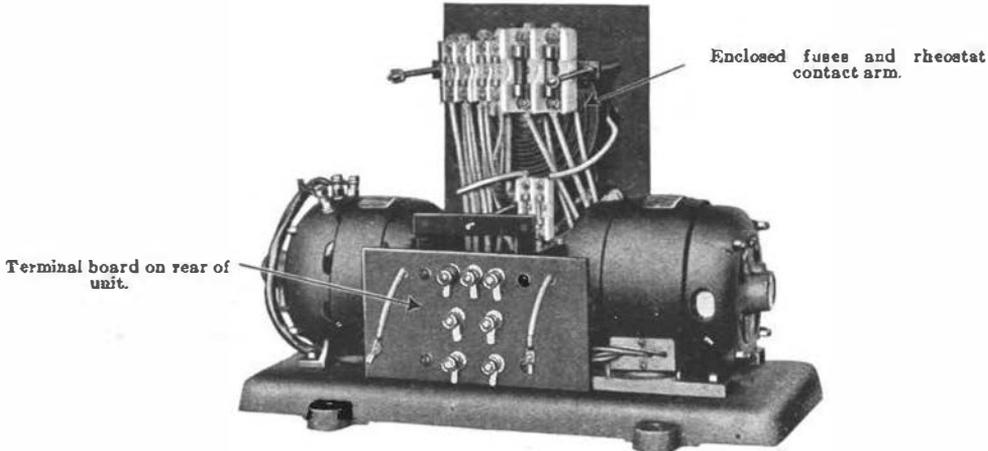
The switchboard panel of the charging unit is equipped with all necessary switches and fuses, a generator field rheostat, reverse current dynamo cutout, charging current ammeter, generator voltmeter and all connections are extended to terminals mounted on a terminal board located at the rear of the unit.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

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

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

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

SWITCHBOARD ACCESSORIES



Battery Charging Set
(Back View with Cover Removed)

Telephone Battery Charging Units—(Continued)

SIZE AND CAPACITY DATA

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

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

DIMENSIONS AND APPROXIMATE SHIPPING WEIGHTS

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

Orders should read:

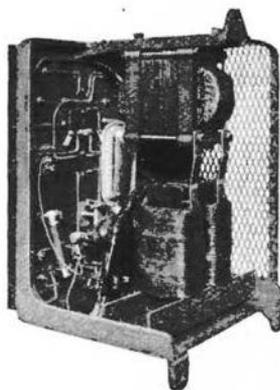
1—Code No. 1565A Telephone Battery Charging Unit.

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

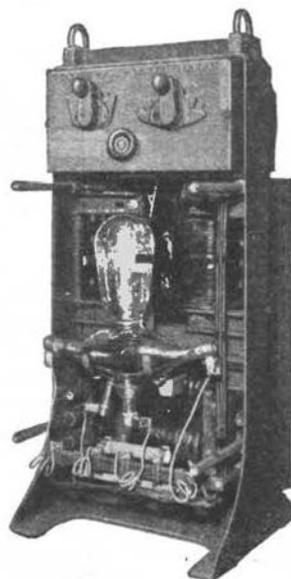
SWITCHBOARD ACCESSORIES



10 Ampere Outfit



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



Front View of 30 Ampere Outfit—Cover Removed

Mercury Arc Rectifiers

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

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

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

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

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

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

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

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

Rectifiers for 60 Cycle Circuits (Single Phase)

Overall Dimensions and Weights (Approx.)

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

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

SWITCHBOARD ACCESSORIES



No. 1441B Battery Cabinet

Interrupter Battery Cabinet

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

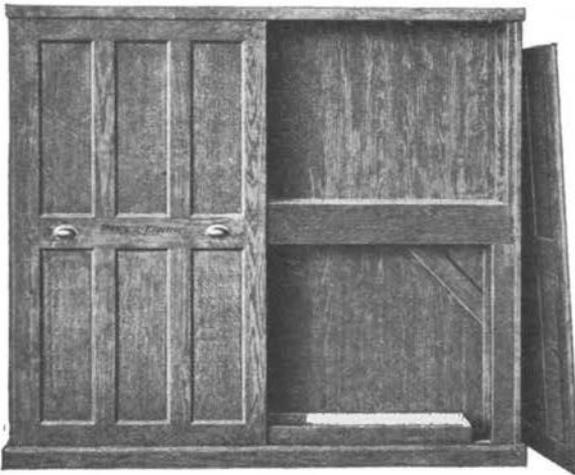
Various sizes of these cabinets are furnished as follows:

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

Code No.	Accommodations for		
	No. 84 Interrupter	Dry Cells	Edison BSCO Cells
1440B	1	72	2
1441B	2	140	4
1442	2	280	4
1442B	2	2 0	4

Storage Battery Cabinets

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



No. 1454 Storage Battery Cabinet

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

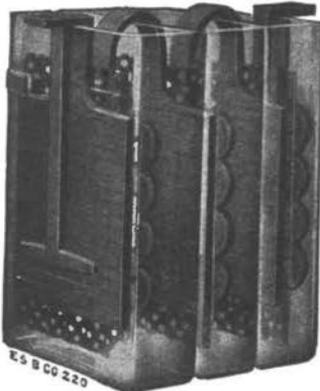
The interior is heavily coated with an acid resisting paint, which prevents the wood from being rotted by the acid fumes.

Wooden sand trays mounted on glass insulators are furnished.

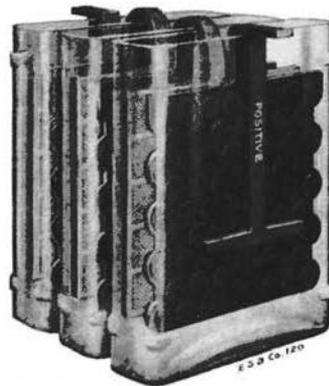
These cabinets are of two types, one having a removable front and hinged top and designated as "chest" type cabinet, and the other as "cabinet" type, having removable doors only. These two types of cabinets can be easily identified by the dimensions, the "chest" type being 1 foot 9¼ inches high, while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

Code No.	Type	Dimensions			No. of Cells	Type of Cell
		Height	Width	Length		
1450	"Chest"	1 ft. 9¼ ins.	11 ins.	3 ft. 0 ins.	11	BT., CT. or PT.
1451		1 ft. 9¼ ins.	1 ft. 1½ ins.	3 ft. 0 ins.	11	ET.
1452		1 ft. 9¼ ins.	1 ft. 6¼ ins.	3 ft. 0 ins.	22	BT., CT. or PT.
1453	"Cabinet"	1 ft. 9¼ ins.	1 ft. 11¼ ins.	3 ft. 0 ins.	22	ET.
1454		5 ft. 0 ins.	1 ft. 2 ins.	5 ft. 4 ins.	11	D-11
1455	"Cabinet"	5 ft. 5¾ ins.	1 ft. 2 ins.	5 ft. 11 ins.	11	E-11
1458		5 ft. 0 ins.	1 ft. 6¼ ins.	9 ft. 4½ ins.	22	D-9
1460		5 ft. 4 ins.	1 ft. 8¼ ins.	10 ft. 11½ ins.	22	E-7, E-9 or E-11

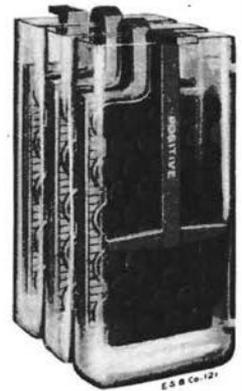
Western Electric
SWITCHBOARD ACCESSORIES



Type "BT"



Type "BT"



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 burnings 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.

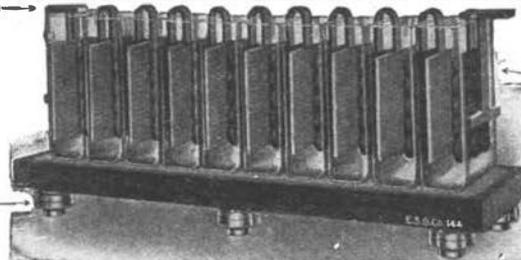
Individual Cells

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

Complete Outfits for Telephone Service

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

Negative Terminal Plate →



← Positive Terminal Plate

← Glass Insulators

← Wood Sand Tray

10 Cells of Type "CT" on Sand Tray

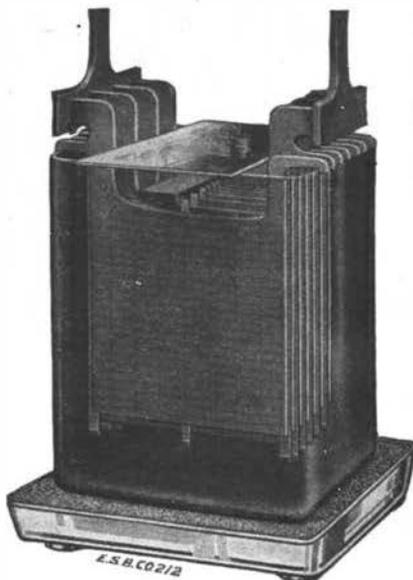
Mfrs. Code No.	BT		CT		PT		ET	
	11 Cells (1 Set)	22 Cells (2 Sets)	11 Cells (1 Set)	22 Cells (2 Sets)	11 Cells (1 Set)	22 Cells (2 Sets)	11 Cells (1 Set)	22 Cells (2 Sets)
Size of Outfit.....	No. 10	No. 20	No. 10	No. 20	No. 10	No. 20	No. 10	No. 20
Elements or couples.....	1	2	1	2	1	2	1	2
Positive terminal plate.....	12	23	12	23	12	23	12	23
Negative terminal plate.....	8	6	3	5	3	5	3	5
Glass Jars (1 extra).....	1	1	1	1	1	1	1	1
Connectors Type "B".....	1	1	1	1	1	1	1	1
Connectors Type "D".....	1	1	1	1	1	1	1	1
Hydrometer Type "B".....	1	1	1	1	1	1	1	1
Hydrometer Type "E".....	1	1	1	1	1	1	1	1
Floating Mercury Thermometer.....	1	1	1	1	1	1	1	1
Terminal lugs.....	1	1	1	1	1	1	1	1
Terminal lugs.....	1	2	1	2	1	2	1	2
*Wood sand tray.....	12	23	12	23	12	23	12	23
Glass covers.....	6	12	6	12	6	12	6	12
Glass insulator.....	2	4	2	4	2	4	2	4
Terminal punchin (No. P-65740).....	20	40	20	40	20	40	20	40
Electrolyte (spec. gravity 1.210) lbs.....	1	1	1	1	1	1	1	1
Set instructions, E. S. B. Cos. Form No. 421R-6.....	1	1	1	1	1	1	1	1

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

Method of Ordering

Orders for complete storage battery outfits as listed above should read as follows:
"1 complete (11 or 22) cell type _____" storage battery outfit including accessories."

SWITCHBOARD ACCESSORIES



Type "D" 7

Chloride Accumulator Storage Batteries

TYPE D

The Type D, comprises cells ranging in capacity from 2½ to 15 amperes at the normal eight hour discharge rate. They are supplied in either glass or hard rubber jars, but inasmuch as glass jars are commonly used for telephone purposes dimensions are listed for glass jars only. In ordering elements or parts thereof, specify whether intended for glass or rubber jars.

Individual Cells

Mfra. Code No.	D 3	D-5	D-7	D-9	D-11	D-13
Discharge in amperes } For 8 hours For 5 hours For 3 hours	2½	5	7½	10	12½	15
	3½	7	10½	14	17½	21
	5	10	15	20	25	30
Normal charging rate in amperes	2½	5	7½	10	12½	15
Outside dimensions of glass jar, ins. } Length Width Height	3½	5½	6½	8½	9½	11
	7½	7½	7½	7½	7½	7½
	10½	10½	10½	10½	10½	10½
Wt., electrolyte in glass jar, lbs.	7½	11	14	17	20	24
Wt. of cell complete with electrolyte in glass jar, lbs.	20	32	42	53	62	74
Height from bottom of jar to top of strap, ins.	15½	15½	15½	15½	15½	15½

Complete (11 Cell) Outfits for Telephone Service

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

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

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

As the demand for current increases, this demand can be met by simply adding plates to make up the necessary capacity. For example, say on the 8 hour rate of discharge the present requirements will take 4½ ampere and the ultimate requirements 14 amperes. Order No. D-13 jars equipped with No. D-5 elements. Then as the demand for current increases you can add Nos. D-7, D-9, D-11 or D-13 elements. This is made possible by the construction of the batteries.

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

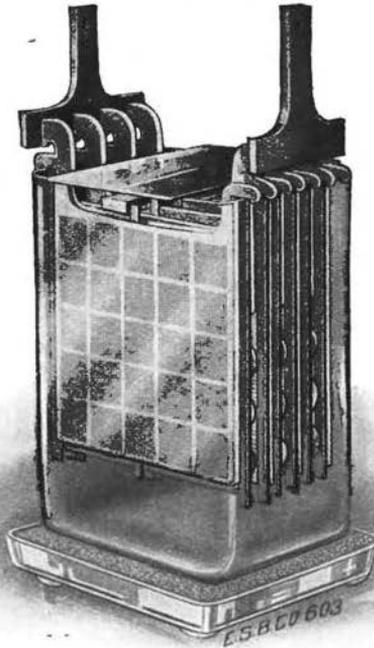
Note 3. Individual glass sand trays are most commonly used in telephone systems for this type of battery, but large wood sand trays with the necessary glass insulators can also be furnished. The order should be specific in regards to this feature.

Method of Ordering

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

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

SWITCHBOARD ACCESSORIES



Type "E" 7

Chloride Accumulator Storage Batteries

TYPE E

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

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

Individual Cells

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

Complete (11 Cell) Outfits for Telephone Service

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

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

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

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

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

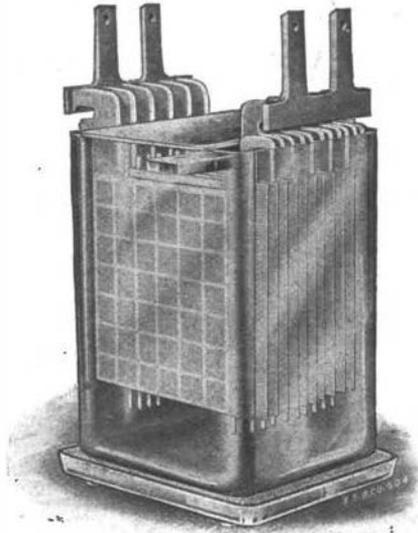
Method of Ordering

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

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

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

SWITCHBOARD ACCESSORIES



Type "F" 11 in Style A Glass Jar

Chloride Accumulator Storage Batteries

TYPE F

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

Individual Cells

Mfrs. Code No.	F-9	F-11	F-13	F-15	
Discharge: in amperes {	For 8 hours.....	40	50	60	70
	For 5 hours.....	56	70	84	98
	For 3 hours.....	80	100	120	140
	For 1 hour.....	160	200	240	280
Normal charging rate in amperes.....	40	50	60	70	
Outside dimensions of Style "A" glass jars, ins. {	Length.....	8½	9¾	11	12¾
	Width.....	12¾	12¾	12¾	12¾
	Height.....	17	17	17	17
Height of cell in Style "A" glass jar from bottom of sand tray to top of strap, ins.	23¾	23¾	23¾	23¾	
Wt. of electrolyte in Style "A" glass jar, lbs.	55	62	69	76	
Wt. of cell complete with electrolyte in Style "A" glass jars, lbs.	174¾	201¾	229	258	

Complete (11 Cell) Outfits for Telephone Service

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

- | | |
|--|-------------------------------|
| 11 Complete elements, including plates, separators, etc. | 1 Thermometer |
| 12 Glass jars (1 extra) | Terminals |
| 12 Glass sand trays with feet | Bolt Connectors |
| 12 Glass covers | Displacement block |
| 5 Extra wood separators | Electrolyte |
| 1 Hydrometer | Wood sand trays } See Note 2. |
| | Glass Insulators } |

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

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

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

Method of Ordering

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

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

TELEPHONES

GENERAL



**Wall Telephone
Central Battery Dial Type**



**Desk Telephone
Central Battery Type**



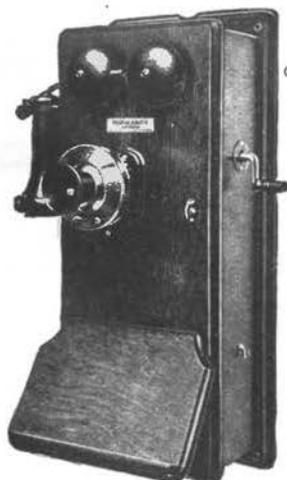
Inter-phone

Western Electric telephones can be relied upon to give satisfactory service with minimum maintenance. Our extensive experience in the manufacture of telephone equipment for over half a century enables us to offer equipment which has proved its efficiency and reliability under most severe conditions. Through scientific design, careful construction and the use of only the best materials and workmanship, Western Electric telephone apparatus is recognized by the leading telephone authorities throughout the world as standard.

Our large output enables us to purchase raw materials under rigid specifications in large quantities at the lowest market prices. This, together with unequalled manufacturing facilities, makes it possible for us to offer standard telephones at reasonable prices. Every telephone and, in fact, every part is subject to a rigid inspection, both in the raw material and during manufacture, as well as before shipment.

Large and complete stocks of standard apparatus are carried in our numerous distributing houses, which are located in cities of the United States and are so situated as to make possible the delivery of standard goods in most cases within twenty-four hours after the receipt of the order. This system of locating distributing houses in the various commercial centers throughout the country insures prompt filling of orders, together with a considerable saving in transportation, as our prices are F. O. B. distributing houses.

There is a Western Electric telephone which will satisfactorily meet any standard service condition, the telephones listed on the following pages being considered as meeting all usual requirements. For special requirements, we have special telephones. Should special conditions be met, which are not already covered by existing apparatus, your problem will be given immediate and cheerful attention by our engineers.



**Wall Telephone
Magneto Type**



Mine Telephone

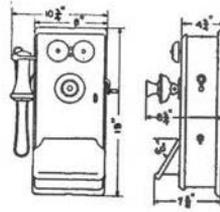


**Desk Telephone
Magneto Type**

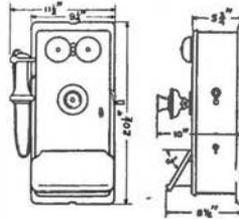
Western Electric
TELEPHONES
 (Continued)



2 Cell, Closed View
 No. 1317 Telephones



2 Cell



3 Cell

Dimensions of 2 and 3 Cell
 No. 1317 Sets



3 Cell, Closed View

No. 1317 Type Magneto Telephones

GENERAL DESCRIPTION

The No. 1317 type telephone represents the highest development attained in magneto telephone design and construction. It has been standard with the Western Electric Company for more than a decade, and its high efficiency, reliability and long life have been thoroughly proven by the hundreds of thousands in service.

2 and 3 Cell Types

No. 1317 telephones are made in two styles, namely, the "2 cell" and the "3 cell." The talking circuits of these two types are identical, i.e., they employ the same transmitters, receivers and induction coils. The battery compartment of the "3 cell" type is sufficiently large to take three standard dry cells, whereas only two dry cells can be placed in the "2 cell" type. The larger cabinet of the "3 cell" type also permits the mounting of the No. 48 type (5 bar) generator, while the "2 cell" type employs the No. 50 type (large 3 bar) generator.

The No. 50 type (large 3 bar) generator, while intended primarily for use on medium loaded lines, is exceptionally powerful, and is capable of giving satisfactory service on about 90 per cent. of the lines now in use. For example this generator will ring thirty 2500 ohms ringers connected to a No. 12BB iron metallic telephone line 15 miles in length (provided, of course, that the line is properly installed and in good condition). It will operate more telephones on a line than many four or five bar generators.

Woodwork and Finish. The cabinet is made of quarter sawed oak and given three coats of high-grade varnish rubbed down by hand. Unexposed surfaces of the telephone are also given a protective finish so as to prevent warping.

Wiring. All terminals including those for the transmitter, receiver, cord, line wires, etc., are plainly marked so that there can be no possible mistake when making connections. The various cords, such as those of the transmitter and receiver and the flexible leads running to the condenser are all furnished with cord tips.

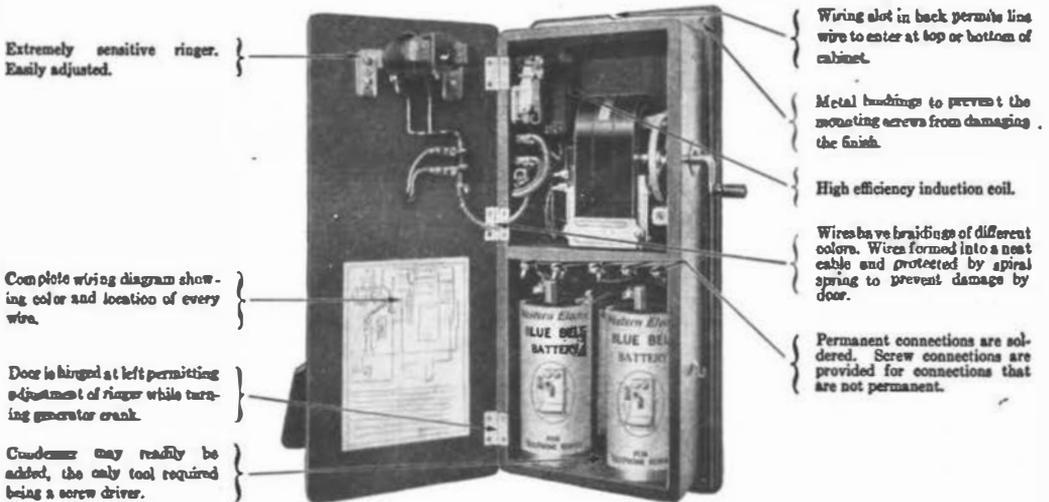
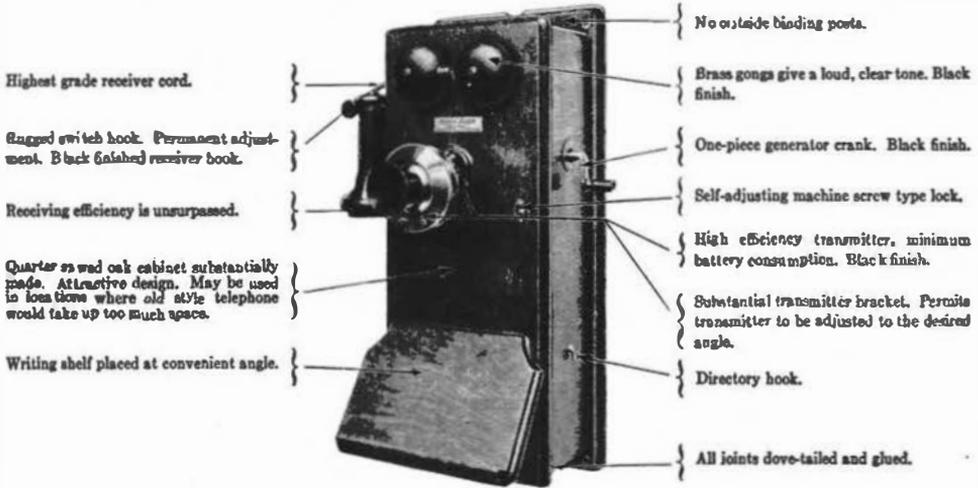
A complete and explanatory circuit label is pasted on the inside of the door of each telephone in addition to which a booklet is furnished giving complete instructions for installation and maintenance.

Metal Finish. The transmitter bracket, gongs, switch hook, generator, crank and lock escutcheon are given an extremely durable and pleasing black finish.

Adjustment. These telephones are carefully adjusted in the factory, and should, therefore, be satisfactory for service as received by the customer unless unusual service conditions should be encountered, in which case only the ringer will require readjustment. The adjustment of the ringer is a very simple matter and instructions furnished in the booklet are so clear that no difficulty will be encountered.

TELEPHONES
(Continued)

No. 1317 Type



TELEPHONES

(Continued)

No. 1317 Type Magneto Telephones

No. 1317-3 Cell Type

Code No.	Transmitter	Receiver	Receiver Cord	Transmitter Cord	Condenser	Ringer		Generator		Kind of Ringing Current		Class of Signal Service		Line Conditions as Regards Load
						Code No.	Res. Ohms	Operating Current	Co e No.	Current	Generator in Telephone Sends Out	Ringer in Telephone Operates On	Telephone to Central Office		Central Office to Telephone
1317AH	323BW ***	143AW	No. 521 { 30 ins.	One No. 547 and One No. 548 { 6 ins.	None	38AG	1000	A.C.	22A	A.C.	A.C.	Code	Code	Lightly Medium Medium Heavily Heavily Lightly Medium
1317N						38FG	1600	A.C.	48A	A.C.	A.C.	Code	Code	
1317R						38FG	1600	A.C.	48A	A.C.	A.C.	Code	Code	
1317P						38BG	2500	A.C.	48A	A.C.	A.C.	Code	Code	
1317S						38BG	2500	A.C.	48A	A.C.	A.C.	Code	Code	
1317AU					None	55AG	1000	A.C.	22D	P.C.	A.C.	Center Checking **	Code	Lightly Medium
1317BA						38FG	1600	A.C.	48A	A.C.	A.C.	Code	Code		C.O. only selective*

No. 1317C-2 Cell Type

1317CA	53FG	1600	A.C.	50F	A.C.	A.C.	A.C.	A.C.	C.O. selective	Code	Medium
1317CG	53AG	1000	A.C.	50F	A.C.	A.C.	A.C.	A.C.	Code	Code	Medium
1317CJ	54BG	2500	A.C.	22BE	A.C.	A.C.	A.C.	A.C.	{CanSignal C.O. only selective	4-Party selective	Lightly
1317CN	53FG	1600	A.C.	50F	A.C.	A.C.	A.C.	A.C.	Code	Code	Medium
1317CR	53FG	1600	A.C.	50F	A.C.	A.C.	A.C.	A.C.	Code	Code	Medium
1317CP	53BG	2500	A.C.	50F	A.C.	A.C.	A.C.	A.C.	Code	Code	Medium
1317CS	53BG	2500	A.C.	50F	A.C.	A.C.	A.C.	A.C.	Code	Code	Medium

In addition to the above-mentioned apparatus all of these telephones are equipped with the following apparatus:

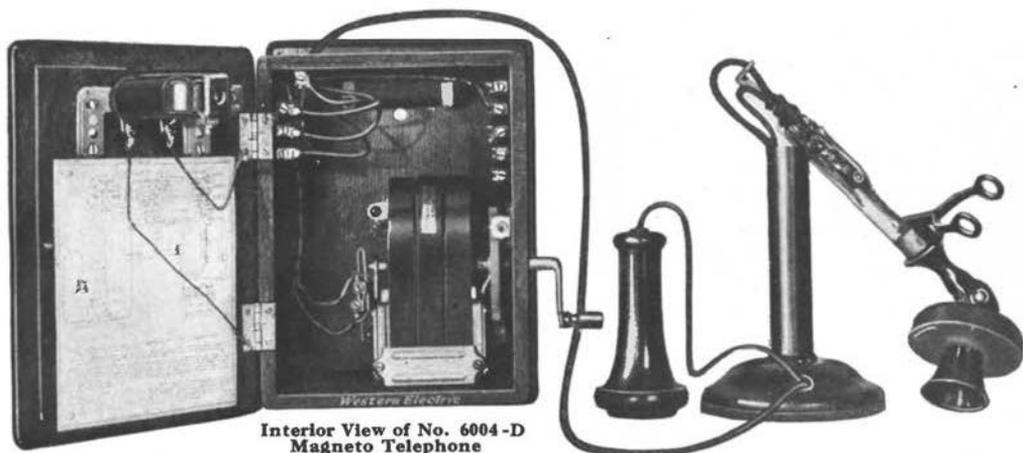
No. 13 Induction Coil No. 8A Transmitter bracket No. 143Y Switchbook

*Equipped with No. 1006A push button. Telephone user can signal central office secretly or not as desired and can signal other parties on same line by code ringing. (See pages describing "Magneto Telephones--Definition of Terms.") **Center checking service. Telephone user can only signal the central office operator. ***The No. 323W will be furnished until the stock is exhausted.

TELEPHONES

(Continued)

Magneto Desk Types



Interior View of No. 6004-D Magneto Telephone

No. 6003 and 6004 Type

The Nos. 6003 and 6004 type desk telephones consist of a No. 1020AL Desk Stand and a Nos. 300 or 315 type Desk Set Box. These telephones comprise the combinations of desk stands and desk set boxes that are most used, and therefore, for convenience in ordering, are covered by a single code number.

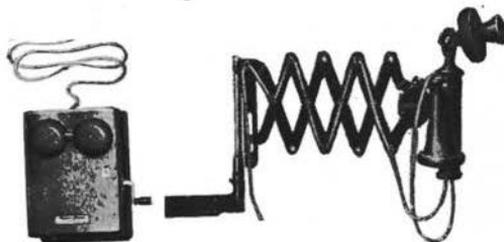
Combinations of apparatus differing from those covered by these code numbers listed may be obtained by ordering the separate items that will make up the desk telephone desired. The following items of apparatus are the electrical equivalent of the No. 1020AL desk stand and may therefore be used in connection with any of the desk set boxes listed below.

- No. 1020CC Telephone Arm
- No. 1048AA Telephone Arm
- No. 1048AB Telephone Arm

- No. 1048AC Telephone Arm
- No. 1001C and H hand sets
- No. 1002AC hand set



No. 315 Type Desk Set Box and No. 1020-CC Type Telephone Arm



No. 300 Type Desk Set Box and No. 1048-AC Telephone Arm

Code No.	Telephone Consists of											Telephone by Signals by Sending Out Ringer in Telephone is Signalled With	Method of Signalling Employed by User of This Telephone	Method of Signalling Employed for Signalling This Telephone	Line Condition As Regards Load		
	Desk Stand	Desk Set Box	Contents of Desk Set Box													Condenser	Ind. Coil
			Generator			Ringer											
Code No.	Current	Code No.	Resistance (Ohms)	Current	Bias Feature	Gaug.	Condenser	Ind. Coil	Telephone by Signals by Sending Out Ringer in Telephone is Signalled With	Method of Signalling Employed by User of This Telephone	Method of Signalling Employed for Signalling This Telephone	Line Condition As Regards Load					
6003B	1020AL	315H	22A	A.C.	51AG	1000	A.C.	None	29A	None	13	A.C.	A.C.	{ Code ringing Can only signal central	Code ringing Four party selective	Lightly loaded	
6003C	1 AL	315J	22E	A.C.	49BG	2500	P.C.	{ Spring and Screws	29A	None	13	A.C.	P.C.	{ Code ringing	Code ringing		
6004B	1020AL	300K	48A	A.C.	51BG	2500	A.C.	None	29A	None	13	A.C.	A.C.	{ Code ringing	Code ringing	Heavy loaded Medium loaded Medium loaded	
6004C	1 2 AL	300L	48A	A.C.	51FG	1600	A.C.	None	29A	None	13	A.C.	A.C.	{ Code ringing	Code ringing		
6004D	1020AL	300AA	50A	A.C.	51BG	2500	A.C.	None	29A	None	13	A.C.	A.C.	{ Code ringing	Code ringing	Medium loaded	
6004E	1020AL	300AB	50A	A.C.	51FG	1600	A.C.	None	29A	None	13	A.C.	A.C.	{ Code ringing	Code ringing		

Note. In the case of the Nos. 300AA, 301AB, 315H, and 315J Desk Set Boxes provision is made for inserting a one microfarad condenser (see No. 21W condenser) in series with the receiver. However, condensers are not furnished unless so ordered.

TELEPHONES

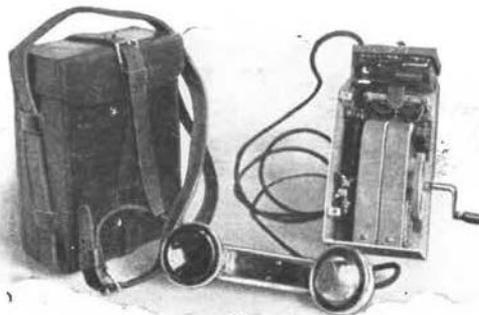
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No. 1330E



No. 1330F

No. 1375B
Apparatus Removed from Case

Portable Magneto Telephones

Nos. 1330 and 1331 Types

These are complete magneto telephones mounted in substantial wooden cases. They are primarily for use in railway service and are designed to withstand the jarring and rough handling incident to train service. In addition to railway service these telephones are suitable for any service where an extremely substantial type of portable telephone is required. While these telephones are not waterproof they are designed to withstand ordinary weather conditions.

The Nos. 1330F and 1331F telephones are equipped with a six-foot waterproof cord and No. 146 plug for connecting them to a telephone line through a No. 136 pole jack.

The Nos. 1330E and 1331E telephones are intended primarily for use where connection to the line will be made with a line pole.

No. 1375 TYPE

The No. 1375B is especially adapted for use in cases where the telephone user must carry the telephone considerable distances. While it is primarily intended for use on moderately loaded lines, the design of the generator is such that it may be satisfactorily operated on heavily loaded lines.

The generator, induction, coil buzzer and terminal block are mounted on an aluminum frame and secured in the case by means of machine screws.

The case is made of high grade leather and is designed to withstand considerable rough handling.

Code No.	Hand Set	Plug	Cord for Plug	—Ringer or Buzzer—		—Generator—				
				Code No.	Resistance (Ohms)	Code No.	Current	Ind. Coil	Condenser	Battery Used*
1330E	1001C	None	None	{ 32B ringer (A.C.)	2500	{ 48A (5 Bar)	A.C.	29	{ 21F	{ 2 Blue Bell Dry Cells* 2 No. 700 Eveready batteries*
1330F		No. 146	No. 509 6 ft.							
1331E		None	None	{ 3B Buzzer (A.C.)	2500	{ 22A (3 Bar)	A.C.	29	{ None 21F	
1331F		No. 146	No. 509 6 ft.							
1375B	1001H			{ D-21141 Buzzer (A.C.)	2150	29E	A.C.	D-17624	None	{ One No. 703 Eveready Batteries*

Code No.	Approx. Wt., Lbs.	Overall Dimensions, Ins.	Line Conditions as Regards Load	Signalling
1330E } 1330F }	28	12½ x 13½ x 5¼	For heavily loaded lines	Telephone signals and is signalled by code ringing
1331E } 1331F }	17	11½ x 10½ x 4¾	For lightly loaded lines	
1375B	10½	9¾ x 7¼ x 4¼	{ Medium and heavily loaded	{ Telephone signals and is signalled by code ringing

* Batteries are not included in the price of the telephone and are furnished only when specified in the order.

No. 1004--HAND SET--HIGH FREQUENCY CURRENT SIGNALLING

The No. 1004A hand set described under "Hand Sets" is a complete telephone weighing only 2 lbs. 10 oz. arranged to signal and be signalled by high frequency current.

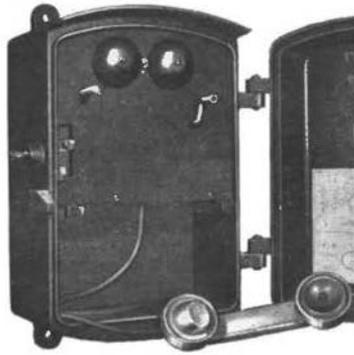
TELEPHONES

(Continued)

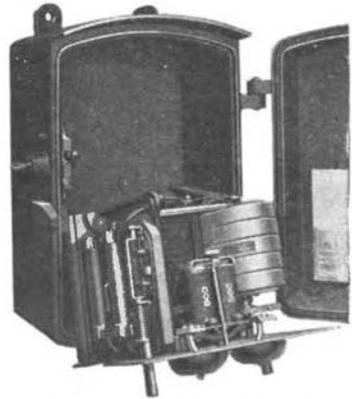
Street Railway Magneto and Central Battery Types



No. 1278 F. G. & H. Type Telephones



Open View



Apparatus Shelf partially removed

No. 1278 TYPE

No. 1278 type telephones employ weatherproof iron boxes and are provided with "insulated" circuits. They are intended principally for exterior use by street railway companies operating telephone lines on which there is a chance of crosses with low voltage power circuits.

This type telephone is arranged so that its circuit is cut off from the line except when its door is opened. When the telephone is in use a repeating coil is interposed between the line and the telephone circuit proper, so as to protect the user, as far as possible, from the chance of injury should the line become crossed with a low voltage circuit.

When the door is opened, a line switch is released which connects one winding of the repeating coil across the line and connects two fuses and two open space cut-outs into this circuit. The telephone circuit proper is connected to the second winding of the repeating coil and, therefore, has no direct contact with the line circuit. The fact that a repeating coil is interposed between the line circuit and the telephone circuit, of course, reduces the efficiency of the telephone to some extent and, therefore, the use of these telephones is not recommended on heavily loaded lines, except where the protective feature is essential. See No. 1336 type telephones.

In case a car is held up awaiting orders from the dispatcher the door of the telephone is left open so as to permit of the telephone being signalled. (It is impossible for the telephone to be signalled when its door is closed.) As the talking circuit is only closed when the push button in the hand set is depressed, the battery in the telephone is not wasted under the above condition.

The apparatus of this telephone is mounted on an iron shelf, which may be removed as a unit from the telephone for inspection. The connection between the apparatus on the shelf and the line and ground terminals is made through the medium of clips which register with contacts mounted on a terminal block secured to the back of the case.

The case and door are of cast iron and have a galvanized finish in addition to which they are given two coats of green paint. Both the top and bottom ends of the case are tapped for receiving 1/2 inch conduit.

The F, G and J telephones are equipped with a lock which is arranged so that the key cannot be removed until the door of the telephone is closed. The No. 1278H is equipped with a hasp, staple and pin similar to that used on No. 1336 type telephone, but padlock is not included.

Code No.	Hand set	Code No.	Ringer		Generator	Ind. Coil	Repeating Coil	Lock	Class of Signal Service	For Line Load
			Resistance (Ohms)							
For Magneto Service										
1278F	1001H	51AG	1000	†48C	{ 13 29 29 }	25E	{ 5B 5B *None }	**Code	Medium	
1278G										
1278H										

For Local Battery Talking and Central Battery Signalling

1278J	1001H	51AG	1000	None	13	25E	5B	**Code	Medium
-------	-------	------	------	------	----	-----	----	--------	--------

In addition to the apparatus listed above these telephones are each equipped with: A special door switch. A special protector.

- 2 D. & W. No. 5001 Type C fuses—500 volt 1 ampere.
- 2 No. 1 protector blocks
- 2 No. 2 protector blocks
- 2 No. 3 protector micas

Dry cells are not furnished and must, therefore be ordered as a separate item.

*This is equipped with hasp, staple and pin the same as No. 1336 type telephones.

**The ringer is disconnected from the line when the door of the telephone is closed.

†Generators have special mounting brackets.

TELEPHONES

Mine Telephones — Magneto



General

A reliable telephone system in a mine will enable the superintendent to communicate instantly with all the important parts of the plant. The saving in time and money which it effects by reliably transmitting routine orders or when there is a temporary suspension of power, a shutdown of some part of the plant, an accident or an emergency affecting both life and property, justifies many times over the investment required.

Mine Laws

No. 1336 Type Mine Telephone That the Legislatures of many of the States have made the installation of mine telephones and signals a requirement for mine operation, is in itself sufficient endorsement of their usefulness. Those farsighted operators who so quickly and wisely responded to these demands are realizing the benefits of the increased operating efficiency that they effect in their mines along with the insurance against loss of life which was the primary object of the legislative acts.

MINE TELEPHONE SYSTEMS

In the Superintendent's office, engine house and other dry and protected parts of the Plant, which should have communication with each other and the mine, the use of standard wall and desk type magneto telephones is recommended.

In cases where all the telephones of the system are connected to a single line (party line) the telephone used should be designed for use on heavily loaded lines—for example:

No. 1336J telephones for service below ground and in exposed locations above ground.

No. 1317S telephones (wall type) (5 bar generator) for service above ground in unexposed locations,

or
No. 6004B telephones (desk types).

In cases where the size of the plant warrants it, the preferable arrangement is to employ a number of lines and a switchboard instead of a party line. These lines may each have a number of telephones connected to them but the most satisfactory arrangement is to have the most important telephones of the system (for example, the engine room telephone and the Superintendent's telephone) connected to individual lines. In addition to greater facility in handling calls the use of a switchboard has a number of advantages, an important one being that in case one of the lines should become broken or crossed, it would not tie up the rest of the system until the trouble is cleared.

In cases where a switchboard is employed, the telephones used below ground should be of the No. 1336 type but the lines above ground, if lightly loaded, may be equipped with telephones having 3 bar generators. For example:

No. 1317AH Telephones (wall type), or

No. 6003B Telephones (desk type).

A copy of booklet, "Mine Telephone Systems and How to Install Them," will be sent to mining companies upon request.

No. 1336 Type Telephones

Briefly, these are metal case magneto telephones having all apparatus and parts treated to resist the action of moisture. They are primarily designed for use on heavily loaded lines where code ringing is employed and, while they are intended chiefly for mine service they are also recommended for outdoor use as in railway service, etc.

Moisture-Proofing

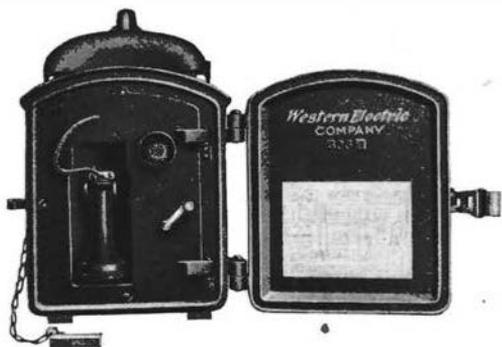
Experience has shown that moisture will condense on the inside surfaces of mine telephones regardless of whether or not they are of so called "Air Tight" construction. In view of this, the practice of employing gaskets, stuffing boxes, etc. was abandoned a number of years ago in favor of the design illustrated by the No. 1336 type. In this design small openings are provided which permit air to circulate through the telephone without exposing it to the chance of trouble due to the entrance of foreign material. An opening is also provided so that water may drain off instead of remaining in the telephone. All apparatus and parts are specially treated so that they will not be injured by moisture or fumes, and in addition the telephone is so made that the presence of moisture will not interfere with signalling or transmission. The terminals of the apparatus are imbedded in insulating compound so that they cannot be short circuited even though the apparatus is wet. The telephone is wired with heavy stranded copper wire having rubber insulation and a braiding.

Protectors

The telephones installed above ground should be equipped with protectors consisting of open space cut outs (For example the No. 60AP protector) to prevent damage to the telephone by lightning. In case there is a chance of contact between the telephone line and a power circuit protectors consisting of open space cut outs and fuses (For example the No. 58AP protector) should be used.

TELEPHONES

Mine Telephones—Magneto—Continued



No. 1336 Mine Telephone (Outer Door Open)



No. 1336 Mine Telephone (Outer and Inner Doors Open)

No. 1336 Type

Code No.	Transmitter	Receiver	Receiver Cord	Condenser	Ringer			Generator		Signalling Service	For Line Load
					Code No.	Resistance	Operating On	Code No.	Current		
1336A	312W	144AW	384	None	None	2500	A.C.	48C	A.C.	Code Ringing	Heavily Loaded
1336E				None	45BG						
1336J				21W	45BG	1600					
1336K				21W	{ (Spl.), 45BG						

In addition to the apparatus listed above the No. 1336 type telephones are equipped with a No. 143J switchhook and a No. 31 induction coil.

Special No. 1336 type telephones equipped with a heavy brass padlock with two keys are obtainable. The padlock is attached to the chain in place of the latch pin. Orders for these telephones must state that padlocks are desired.

The No. 1336A telephone is not equipped with a ringer as it is intended for use where an extension bell is preferred to the regular telephone ringer, also for service where all the calls will be outgoing.

The No. 1336E differs from the No. 1336A in that it is equipped with a ringer and an iron hood for protecting the gongs.

The No. 1336J differs from the No. 1336E only in that a condenser is provided to permit the ringers of this telephone as well as others on the same line, being rung even though its receiver may have been left off the switchhook.

To add a condenser to a No. 1336 type telephone that was not originally so equipped the following apparatus and parts should be ordered:

No. 21W Condenser. One Condenser Strap P-43065. Two Round Head Machine Screws P-110187.

Ringings. The Nos. 1336A telephones are intended for standard bridging service on heavily loaded lines, i.e., the generators and ringers are of such design that forty or more telephones can be operated successfully as far as the ability to ring one another and converse is concerned. It is, however, understood that as many telephones as these on a line would be undesirable.

Ringers and Extension Bells. The ringers used in these telephones may be readily adjusted if necessary with a screwdriver. The gongs emit a loud distinct ring which can be heard a long distance, particularly so underground. However, it is often desired to provide loud ringing extension bells in connection with mine telephones and for this purpose the No. 392 and No. 342 type extension bells are recommended as they are designed to withstand the severe conditions encountered in mine service.

Western Electric TELEPHONES

Mine Telephones—Magneto (Continued)

Dry Cells. Two standard size dry cells are required for each telephone to furnish current for talking. Western Electric Blue Bell Dry Cells are specially designed for telephone service and are recommended because they last longer and are more efficient for this class of service than other dry cells.

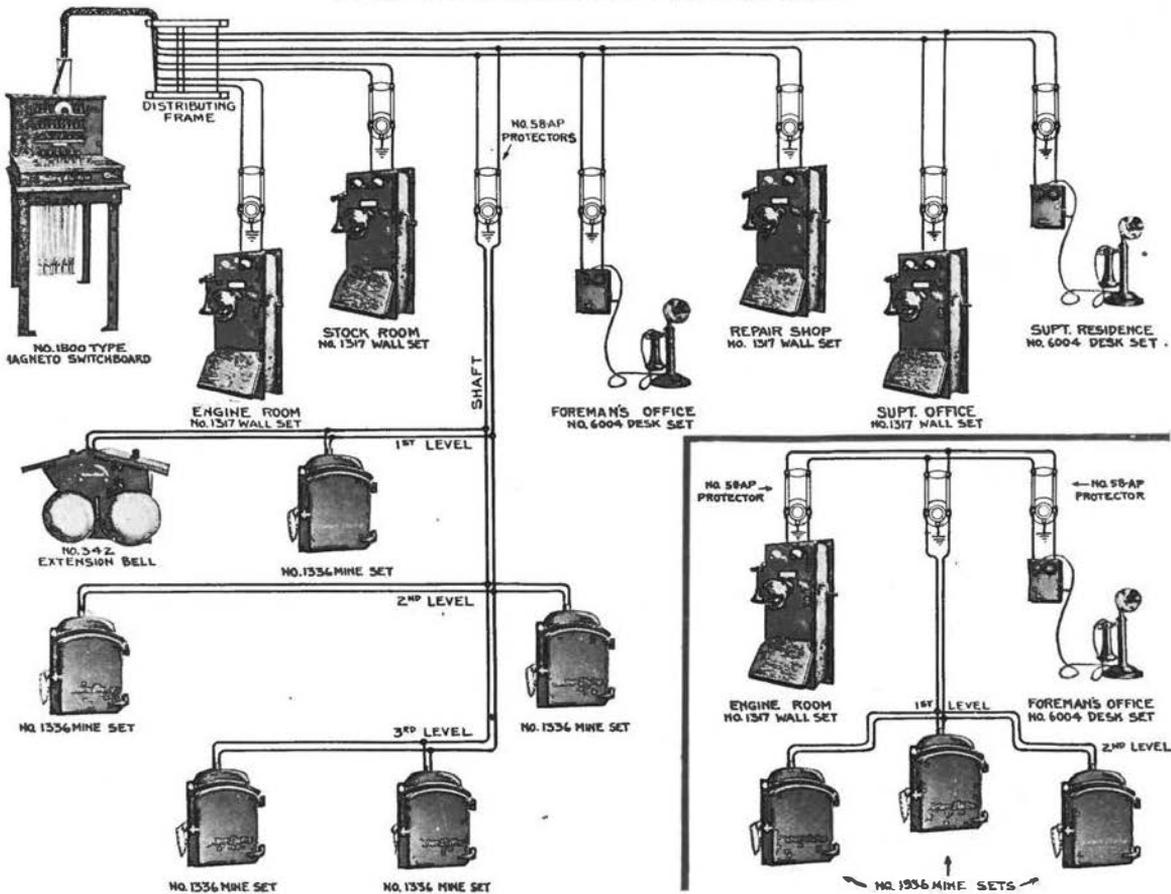
Two special Blue Bell Dry Cell car ons, impregnated with moisture-proofing compound, are furnished with each No. 1336 type telephone. These are to be substituted for the standard cartons furnished on the dry cells. These car ons resist the action of any moisture that may form on the inside of the case and prevent current leakage and rapid deterioration.

Case. The box, outer door, inner door and gong hood are of cast iron heavily coated with a rust resisting finish. When the outer door is closed only the metal transmitter mouthpiece, receiver, receiver cord and the genera or handle are exposed. When the outer door is closed these parts are protected from mechanical injury. When using this telephone it is, of course, evident that only the outer door need be opened.

Entrance for Line Wires. The line wires may be brought in either at the top or the bottom of the case. A short length of pipe is screwed into the top of the case and is covered with a pipe cap. This cap prevents water running into the set by following the line wires. In case the line wire is to be run to the telephone in pipe (conduit) no difficulty will be encountered in joining the conduit to the telephone as the wire entrance hole at the bottom as well as the top of the case is tapped.

Mounting. Wrought iron mounting bars are secured to the back of the case. The upper end of these have "pear" shaped holes, and with this arrangement the telephone can be readily mounted by one man and without any danger of damaging it. This is accomplished by driving two lag screws into the mounting surface until their heads project about $\frac{1}{2}$ inch. The telephone may then be hung upon these mounting screws (the heads of the lag screws will pass through the large end of the "pear" shaped holes) after which the lower mounting screws may be driven into place through the holes in the lower end of the mounting bars. Wrought iron mounting bars are employed as they are less subject to breakage than if lugs were cast on the case.

Typical Western Electric Mine Telephone Systems

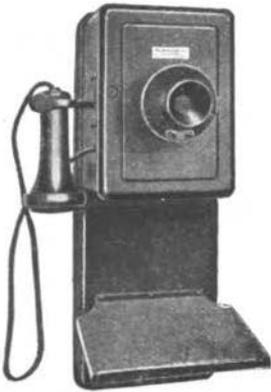


Typical Diagram Showing Method of Connecting Telephones to a Switchboard.

Typical Party Line Mine Telephone System.

TELEPHONES—CENTRAL BATTERY

No. 1533 and 6054 Type Telephones



No. 1533 Type Telephone on a No. 148A Backboard with a No. 146A Backboard (writing shelf)

Telephones representing the highest and most modern development in central battery telephone design are found in the Nos. 1533 and 6054 types.

In addition to the superior features represented by the individual pieces of apparatus and circuits, these telephones embody a number of features that are particularly worthy of note, namely:

Ringer and gongs are enclosed within the case thereby preventing tampering, reducing maintenance and greatly improving the appearance.

Case is made of heavy sheet steel, copper plated and finished with two coats of extremely durable black enamel (baked on) especially developed for this particular purpose.

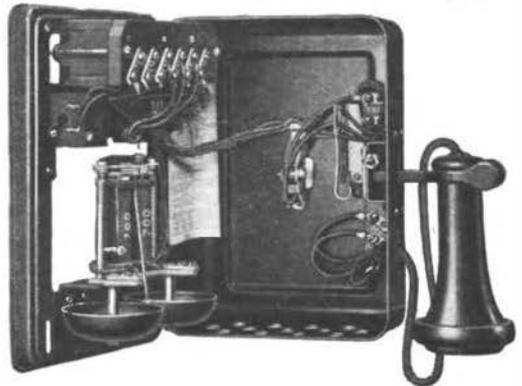
The case is constructed so that every part of the interior is easily accessible when the cover is opened.

The base is flanged thereby giving greater rigidity and preventing base from cutting into plastered surfaces.

Unit type of construction and universal terminal block employed. This permits of the telephone being readily converted from one class of service to another. This also permits of a desk set box being converted into a wall telephone or vice versa by a substitution of covers.



No. 1533A Type Telephone



Inside View of No. 1533A Type Telephone

Telephone Code No.	Transmitter	Receivers	Ringer		Condensator	Relay	Induction Coil	Talking Circuit	Kind of Ringing	Ringling Current
			Code No.	Res. (Ohms)						
1533A	323BW	143AW	8AG	1400	21AP	....	46	Standard Series central battery Central battery signaling local battery talking Standard.....	Single party 2 party selective 4 part semi-selective 4 party selective....	A.C.
1533K	323BW	171W	8 G	1400	21F	....	None			
1533Y	.....	.....	8AG	1400	21AP	....	13			
1533AR	3BW	143AW	42AG 41SG 3½ cycles 41TG 50 cycles 41UG 66½ cycles 41RG 16¾ cycles	....	21AP	85F	46	Standard.....	Harmonic..... 4 & 6 party selective	P.C. H'rm'nic
153 E	323BW	143AW								
1533F										
1533G										
1533 H										

All of these telephones are equipped with the No. 7A transmitter bracket, Nos. 547 and 548 six inch transmitter cords and a 30 inch No. 521 receiver cord.

*Note. The No. 8AG ringers were formerly wound to 1000 ohms instead of 1400 ohms. The 1000 and 1400 ohms ringers have the same impedance and may be used interchangeably in service.

See separate listing for "Central Battery Telephones for Use with No. 1801 Switchboards," and for protectors.

**The No. 323BW transmitters have a black finish.

TELEPHONES



6054A Desk Telephone—No. 1020AL Desk Stand Partially Dismantled

No. 6054 Central Battery Telephones—Desk Type

The No. 6054 desk type telephones consist of a No. 1020 type desk stand and a desk set box. These telephones comprise the combinations of desk stand and desk set boxes that are most used and, therefore for convenience in ordering are covered by a single code number.

Combinations of apparatus differing from those covered by the No. 6054 series of code numbers may be obtained by ordering a desk stand and a desk set box as separate items, also a telephone arm or a hand set may be used in place of the desk stand if desired.

For example, any of the desk set boxes that will function with the No. 1020AL desk stand will also function with the following:

1020CC	Telephone arm	|| 1001C, and H	Hand sets (See Hand Set Hangers)
1048AA	Telephone arm		
1048AB	Telephone arm		
1048AC	Telephone arm		
		|| 1002AC	Hand set

Telephone Code No.	Telephone Code No.—Covers		Contents of Desk Set Box					Taking Circuit	Kind of Ringing	Ringing Current
	Des Stand	Desk Set Box Code No.	Ringer		Con- denser	Reay	Induc- tion Coil			
			Code No.	Res. (Ohms)						
6054A	1020AL	534A	8AG	*1400	21AP	.....	46	Std. C.B.	{ Single party and 2 party selective... }	A.C.
6054AR	1020AL	534AR	42AG	{ 1000 and 3000 }	21AP	85J	46	Std. C.B.	{ 4 party selecti e... }	P.C. (Pulsating current)
6054E	1020AL	534E	418G	.....	21F	.....	46	Std. C.B.	{ Harmonic 4 party selective or 8 party semi-selective... }	Harmonic
6054F		534F	33½ cycles							
6054G		534G	41TG							
6054H		534H	50 cycles							
6054K	1020AH	534K	8AG	*1400	21F	.....	None	{ Series Central Battery }	{ Single party and 2 party selective... }	A.C.

Note. See ratings of No. 534 type desk set boxes, No. 1020 desk stands and protectors.

*The No. 8AG ringers were formerly wound to 1000 ohms instead of 1400 ohms. The 1000 ohm and 1400 ohm ringers have the same impedance and may be used interchangeably in service.

Western Electric TELEPHONES



No. 6034AU



No. 1533A, M&N



No. 6090AE

CENTRAL BATTERY TYPE—(Continued) For Use With No. 1801 Switchboard—Systems A, B, C and D Systems A and B

The telephones for No. 1801 Switchboard Systems A and B are of the series talking circuit type and equipped with 140 ohm vibrating bells which operate on direct current.

Code No.	Case and Finish	Mounting	Receiver
1527A	Metal, Black	Surface Wall	Watch Case Type
1539A	Metal, Black	Flush Wall	Watch Case Type
1533N	Metal, Black	Surface Wall	Hand Receiver
6034AU	No. 1020BJ Stand	Desk	Watch Case Type

Note: Information on hand set type telephones and desk telephones equipped with hand receivers will be furnished on application.



No. 1527A



No. 1539A

System C

The telephones for No. 1801 Switchboard System C may be of the same types as used for Systems A and B, but in case the system is connected to an outside exchange telephones equipped with standard central battery induction coil talking circuit should be used in order to obtain satisfactory transmission, as follows:

Code No.	Case and Finish	Mounting
1533M	Metal, Black	Surface Wall
6000AE	No. 1120CN Stand	No. 295AU Box

System D

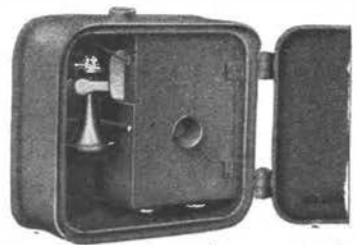
Any standard central battery telephone with ringers operated by alternating current either induction coil or series types can be used with System D. The No. 1533A wall type and No. 6054A desk type telephones may be selected for this system.

No. 1320 CENTRAL BATTERY TYPE FOR POLICE SERVICE

The No. 1320 type is a metal case weatherproof telephone for central battery service. It was designed primarily for the Police Patrol Service but will be found very satisfactory for general central battery service where a weatherproof telephone is required.



Special No. 1320A



No. 1320A with Outer Door Open

The apparatus is mounted on a metal frame which is removable as a unit from the case. An inner door protects the apparatus from the weather when the outer door is open. The overall dimensions are 6½ inches deep by 13¾ inches high by 12¾ inches wide.

A loud ringing extension bell may be connected in multiple with the ringer of this telephone thereby providing means of signaling a patrolman from a distance (see extension bells).

A tapped hole is provided in each end of the case for receiving conduit. Four holes are drilled in the back of the case for receiving mounting screws or mounting clamps. The lock on the outer door is designed so that the key cannot be removed until the door is closed.

Outer door is not marked. Standard finish, gray paint.

Special No. 1320A telephones may be obtained with outer doors marked (raised characters cast on door) in accordance with customer's requirements; color of finish, as specified.

TELEPHONES

Central Battery Telephones—
Machine Switching Service



No. 6534 Type Desk Telephone with
No. 50D Apparatus Blank

Western Electric Company machine switching telephones, including the dials, are the result of experimental work conducted during the past fifteen years. This apparatus will operate satisfactorily with practically any type of machine switching central office equipment.

Western Electric machine switching telephones embody the same excellent features of design and construction as the apparatus for manual service.

In case it is desired to temporarily operate machine switching telephones on a manual basis we are prepared to furnish them less dials and with dial openings covered with apparatus blanks. Telephones so equipped may be equipped for machine switching service by merely removing the apparatus blank and adding a dial and dial cord.



Open View

No. 1553A Type Telephone

Closed View

Telephones—Desk Type—Machine Switching

Code No.	Desk Stand	Desk Set Box Code No.	Ringer		Ind. Coil	Con- denser	Talking Circuit	Kind of Ringing	Ringing Current
			Code No.	Res. Ohms.					
6534A	1050AL	534A	8AG	1400	46	21AP	Standard Central Battery	Single Party Two Party Selective, Four party Semi-Select- ive.	A.C.
6534E	1050AL	534E	41SG	460	46	21F			
6534F	1050AL	534F	41TG	285	46	21F	Standard Central Battery.	Four party Selective. Eight Party Semi-select- ive.	Har- mon- ic.
6534G	1050AL	534G	41UG	200	46	21F			
6534H	1050AL	534H	41RG	1800	46	21F			
6534Y	1050AL	534Y	8AG	1400	13	21AP	Central Battery Signalling, Local Battery Talking	Single Party Two party Selective Four party Semi-select- ive.	A.C.

See separate listings of dials, desk stands, desk stand boxes and protectors.

Western Electric

TELEPHONES

Machine Switching—Dials



No. 2AA Calling Dial

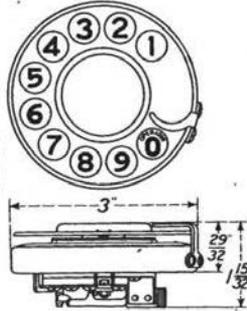
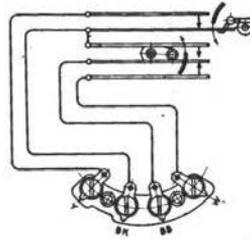
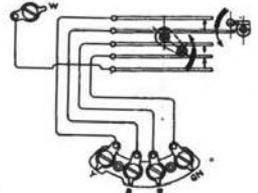


Diagram Nos. 2AA and 2EA Dial



Wiring of



Wiring of No. 2EA and 2EB Dials

DIALS

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

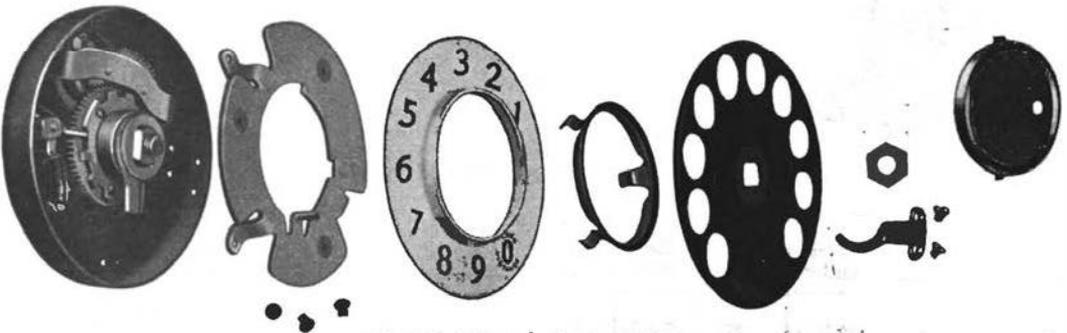
These dials are designed to mount on Western Electric machine switching desk stands and wall type telephones. Also in Western Electric Dial mountings.

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

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

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

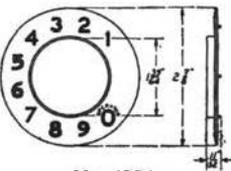
Code Nos.	Number Plate	Color of Characters	
		Numerals	Letters
2AA	132A	Black	Black
2AB	132B	Red	Black
2EA	132A	Black	Black
2EB	132B	Red	Black
2CB	132B	Red	Black



No. 2AA Dial Set—Exploded View

DIAL NUMBER PLATES

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



No. 132A

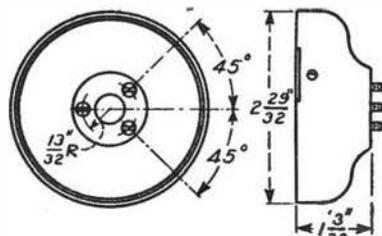
Code Nos.	Color of Characters	
	Numerals	Letters
132A	Black	Black
132B	Red	Black



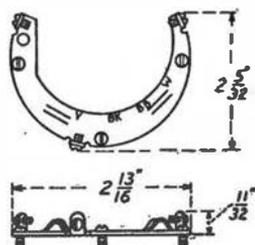
No. 132B

TELEPHONES

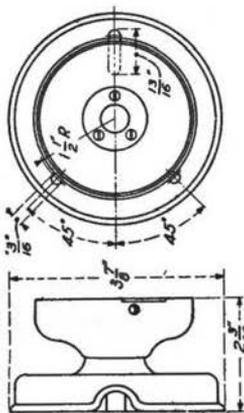
Machine Switching—Dial Mountings



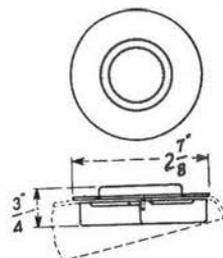
No. 30A



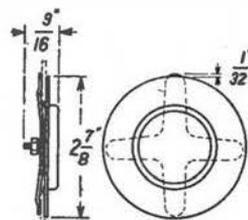
No. 52A



No. 33A



No. 50D



No. 50B

DIAL MOUNTINGS

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

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

Code No.	Principal Use	Description
30A	Intended to mount on wall type telephones.	3 machine screws are furnished. Woodscrews can be substituted if desired.
31A	Used on switching key shelves.	Has a spring clip on which the dial mounting proper is seated. The clip mounts permanently on key shelf. Dial, dial adapter and mounting may be removed as a unit from the spring clip.
32A	Local test desk and P.B.X. switchboards.	Consists of the No. 30A dial mounting provided with a metal base. Intended primarily to mount in a vertical position.
33A	Intended to mount on walls adjacent to telephones or deskstands.	Consists of the No. 30A dial mounting provided with a metal base.

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

DIAL ADAPTERS

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

DIAL OPENING APPARATUS BLANKS

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

Western Electric

INTER-PHONES AND ACCESSORIES



Introductory

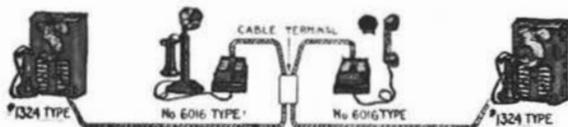
Fast and reliable telephonic communication is today such a well recognized essential that Inter-phones are considered a necessity in the modern business and home life. Schools, industries, offices, public institutions and the modern home require them, and they are considered a part of the building equipment by leading Architects in planning and designing new buildings. The user is the only operator required—pushing one button makes the desired connection.

Inter-phones are reliable and carefully designed telephones constructed in various styles and types to meet different classes of use.

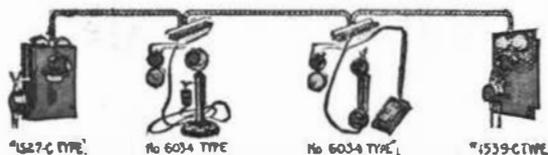
The Western Electric Company has been engaged in the manufacture of telephone apparatus for more than forty years, and in Inter-phones are embodied the engineering skill and refined manufacture resulting from this long experience.

INTER-PHONES

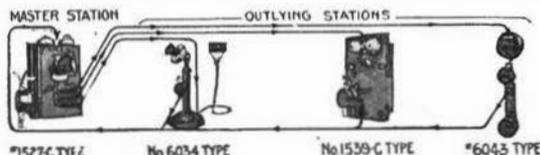
Picture Index of Inter-phone Systems



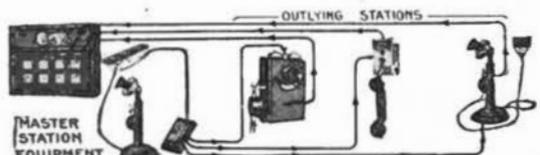
System No. 1



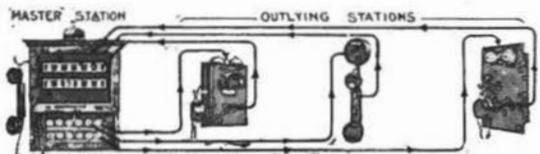
System No. 11



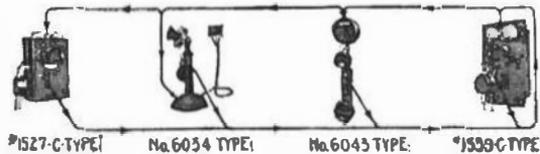
System No. 12



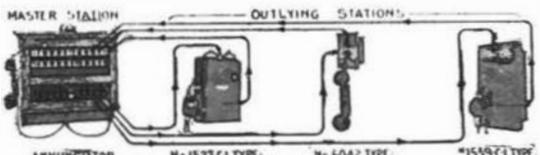
System No. 12A



System No. 12B



System No. 15C



System No. 18

SYSTEM NO. 1

Selective Ringing—Selective Talking Service
 3 up to 24 stations. Page 99

1. Any station can ring selectively any other station.
2. More than one conversation can take place simultaneously.
3. Apparatus, operation and appearance, the highest grade obtainable.
 (For systems Nos. 7, 8, 9 and 10 see Apartment House Inter-phones.)

SYSTEM NO. 11

Selective Ringing—Common Talking Service
 3 up to 8 stations. Page 101

1. Any station can ring selectively any other station.
2. Only one conversation can be carried on at a time.
3. Apparatus pleasing in appearance and moderate in cost.

SYSTEM NO. 12

Master and Outlying Stations—Common Talking Service
 3 up to 8 stations. Page 102

1. The "master station" can call any one of the "outlying stations," selectively and the outlying stations can call the master station (but not each other).
2. Wall, desk or hand set Inter-phones may be used interchangeably in this system for both the master and outlying stations.
3. Only one conversation can be carried on at a time

SYSTEM NO. 12A

Master Annunciator and Outlying Stations Common Talking Service
 3 up to 20 stations. Page 104

1. Adapted for schools where the principal must call the teachers individually and teachers must call the principal but not each other.
2. Same as System No. 12 except master station is equipped with an annunciator for identifying calls from the outlying stations.
3. The master station annunciator is of the Electrica Resetype.
4. Only one conversation can be carried on at a time.

SYSTEM NO. 12B

Master Annunciator and Outlying Stations Common Talking Service
 3 up to 24 stations. Page 105
 Formerly Known as Systems No. 16B & C

1. The "outlying stations" can ring the "master annunciator" station but not each other.
2. Master annunciator station may or may not have push buttons for calling any one of the outlying stations.
3. This system is also designed for replacing existing ordinary annunciator and push button systems (where the wiring is suitable).
4. Only one conversation can be carried on at a time.

SYSTEM NO. 15C

Code Ringing—Common Talking Service
 2 up to 6 stations. Page 108

1. A simple private line system (requires only 3 line wires between stations).
2. When a button is pressed at any station the bells of all other stations will ring simultaneously.
3. The various stations are called by signalling each one with a different code.
4. Only one conversation can be carried on at a time.

SYSTEM NO. 18

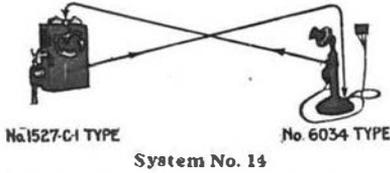
Master Annunciator with Connecting Cords
 10 up to 70 stations. Page 109

1. From the "master station annunciator" any one of the "outlying stations" can be called selectively, or the master station can be called from the outlying stations.
2. Communication can be established between any two outlying stations by means of connecting cords at the master station annunciator.

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

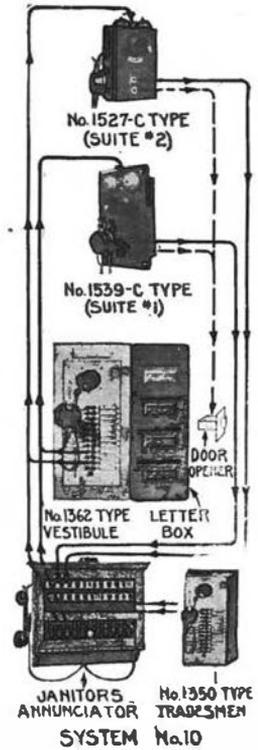
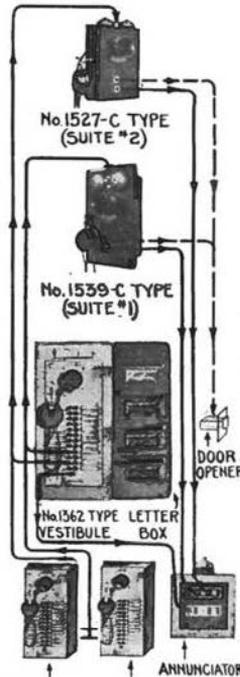
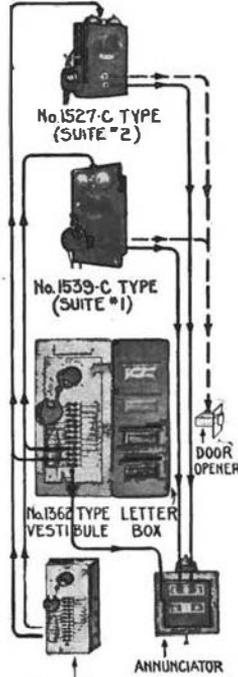
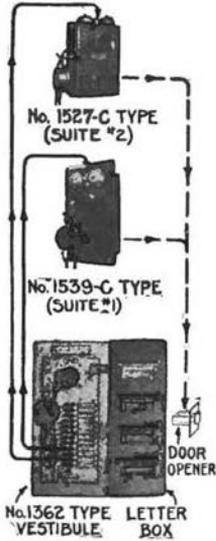
INTER-PHONES

Picture Index of Inter-phone Systems
SYSTEM No. 14



2 Stations Only Page 107

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



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

Page 111

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

System No. 7

Non-Interfering Service

One vestibule and up to 24 suite Inter-phones Page 112

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

System No. 8

Non-Interfering Service

One vestibule, one janitor and up to 24 suite Inter-phones Page 112

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

System No. 9

Non-Interfering Service

One vestibule, one janitor, one tradesmen's and up to 24 suite Inter-phones Page 112

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

System No. 10

Non-Interfering Service

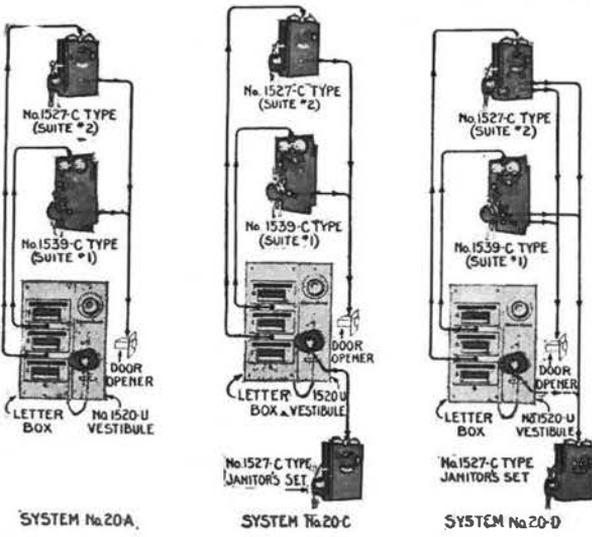
One janitor's switchboard, two or more vestibule and tradesmen's Inter-phones and any number of suite Inter-phones up to 70. Page 113

This system provides the same service as in System No. 9, but on a larger scale. Intended for use where several vestibules in the same or adjoining apartments are to be served by one janitor. A maximum of 24 suite Inter-phones can be connected to each vestibule set.

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

INTER-PHONES

Picture Index of Inter-phone Systems



APARTMENT HOUSE SYSTEMS--
(Continued)

System No. 20

Selective Ringing--Common Talking Service
Page 114

There are six combinations of the No. 20 System suitable for systems consisting of one vestibule and up to 24 suite Inter-phones.

System No. 20A

Page 115

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

System No. 20C

Page 115

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

System No. 20D

Page 115

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

System No. 20E

Page 116

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

System No. 20G

Page 116

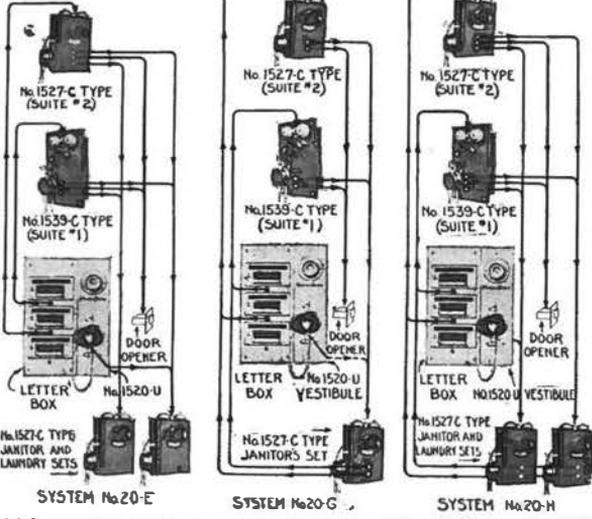
1. Vestibule can call apartments and janitor.
2. Apartments can open door and call janitor.
3. Janitor can call apartments.

System No. 20H

Page 116

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

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



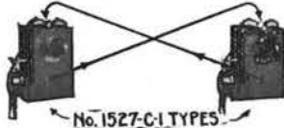
which are shown in a separate bulletin, "Installing and Maintaining Western Electric Inter-phones."

INTER-PHONE OUTFITS



Outfit No. 17
Page 118

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



Outfit No. 30
Page 117

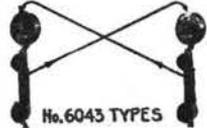
Includes two private line surface wall Inter-phones packed in one box.

Outfit No. 30A

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

Outfit No. 30B

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



Outfit No. 31
Page 118

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

Outfit No. 31A

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

Outfit No. 31B

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

INTER-PHONES

Description of System No. 1 Inter-phones

Selective Ringing--Selective Talking Service



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

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

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

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

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

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

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

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

The Housings of the metal wall sets and desk set key boxes are made of heavy sheet steel, formed and pressed into shape. The housings are then treated with a special copper plating process. This method is used to protect the metal from moisture so that rust cannot attack its surface. After the surface is copper-plated it is finished with two coats of black japan which is baked on. The japan finish being baked on clings firmly to the metal preventing cracking or peeling as is liable to happen when an air drying finish is applied.

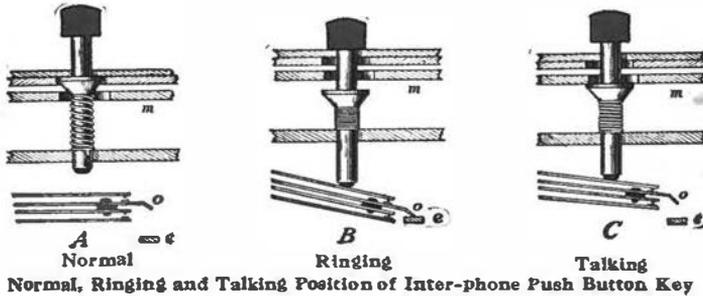
It is standard Western Electric practice to treat the surfaces of all steel parts with either copper plating or an equally effective process, before applying the exterior finish, to protect the steel against rusting.

INTER-PHONES

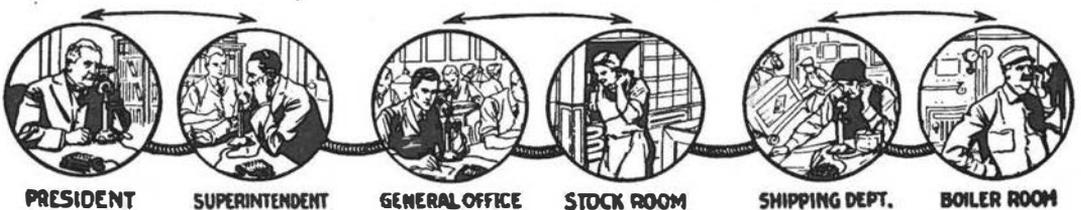
Description of System No. 1 Inter-phones (Continued)

Selective Ringing--Selective Talking Service

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



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



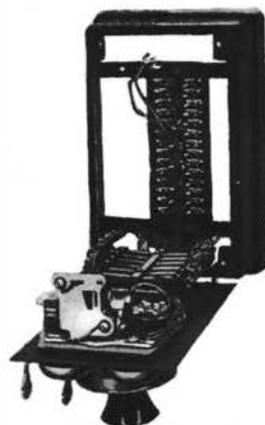
INTER-PHONES

Description of No. 1 Inter-phones (Continued)

Selective Ringing—Selective Talking Service



No. 1324 Type Wall Inter-phones



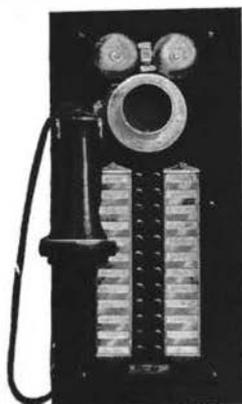
Open View Wall Inter-telephone

WALL TYPE INTER-PHONES

No. 1324 Type Inter-phones

The No. 1324 type Inter-telephone is an all metal set having a hinged face plate, movable transmitter and hand receiver. Finished black with nickel trimmings. The face being hinged, makes it possible to easily inspect all connections and apparatus, without disturbing the installation.

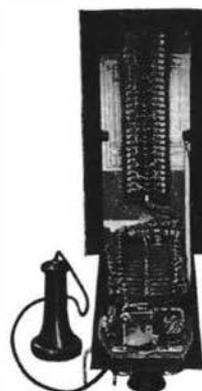
This Inter-telephone is furnished in 6, 12, 16, 20 and 24 button sizes.



No. 1355 Type Wall Inter-telephone



Metal Outlet Box



Interior of No. 1355 Type Wall Inter-telephone

No. 1355 TYPE INTER-PHONES

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

METAL CASE WITH DULL BLACK FINISH

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

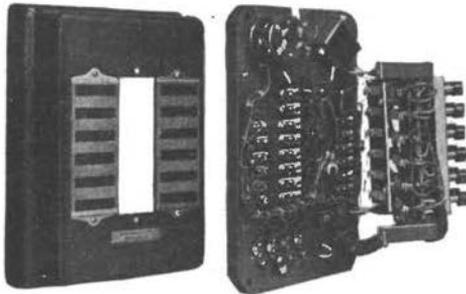
INTER-PHONES

Description of System No. 1 Inter-phones (Continued)

Selective Ringing—Selective Talking Service



No. 6016 Type Desk Inter-telephone



Construction of 328 Type Key Box



No. 6016 Type Hand Set Inter-telephone

No. 6016 TYPE DESK AND HAND SET INTER-PHONES

No. 6016 Type Desk Inter-phones

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

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

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

No. of Buttons	Code No.	Desk Stand	Cord, Ft.	Includes		Dimensions—Inches		
				Key Box	Key Box	Width	Length	Depth
6	6016M	1120BE	6	328C-6	5	7½	2⅝	
12	6016K	1120BE	6	328C-12	5	7½	2⅝	
16	6016N	1120BE	6	328C-16	5¼	10¾	2⅝	
20	6016P	1120BE	6	328C-20	5¼	10¾	2⅝	
24	6016L	1120BE	6	328C-24	5¼	10¾	2⅝	

No. 6016 Type Hand Set Inter-telephone

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

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

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

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

No. of Buttons	Code No.	Hand Set	Cord, Ft.	Hand Set Hanger	Includes		Dimensions—Inches		
					Key Box	Key Box	Width	Length	Depth
6	6016MH	1001J	6	1B	328C-6	5	7½	2⅝	
12	6016KH	1001J	6	1B	328C-12	5	7½	2⅝	
16	6016NH	1001J	6	1B	328C-16	5¼	10¾	2⅝	
20	6016PH	1001J	6	1B	328C-20	5¼	10¾	2⅝	
24	6016LH	1001J	6	1B	328C-24	5¼	10¾	2⅝	

INTER-PHONES

Description of Metal Wall Inter-phones

Nos. 1527C AND 1539C TYPES

Selective Ringing--Common Talking Service
GENERAL

The Nos. 1527C and 1539C Inter-phones represent the highest development yet attained toward the standardization of design and construction of Common Talking Type Inter-phones.

This result is due to the exceptional engineering skill employed in producing a universal Inter-phone that is simple, yet pleasing in design; compact, yet with every part accessible for instant inspection; rugged, yet light in weight and efficient in operation.

CONSTRUCTION AND FLEXIBILITY

The principal features of these Inter-phones are:

Surface and Flush Type Inter-phones so wired as to be adaptable for use in any of our "Common Talking" Inter-phone systems.

An Interchangeable Push Button Arrangement provides for readily furnishing Inter-phones from stock in capacities of 1, 2, 3, 4, 6 and 8 buttons as required.

Circuit Labels in Each Inter-phone together with an envelope containing strap wires and a diagram of connections give clear, concise instructions for universally connecting the completely equipped sets for any of our Common Talking Systems.

The Push Button Arrangement provides for the future growth of an Inter-phone system by simply ordering push button units of the required capacities without having to remove or dismantle the sets from the system. (This assumes that cable including spare wires is originally installed.)

FINISH OF INTER-PHONES

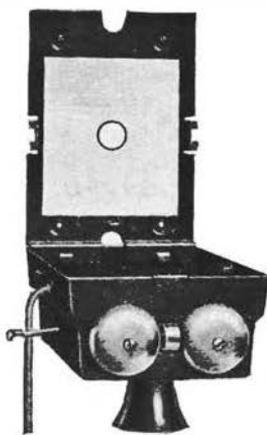
The Metal Parts of the Nos. 1527C and 1539C Inter-phones with the exception of the transmitter and bells are treated with the Parker Rustproof Process. This consists of treating the parts in a hot chemical bath, which changes the surface of the metal to a non-rusting basic phosphate.

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

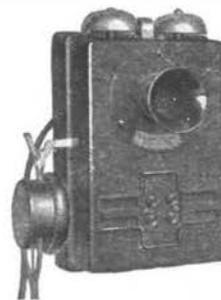
Durable Black Enamel Baked On (over the Parkerized surfaces) provides a tough elastic, non-chipping finish, two coats of the enamel being applied on surfaces exposed to view.

OF INTEREST TO CONTRACTORS

The universal and flexible feature of these new metal wall Inter-phones is of special importance since it now enables contractors and dealers to carry complete stocks of Inter-phones for adoption to any of our common talking systems with but a small amount of investment.

No. 1527C-2 Type
Inter-phone

Open View

No. 1527C-4 Type
Inter-phoneNo. 1527C INTER-PHONES
(Surface Type)

The No. 1527C Type Inter-phone has a surface mounting metal housing which contains all of the talking and signalling apparatus, also a metal backboard, which is furnished for mounting the set to the wall.

The Housing of the set is of rugged construction, being formed out of sheet steel and is equipped with hinge hooks which match up with slots in the base of the metal backboard. This arrangement permits fastening the backboard in place on the wall and then mounting the housing unit to it.

The Hinge Arrangement of this set enables the installer to swing down the housing unit from the backboard (see illustration) for making connections to the terminals; also to permit interior inspection of the set at any time after its installation.

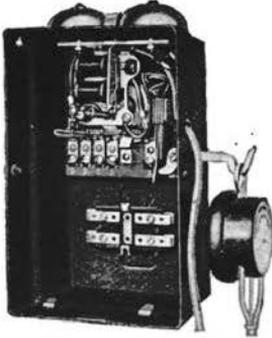
INTER-PHONES

Description of Metal Wall Type Inter-phones (Continued)

Selective Ringing—Common Talking Service
Nos. 1527C AND 1539C TYPES

The Metal Backboard is designed to permit the entrance of wires or cabling from either the top, bottom or center of the set; also, a metal guide ring is located near the cable entrance at the base of the backboard so that the connecting wires may be looped through this ring to hold them in place and provide a proper bending point when the housing is swung forward.

The Finish is durable dull black enamel with nickel trimmings (see general notes on "Finish of Inter-phones").

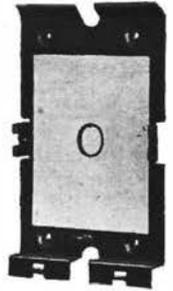


Interior of Housing for 1527C Type

Code No.	No. of Buttons	For Inter-phone Systems
1527C-0	0	7 and 20
1527C-1	1	7, 8, 9, 10, 12, 14, 15, 18 and 20
1527C-2	2	8, 9, 10 and 20
1527C-3	3	11, 12 and 20
1527C-4	4	11, 12 and 20
1527C-6	6	11, 12 and 20
1527C-8	8	11, 12 and 20

Dimensions of Housing (0 to 8 Buttons)

High, Ins.	Wide, Ins.	Deep, Ins.
7½	5	2¾



Backboard for 1527C Type



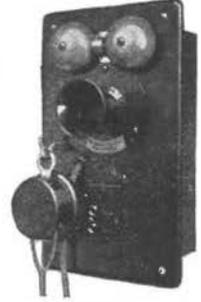
No. 1539C-1 Type Inter-phone



Outlet Box for 1539C Type



Back of Face Plate for 1539C Type



No. 1539C-2 Type Inter-phone

No. 1539C INTER-PHONES

Flush Type

The No. 1539C type Inter-phone has a flush steel face plate on which is mounted all of the talking and signalling apparatus, also a metal outlet box which is furnished for mounting the set in the wall.

The Outlet Box is of unique design in that metal aligning strips are fastened at the top and bottom front of the box (see illustration), so as to properly align the set after the face plate unit is fastened to the outlet box (in case the outlet box is installed out of plumb). It is equipped with adjustable ears for mounting it in the wall, the same as are furnished on standard sectional outlet boxes. Knockouts are provided at both the top and bottom for the entrance of ½ inch conduit or connecting wires.

The Face Plate Support for Installer is an added feature of this set, consisting of a wire hook mounted on a small card with printed instructions for its use. This hook is for temporarily supporting the Inter-phone face plate, of flush type sets, during installation, so that the wires may be readily connected to the terminals by the installer.

The Finish is durable dull black enamel with nickel trimmings (see general notes on "Finish of Inter-phones").

Code No.	No. of Buttons	For Inter-phone Systems
1539C-0	0	7 and 20
1539C-1	1	7, 8, 9, 10, 12, 14, 15, 18 and 20
1539C-2	2	8, 9, 10 and 20
1539C-3	3	11, 12 and 20
1539C-4	4	11 and 12
1539C-6	6	11 and 12
1539C-8	8	11 and 12

—Dimensions of Face Plate—

High	Wide
9 Ins.	5½ Ins.

—Dimensions of Outlet Box (For Wall Opening)—

High	Wide	Deep
7½ Ins.	4 Ins.	2½ Ins.

INTER-PHONES

Description of Inter-phones

Selective Ringing—Common Talking Service

DESK SET INTER-PHONES

No. 6034 Types

A compact type of desk Inter-telephone embodying all of the necessary talking and signalling equipment and retaining in design the same general appearance of the standard type of desk telephone.

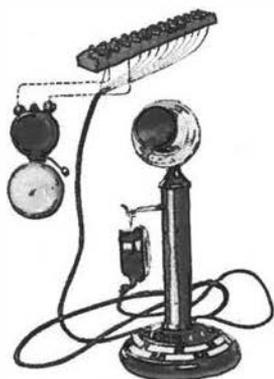
The stands are equipped with watch-case receivers and finished in dull black enamel with nickel trimmings, presenting a neat and attractive appearance.

The desk stands of the Nos. 6034AP and BE Inter-phones are each equipped with a push button and buzzer. The push button is mounted in a convenient position in the stem of the stand for signalling purposes and the buzzer is mounted in the base of the stand for receiver calls.

The four and eight button types of Inter-phones have the push buttons mounted in the base of the desk stands (including blank name plates) for signalling the various stations in a system, also a separate bell is furnished for receiving the calls.



No. 6034-BE Desk Inter-telephone



No. 6034 Type Desk Inter-telephone

No. of Buttons	Code No.	Includes				
		Desk Stand		Bell	Connecting Block	For System
		Code No.	Cord Ft.			
1	6034AP	1020BG	6	•	2No.11A	12
1	6034BE	1420BG	6	•	12A	14 & 15C
4	6034M	1020AS	6	11B	8E	11, 12
8	6034P	1020AT	6	11B	8F	11, 12

Note. *Buzzer in base of desk stand.

HAND SET INTER-PHONES

No. 6034 Types

These Inter-phones are for the same service as the four and eight button desk types as described above except that a hand set and a separate push button block is furnished in place of the desk stand.

The hand set may be hung at the side of a desk or placed in any position desired. (See description of "Hand Sets" below.)



No. 6034 Type Hand Set Inter-telephone

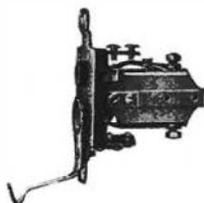
No. of Buttons	Code No.	Includes						
		Hand Set		Push Button Block		Bell	Connecting Block	For System
		Code No.	Cord Ft.	Code No.	Cord Ft.			
4	6034AZ	1003K	6	104AC	6	11B	8E	11, 12
8	6034BB	1003K	6	108AC	6	11B	8F	11, 12

Nos. 6042 and 6043 Types

HAND SETS (No. 1003 Types)

This represents one of the most convenient types of talking equipment. The transmitter and receiver are a part of the hand set, which can be held and operated with one hand, leaving the other free. A bar marked "Press to talk" mounted in the hand set handle is held down by the natural position of the hand while talking. When not in use, the hand set can be hung on a hook or laid down in any position. The hand set is finished in dull black.

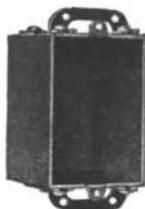
INTER-PHONES



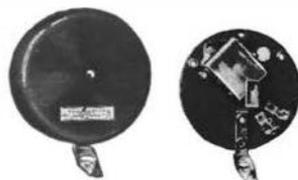
No. 382 Type Apparatus Unit



Face Plate No. 12007



Type AA Union Sectional Switch Box



No. 383 Type Apparatus Unit Surface Mounting

Description of Inter-phones

Selective Ringing—Common Talking Service

HAND SET INTER-PHONES (Continued)

Nos. 6042 and 6043 Types

Apparatus Unit (or Box). In connection with most "one button" hand sets it is necessary to use Apparatus Units containing terminals and other accessories. Two types can be furnished.

Surface Mounting Apparatus Units (No. 383 type) are equipped with an insulated base, black finished round metal cover and nickel hook. Approximate size 3 1/4 inches in diameter by 1 1/8 inches deep.

Flush Mounting Apparatus Boxes (No. 382 type) are intended to be set in the wall and are equipped with a brush brass finished face plate. These boxes consist of three parts—a Gem A Union sectional switchbox, an apparatus unit and a face plate. The face plate is 4 1/2 x 2 3/4 inches, the wall box 2 x 3 x 3 inches deep.

An important point to be observed is that wall box and face plate are the same as those used in electric light wiring for push button switches. This feature is of special importance to the contractor, since it allows him to draw on his own stock of Union sectional switchboxes and face plates. For this reason we are prepared to furnish sets either complete, including wall box and face plate, or minus these parts.

How Hand Sets Are Connected to Apparatus Units

With the Surface Apparatus Unit the hand set cord is permanently attached to the hand set and apparatus unit.

With the Flush Apparatus Box the hand set cord is not permanently attached to the box. Except the Numbers 6042E and K (systems 12A and 12B). These cords are equipped with plugs. The plug can be inserted or removed from the receptacle located in the center of the face plate.



No. 6042 Type Hand Set Inter-Phone



No. 6043 Type Hand Set Inter-Phone

No. 6042 Flush Types

No. of Buttons	Hand Set			Apparatus (Flush Type)			For Systems
	Code No.	Code No.	Cord Ft.	Code No.	Switchbox	Face Plate No.	
1	6042E	**1003G	3	382E	None	None	12 & 12A
	or 6042K	**1003G	3	382EB	GemA	12007	
1	6042D	1003K	3	382J	None	None	12B
	or 6042M	1003K	3	382JB	GemA	12007	
1	6042AE	1003AA	3	382JB	None	None	14 & 15C
	or 6042AF	1003AB	3	382J	GemA	12007	
1	6042G	1003C	3	382J	None	None	18
	or 6042L	1003C	3	382JB	GemA	12007	

*Notes. Switch boxes 2 x 3 x 3 inches deep (standard).

**Hand set cord equipped with plug.

No. 6043 Surface Types

No. of Buttons	Code No.	Hand Set	Cord, Ft.	Apparatus Box (Surface Type)	For Systems
1	6043E	1003J	3	383J	12 & 12A
1	6043D	1003E	3	383J	12B
1	6043P	1003AB	3	383J	14 & 15C
1	6043G	1003P	3	383J	18

INTER-PHONES
Description of Annunciators

Selective Ringing--Common Talking

The **Finish** of the annunciators used for our various Inter-phone systems is light golden oak and the cabinets are neat and attractive in design. Special finishes can be furnished on order at a slight additional expense.

The **Drops** used in all hand reset annunciators are gravity type and made of decarbonized steel and brass, constructed to withstand the most severe service. The drops are shallow in design to permit neatness and compactness in the annunciator, also they remain locked against all vibration, falling only when current passes through the magnet.

The drops used in the electrical reset annunciators are the Semaphore gravity type. Two lock drops are combined in one unit, self-locking in either position. When energized, the right-hand magnet throws and locks the shutter to the left-hand side. The left-hand magnet, when operated by the reset button of the annunciator, returns the shutter to its original position.

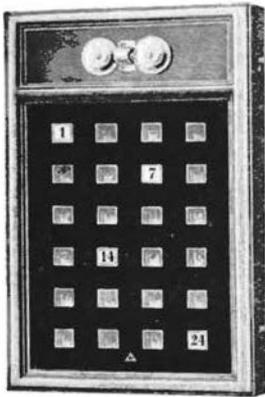
ANNUNCIATOR FOR SYSTEM No. 12A

Nos. 401 and 407 Types

An electrical reset type annunciator for use in connection with our No. 12A system master station and may also be used for other purposes where a standard type of electrical reset annunciator is desired.

The drops (as described above) are mounted on the backboard and are regularly furnished with the reset for the total number of drops.

The finish of the wood case (No. 401 type) is golden oak. The finish of the metal case (No. 407 type) is dull black. Other finishes are "special."



No. 401 Type Annunciator

No. of Drops	Arrangement		Dimensions			Wood Type	Metal Type
	Across	Down	High	Wide	Deep		
4	2	2	9 ⁵ / ₈	7 ¹ / ₄	2 ¹ / ₂	No. 401	No. 407
6	3	2	9 ⁵ / ₈	9 ¹ / ₂	2 ¹ / ₂		
8	4	2	9 ⁵ / ₈	11 ³ / ₄	2 ¹ / ₂		
10	4	3	11 ⁵ / ₈	11 ³ / ₄	2 ¹ / ₂		
12	4	3	11 ⁵ / ₈	11 ³ / ₄	2 ¹ / ₂		
15	5	3	11 ⁵ / ₈	14 ¹ / ₂	2 ¹ / ₂		
16	6	3	11 ⁵ / ₈	16 ¹ / ₄	2 ¹ / ₂		
18	6	3	11 ⁵ / ₈	16 ¹ / ₄	2 ¹ / ₂		
20	5	4	13 ⁵ / ₈	14	2 ¹ / ₂		
22	6	4	13 ⁵ / ₈	16 ¹ / ₄	2 ¹ / ₂		
24	6	4	13 ⁵ / ₈	16 ¹ / ₄	2 ¹ / ₂		

Note. Intermediate or larger sizes in sets of two drops can be furnished.

ANNUNCIATORS FOR INTER-PHONE SYSTEMS Nos. 10 AND 18



Master Station Annunciator
Nos. 1028 and 1051

A hand reset type wooden case annunciator with golden oak finish, presenting a neat and attractive appearance. Other finishes can be furnished on order at a slight additional expense. The annunciators are equipped with a number of drops and jacks, a push button for ringing, a hand or desk set Inter-phone (which must be ordered separately) and a cord and plug for calling and answering calls.

The drops and jacks will be numbered from one up, unless otherwise specified. The number of vestibule drops for System No. 10 must be specified on order. The combined resistance of bell and drops in series is 10 ohms resulting in lengthening the life of the battery and lowering the maintenance cost.

The Nos. 1028 to 1039 series are for use in System No. 18. For details of operation, see page 109.

The Nos. 1040 to 1051 series are for use in System No. 10. For details of operation, see page 113.

INTER-PHONES

Annunciators for Systems Nos. 10 and 18—Continued

Selective Ringing—Common Talking Service

No. of Drops	System No. 18 List No.	System No. 10 List No.	Arrangement of Drop and Jacks		Outside Dimensions in Inches		
			Across	Down	Height	Width	Depth
10	1028	1040	5	2	23 1/4	12 1/2	5 3/4
12	1029	1041	6	2	23 1/4	14	5 3/4
14	1030	1042	7	2	23 1/4	16	5 3/4
18	1031	1043	9	2	23 1/4	18 1/2	5 3/4
20	1032	1044	10	2	23 1/4	20	5 3/4
24	1033	1045	12	2	29 1/2	23	5 3/4
30	1034	1046	10	3	29 1/2	20	5 3/4
36	1035	1047	12	3	29 1/2	23	5 3/4
42	1036	1048	14	3	34 1/2	26	5 3/4
48	1037	1049	12	4	34 1/2	23	5 3/4
56	1038	1050	14	4	40 1/2	26	5 3/4
60	1039	1051	12	5	40 1/2	23	5 3/4
70			14	5	40 1/2	23	5 3/4

Note. Larger sizes can be furnished on order.

Each of the above List Nos. cover the annunciator only and does not include the Inter-phone, which must be ordered separately as follows:

Desk or Hand Set Inter-phones for Systems Nos. 10 and 18 Annunciators

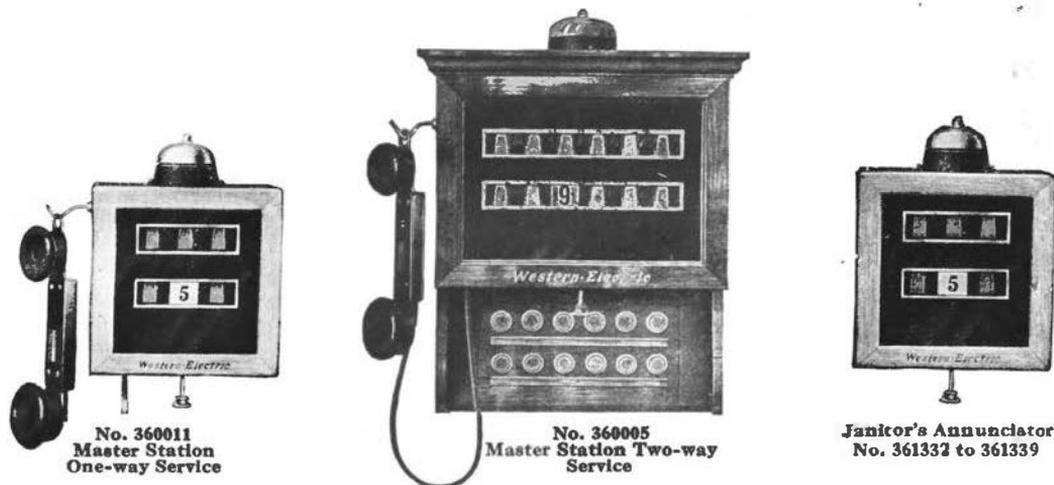
1003K Hand set, black finish, 3 ft. cord. || 1320BF Desk stand, black finish, 3 ft. cord.

Hook

A No. 141A hook can be furnished for hanging the hand set to the side of the annunciator.

Connecting Cords

One or two pairs of connecting cords can be furnished when specified on order. These cords are for use only in System No. 18 as described under "Operation" page 109.



ANNUNCIATORS FOR INTER-PHONE SYSTEMS Nos. 8, 9 AND 12B

Hand reset type wooden case annunciators with golden oak finish. Other finishes can be furnished on order at a slight additional expense.

The Nos. 360000 to 360008 series are for use in System No. 12B "Two-Way Ringing Service,"

The Nos 360009 to 360017 series are for use in System No. 12B "One-Way Ringing Service"

The Nos. 361332 to 361339 series are for use in "Apartment House Systems Nos. 8 and 9"

No. of Drops	System No. 12B—Used For		System Nos. 8 and 9 List No.	Drop Arrangement (Horizontal Rows)
	Two-Way Service List No.	One-Way Service List No.		
2	360000	360009	.....	1
4	360001	360010	361332	1
6	360002	360011	361333	2
8	360003	360012	361334	2
10	360004	360013	361335	2
12	360005	360014	361336	2
15	360006	360015	361337	3
18	.....	.....	361338	3
20	360007	360016	.....	2
24	360008	360017	.....	2
25	.....	.....	361339	5

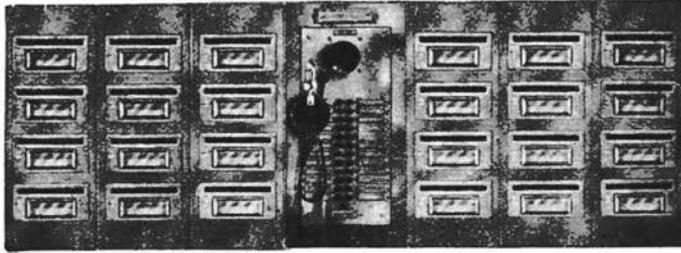
Note. Larger sizes can be furnished on order.

Each of the above List Nos. (360000 to 360017) cover the annunciators only and do not include the hand set which must be ordered separately, as follows:

Hand Set Inter-phone for System No. 12B Annunciators

1003D Hand set, black finish, 3 ft. cord. || 141A Hook furnished on order for hanging hand set.

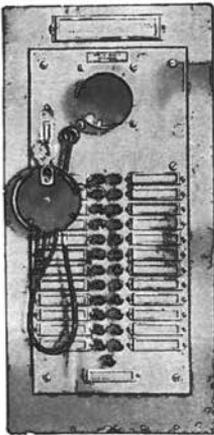
INTER-PHONES
Description of Apartment House Inter-phones
Selective Talking (Non-interfering Service)



No. 1362 Vestibule Inter-phone with Letter Boxes

VESTIBULE INTER-PHONES FOR SYSTEMS Nos. 7, 8, 9 AND 10

The vestibule equipment for Systems Nos. 7, 8, 9 and 10 consists of the No. 1362 type Inter-phone and any number of letter boxes.



No. 1362 Type Vestibule Inter-phone

No. 1362 Type Vestibule Inter-phones (Armored Receiver Cord)

The No. 13 2 type vestibule Inter-phone has a metal case with brush brass finish, arranged for flush mounting. This Inter-phone is provided with the same type of push button keys as the No. 1 System Selective Ringing—Selective Talking System and permits the Vestibule and Suites as well as the Janitor and Suite Inter-phones to carry on conversations at the same time without interference with each other.

The Inter-phones are furnished in 7, 13, 17, 21 and 25 button keys, each button representing one apartment, except the last or odd button which represents the janitor. The function of each of these keys, when operated is to establish connections between the Vestibule and the called Station. When a push button is pressed all the way down the bell on the corresponding station is rung. When the pressure is released, the key assumes an intermediate position, thereby breaking the ringing contact and connecting the called line for conversation. The key is automatically held in this intermediate position by a locking plate until the operation of another button releases the key and restores it to its normal position. Talking current is cut off when the receiver is replaced on the switchhook. The lower or odd button (for calling the janitor) is non-locking in the operating position. This provides a means for releasing the other buttons in the set should some one maliciously operate all of them at one time. The Vestibule Interphone is provided with a watch-case receiver and flush type transmitter. The receiver is equipped with a flexible armored cord for its protection.

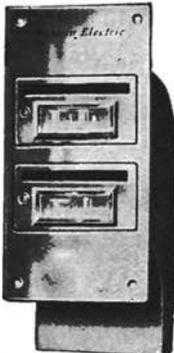
Brush Brass Finished Face Plate and Metal Outlet Box

No. of Buttons	Code No.	Face Plate		*Dimensions—Inches		
		Height	Width	Height	Width	Depth
7	1362C-7	11 ¹ / ₈	7 ⁵ / ₈	8 ³ / ₄	5 ¹ / ₄	3 ¹ / ₄
13	1362C-13	11 ¹ / ₈	7 ⁵ / ₈	8 ³ / ₄	5 ¹ / ₄	3 ¹ / ₄
17	1362C-17	16 ¹ / ₈	7 ⁵ / ₈	12 ⁷ / ₈	5 ¹ / ₄	3 ¹ / ₄
21	1362C-21	16 ¹ / ₈	7 ⁵ / ₈	12 ⁷ / ₈	5 ¹ / ₄	3 ¹ / ₄
25	1362C-25	16 ¹ / ₈	7 ⁵ / ₈	12 ⁷ / ₈	5 ¹ / ₄	3 ¹ / ₄

The armored receiver cord complete with receiver is coded as "No. 524W receiver."

Vestibule Letter Boxes

Brush brass finished letter boxes to match the vestibule Inter-phones. Equipped with two or four mail compartments and are suitable for mounting on either side of the No. 1362 type vestibule inter-phones.



No. 12013 Letter Box

Mail Compartments	List No.	To Mount with No. 1362 Type Set	*Dimensions—Inches		
			Height	Width	Depth (In Wall)
2	12013	7 and 13 button	11 ¹ / ₈	5 ¹ / ₈	4 ³ / ₄
4	116937	17, 21 and 25 button	16 ¹ / ₈	5 ¹ / ₈	4 ³ / ₄

Suite Inter-phones

The No. 1527C (surface) and No. 1539C (flush) type suite Inter-phones for Systems Nos. 7, 8, 9 and 10 are described on pages 90 and 91.

*Note. The proper method of mounting the Inter-phone and letter boxes in the vestibule wall is shown in bulletin "Installing and Maintaining Western Electric Inter-phones."

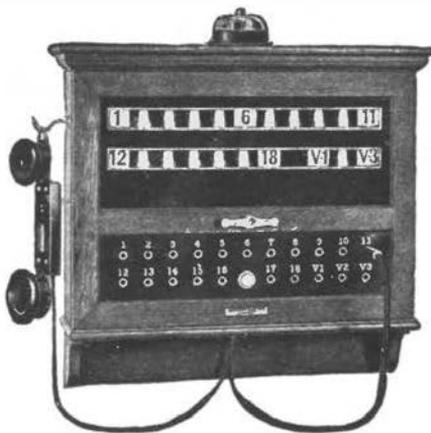
INTER-PHONES

Description of Apartment House Inter-phones (Continued)

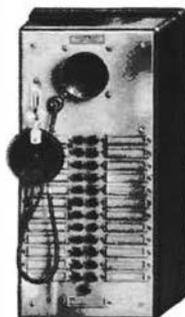
Selective Talking (Non-Interfering Service)



Janitor's Annunciator
No. 361332 to No. 361339



Janitor's Annunciator



No. 1350C-25 Type
Janitor's and Tradesmen's
Inter-phone

JANITOR'S AND TRADESMEN'S INTER-PHONES

No. 1350 Inter-phones (Surface Type)

The No. 1350 type janitor's and tradesmen's wall Inter-phone has a surface mounting metal case with black finish. No bell is provided in this set as it is used with an annunciator (Nos. 361332 to 361339 type) when calls are to be received at this station. These Inter-phones are made in 7, 13 and 25 button sizes, the construction and operation being the same as outlined under Vestibule Inter-phones. The lower or odd button in each Inter-phone is non-locking in operation and provides connection with the vestibule Inter-phone.

No. of Buttons	Code No.	System No.		Dimensions of Housing—Inches		
		For Janitor	For Tradesmen	Height	Width	Depth
7	1350C-7	8 and 9	9 and 10	14 1/8	7 1/8	3
13	1350C-13	8 and 9	9 and 10	14 1/8	7 1/8	3
25	1350C-25	8 and 9	9 and 10	14 1/8	7 1/8	3

Janitor's Annunciators. Annunciators for systems 8, 9 and 10 are described on pages 94 and 95.

Coil and Condenser Box. The coil and condenser box is required for each vestibule, janitor's (either wall Inter-phone or annunciator) or tradesmen's station. This apparatus is necessary in order that separate conversations may be carried on simultaneously between the vestibule, janitor and tradesman's Inter-phone and three apartments, without having the conversations interfere with each other. The condenser provides a path for the high frequency talking currents, which cannot pass through the high impedance retardation coil.

Wooden case furnished in golden oak.



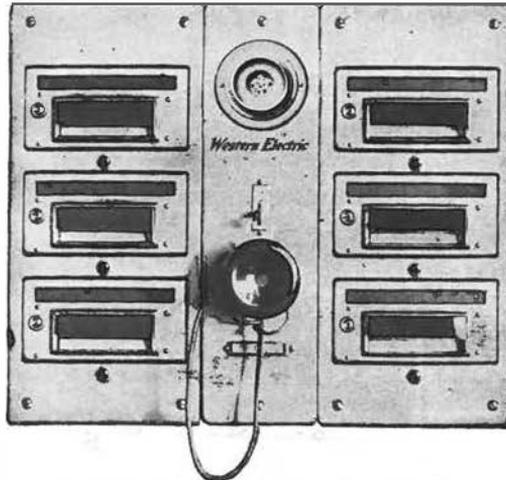
Coil and Condenser
Box

Code No.	Containing	System No.
295BC	1 coil and 1 condenser	7
295AS	2 coils and 2 condensers	8
295BD	3 coils and 3 condensers	9 and 10

Western Electric
INTER-PHONES

Description of Apartment House Inter-phones (Continued)

Common Talking Service



Vestibule Equipment for Six Apartments

VESTIBULE INTER-PHONES FOR No. 20 SYSTEM

The vestibule equipment for the No. 20 system consists of the No. 1520U Inter-phone and any number of letter boxes.

No. 1520U Vestibule Inter-phone (Armor Receiver Cord)

The No. 1520U vestibule Inter-phone consists of a flush mounting brush brass finish face plate with a push button for signaling the janitor. The metal transmitter mouthpiece is embossed and cannot be broken or removed. The transmitter mounts on the back of the face plate. The receiver used is of the watch-case type and is equipped with a flexible armored cord for its protection.

Code No.	Finish	—Dimensions—Inches—	
		Height	Width
1520U	**Brush brass	12 1/8	3 1/2

The armored receiver cord complete with the receiver is coded as "No. 524W Receiver."

Vestibule Letter Boxes

Consist of a brush brass finish face plate equipped with either two or three three-mail compartments. A push button for signaling the suite to which the compartment is assigned is mounted below the plate glass window of each mail compartment. The plate glass window, the extra wide mail opening, the card holder inside of the box and the push button mounted below each compartment are exclusive features of our vestibule equipment.

Mail Compartments	List No.	To Mount With	—*Dimensions—Inches—		
			Face Plate Height	Face Plate Width	Depth (In Wall)
2	3-PL-1	1520U	12 1/8	5 1/8	4 3/4
3	3P	1520U	12 1/8	5 1/8	4 3/4

*The proper method of mounting the vestibule inter-phones and outlet boxes in the wall is shown in bulletin, "Installing and Maintaining Western Electric Inter-phones."

Suite, Janitor and Laundry Inter-phones

The No. 1527C (surface) and No. 1539C (flush) suite, janitor and laundry inter-phon for System No. 20 are described on pages 90 and 91.

**Black finish can be furnished special on order.



No. 1520 Type Vestibule Inter-phone



No. 3 Letter Box



No. 1527C-3 Wall Inter-phone

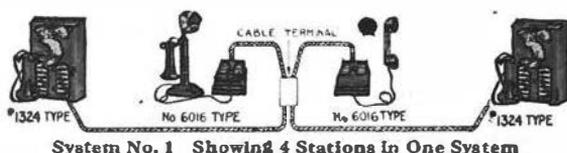


No. 1539C-2 Wall Inter-phone

INTER-PHONE SYSTEMS

System No. 1

Selective Ringing—Selective Talking



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

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

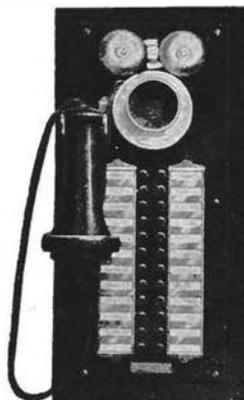
For each station in the system, one push button key is required in each Inter-phone. For detail description of these keys and method of operation refer to the general description outlined on page 87.

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

Types of Inter-phones. Wall, desk or hand set Inter-phones may be used interchangeably in this system. The Inter-phones listed below are described in detail on pages 87 to 89.



No. 1324-C Type Wall Inter-phone Metal



No. 1355-C Type Wall Inter-phone Metal

WALL TYPE INTER-PHONES

No. of Buttons	Surface Metal	Flush Metal	Desk Set Inter-phones	Hand Set Inter-phones
6	1324C-6	.....	6016M	6016MH
12	1324C-12	.....	6016K	6016KH
16	1324C-16	*1355C-16	6016N	6016NH
20	1324C-20	*1355C-20	6016P	6016PH
24	1324C-24	*1355C-24	6016L	6016LH

***Note.** Dimensions of outlet boxes for these Inter-phones are outlined on pages 87 and 89.

INTER-PHONE SYSTEMS

System No. 1—(Continued)

Selective Ringing—Common Talking



No. 6016 Type Desk Inter-telephone



No. 6016 Type Hand Set Inter-telephone

ACCESSORIES

Cable

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

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

These cables are described on page 119.

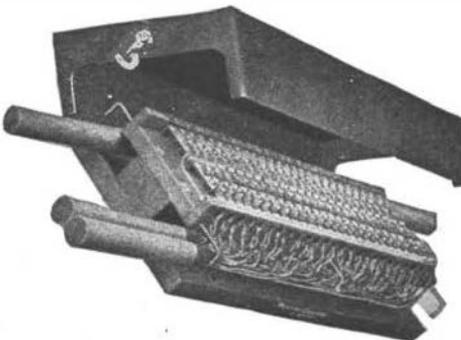
Cable Terminals

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

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

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

Cable terminals are described on page 119.



No. 19B. Cable Terminal with Cable Connections

Batteries

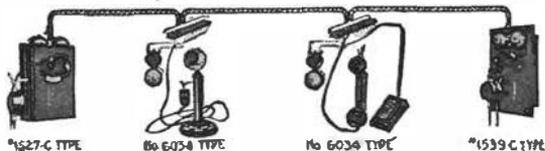
Not more than twelve Blue Bell dry cells will be necessary for operating the system. (Five cells for the talking circuit; four to seven cells for the ringing circuit, depending upon length of line.)

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

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

INTER-PHONE SYSTEMS System No. 11

Selective Ringing—Common Talking



System No. 11.

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

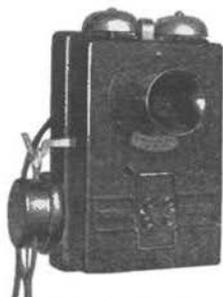
Service. For use in residences, banks, institutions, warehouses, stores or other mercantile establishments where conversations can be limited to one at a time.

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

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

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

Types of Inter-phones. Wall, desk or hand type Inter-phones may be used interchangeably in the same system. The Inter-phones as coded below are described in detail on pages 90 to 91.



No. 1527-C-1
Surface Type



No. 1539-C-3
Flush Inter-phone

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

*Note. For dimensions of outlet boxes refer to pages 90 and 91.

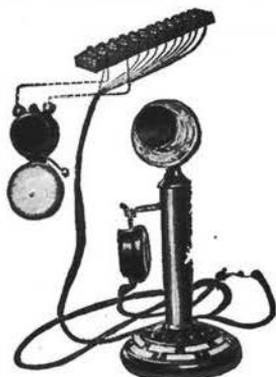
ACCESSORIES

Retardation Coil

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

Cable

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



No. 6034 Type Desk Inter-phone



No. 6034 Type Hand Set Inter-phone

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

Note. Cables are described on page 119.

Connecting Blocks

Where a junction is to be made between cables, or wherever a branch is taken off the main cable, a connecting block should be used. In cases where the cable can be run direct to the Inter-phone, the connecting block is not required. The number of connecting blocks required depends upon local conditions. The No. 6G connecting block as listed on page 120 will answer the purpose in most cases.

Batteries

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

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

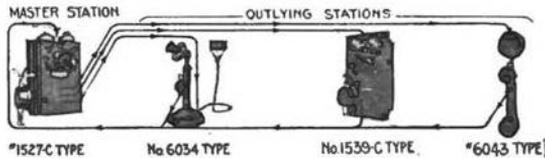


51E Retardation Coil

INTER-PHONE SYSTEMS

System No. 12

Master Station--Common Talking



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

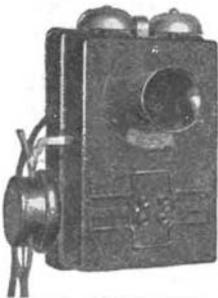
Operation. The Master Station Inter-phone is equipped with a number of push buttons; one for each outlying station in the system. By depressing the button marked with the name or number of the outlying station wanted, the bell at that station will ring and there only.

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

Only one conversation can be carried on at a time.

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

Types of Inter-phones. Wall, desk and hand set Inter-phones may be used in this system for either the master or outlying stations. The Inter-phones listed below are described in detail on pages 90 to 93.



No. 1527-C Type Wall Inter-phone



No. 1539-C Type Wall Inter-phone



No. 6034 Type Hand Set Inter-phone



No. 6034 Type Desk Inter-phone

MASTER STATIONS

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

*Note. For dimensions of outlet boxes refer to page 91.

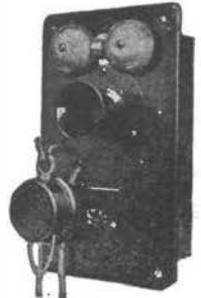
INTER-PHONE SYSTEMS
System No. 12 (Continued)



No. 1527C-1
Surface Inter-telephone



No. 6034 Type Desk Inter-telephone



No. 1539C-1
Flush Inter-telephone



No. 6043E
Hand Set Inter-telephone



No. 6042E
Hand Set Inter-telephone



No. 6042K
Hand Set Inter-telephone

OUTLYING STATIONS

No. of Buttons	Metal Wall Type Inter-phones		Desk Set Inter-phones	Hand Set Inter-phones
	Surface	Flush		
1	1527C-1	*1539C-1	6034AP	*6042K
..	.....	.....	.....	**6042E
..	.....	.....	.....	6043E

Note. *For dimensions of outlet boxes refer to page 91.
**No. 6042E is same as No. 6042K, but without face plate and wall box. For details see page 93.

ACCESSORIES
Retardation Coil

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



No. 51E Retardation Coil

Wiring

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

Cables and connecting blocks are described on pages 119 to 120.

Batteries

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

On lines of greater length it is recommended that instead of increasing the number of battery cells to more than five, larger wire be used. This should be determined in accordance with the installation instructions.

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

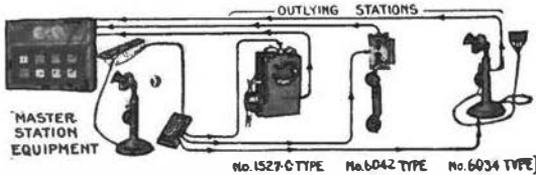
Note. Detailed information covering wiring diagrams, connection of wires and cables, connecting blocks, etc., can be found in our booklet, "Installing and Maintaining Western Electric Inter-phones," which will be furnished upon request.

INTER-PHONE SYSTEMS

System No. 12A

MASTER ANNUNCIATOR SYSTEM

Two-Way Ringing--Common Talking



System No. 12A
Showing Master Annunciator and 3 Outlying Stations

one extra button for electrically resetting the annunciator drops. To call an outlying station, the push button marked with the name or number of the party wanted is depressed. This rings the bell at the station selected and there only.

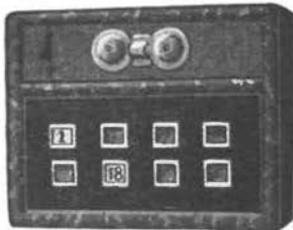
Each outlying station Inter-phone is equipped with a push button which signals the master station when depressed. This call will also be registered at the master station by the operation of the annunciator drop corresponding to the station calling.

Capacity. One master station and 3 up to 20 or more outlying stations.

Service. Especially adapted for schools where the principal may call the teachers individually and the teachers can call the principal. Similar to the No. 12 System except that the master station includes an annunciator for identifying the calls from the outlying stations.

Only one conversation can be carried on at a time.

Operation. The master station Inter-phone includes a push button block having as many buttons as there are outlying stations, also



Master Station Equipment

TYPES OF INTER-PHONES

Master Station

To consist of the following:

1. A desk set Inter-phone with a 5½ foot flexible conductor cord.
2. A push button block with or without weighted base and having a flexible conductor cord of any length desired.
3. A connecting block.
4. A surface type annunciator.

Each of the above items must be ordered separately and in accordance with the following code numbers and capacities; larger capacities can be furnished.

No. of Outlying Stations	**Push Button Block (Page 120)		Desk Stand Code No.	Connecting Block (Page 120) Code No.	Annunciator (Page 94)		
	*No. of Buttons	List No.			Wood Type	No. of Drops	Metal Type
3	4	†104AC	***1320BF	6G	401	4	407
7	8	†108AC	***1320BF	6G	401	8	407
11	12	7921	79010	6B	401	12	407
15	16	7930	79020	6B	401	15	407
19	20	793	7902	6F	401	16	407

*One button of the push button block is required for resetting the annunciator drops.

**Cord for push button block must be ordered separately, in the length desired (6 feet of cord being the average length).

***Equipped with long hand receiver. †Metal Pushbutton Block.

Outlying Stations

Wall, Desk or Hand Set Inter-phones may be used. The Inter-phones are the same as specified for the Outlying Stations of System No. 12, the code numbers, etc., of which can be obtained by referring to page 103.

ACCESSORIES

Retardation Coil

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

Wiring

Two common wires are required throughout the system and in addition two individual wires from the master to each outlying station. Cable or insulated wires may be used. Where there is a long run of a large number of wires, it will be found economical to use cable and at all distributing and junction points, to install connecting blocks. From these connecting blocks separate wires can be run to the Inter-phones. The sizes of cable and the number of connecting blocks required should be determined in accordance with the information furnished in our booklet, "Installing and Maintaining Western Electric Inter-phones."

Cables are described on page 119.

Batteries

The batteries for this system are the same as specified for System No. 12 as outlined on page 103.

INTER-PHONE SYSTEMS

System No. 12B

MASTER ANNUNCIATOR SYSTEM

(One-way or Two-way Ringing--Common Talking)

(Formerly Known as Inter-phone Systems Nos. 16B and C)

Service. Provides for communication between a master station annunciator and a number of outlying stations.

The master station annunciator (Mechanical Reset Type) is equipped with a hand set Inter-phone, and can be obtained with or without push buttons, depending upon the kind of ringing service required as follows:

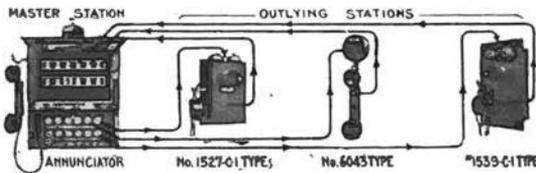


Fig. 1

Fig. 1. Two-way Ringing (Annunciator Equipped with Push Buttons, One for Each Outlying Station) enabling the outlying stations to ring the master station and the master station to ring the outlying stations individually.

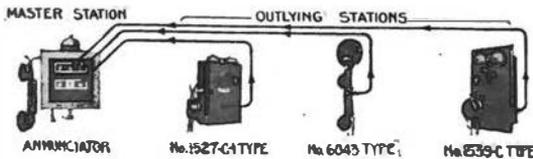


Fig. 2

Fig. 2. One-way Ringing (Annunciator without Push Buttons) enabling the outlying stations to ring the master station but the master station cannot ring the outlying stations.

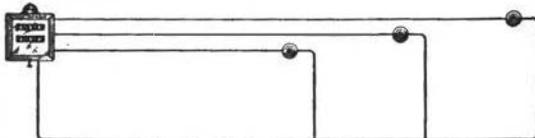


Fig. A

This system is also designed to replace an existing annunciator and push button system and provides the same service as outlined above for Fig. No. 2 as follows:

Fig. A shows wiring and equipment of an ordinary existing annunciator and push button system.

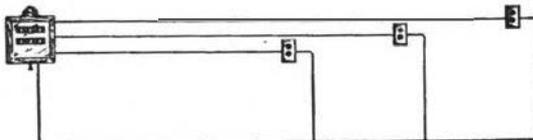


Fig. B

Fig. B shows the No. 382CB Flush Type Apparatus Box used in place of a push button. The annunciator is one of the No. 360009 or No. 360017 type as described hereinafter.

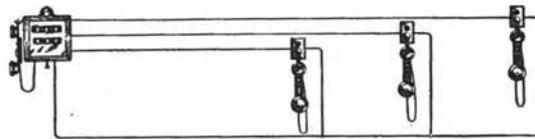


Fig. C

Fig. C shows how easily the added convenience of telephone service is obtained by merely plugging a No. 1003F Hand set into the apparatus box and adding a No. 1003D Hand set to the annunciator.

Operation. Each outlying station is equipped with a push button which signals the master station when depressed. The call will also be registered at the master station by the operation of the annunciator drop corresponding to the station calling.

Only one conversation can be carried on at a time.

Capacity. One master station and any number of outlying stations up to 24 or more.

INTER-PHONE SYSTEMS
System No. 12-B—(Continued)

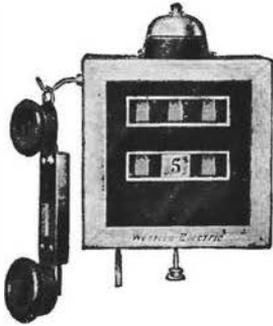
MASTER ANNUNCIATOR SYSTEM
TYPES OF INTER-PHONES

Master Station

This consists of a black finished hand set with a three-foot cord and an annunciator with hook for holding the hand set.

The annunciator and hand set must be ordered separately.

Finish of annunciator is golden oak. Light or dark oak finish can be furnished without additional charge.



No. 360011
 Master Station
 One-way Service

Annunciators

For One-Way Ringing			For Two-Way Ringing		
List No.	No. of Drops (One per Outlying Station)		List No.	No. of Drops & Push Buttons (One per Outlying Station)	
360009	2		360000	2	
360010	4		360001	4	
360011	6		360002	6	
360012	8		360003	8	
360013	10		360004	10	
360014	12		360005	12	
360015	15		360006	15	
360016	20		360007	20	
360017	24		360008	24	

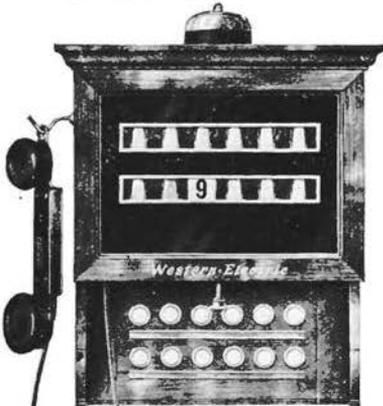
Note. For dimensions of annunciators see page 95.

Hand Set

A No. 1003D hand set must be ordered separately with each annunciator. This set is equipped with a three-foot cord, and can be hung on the hook on the side of the annunciator.

Outlying Stations

Wall or hand set Inter-phones may be used. The Inter-phones listed below are described in detail on pages 90 to 93.

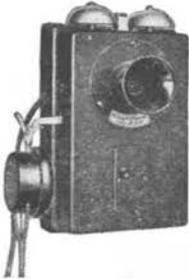


No. 360005
 Master Station Two-way
 Service

No. of Buttons	Wall Type Inter-phone (Metal) Surface	Inter-phone (Metal) Flush	Hand Set Inter-phones Surface	Inter-phones Flush
1	1527C-1	*1539C-1	6043D	*6042M
..	.....	.....	.....	**6042D

Note. *For dimensions of outlet boxes and description of sets see page 93.

**No. 6042D is the same as No. 6042M, but without face plate and wall box.



No. 1527 C-1

ACCESSORIES

Wiring

For one-way ringing service (annunciator without push buttons) one wire, common to all stations in the system and in addition, one individual wire from the master station to each outlying station.

For two-way ringing service (annunciator equipped with push buttons) one wire, common to all stations in the system, also two individual wires from the master station to each outlying station.

Batteries

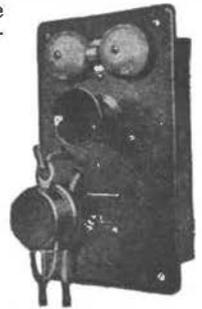
Only one battery is required for the operation of the system. This should consist of three or four Blue Bell dry cells, where the distance between the master station and the farthest outlying station is 250 feet or less and No. 22 B. & S. gauge copper wire is used. On lines of greater length it is recommended that instead of increasing the number of dry cells to more than four, larger wires be used as follows:

- 250 to 400 ft. use 20 B. & S. gauge copper wire
- 400 to 600 ft. use 18 B. & S. gauge copper wire
- 600 to 1000 ft. use 16 B. & S. gauge copper wire

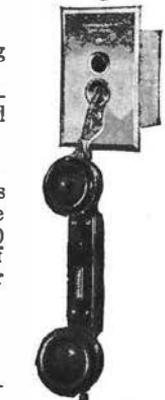
Detailed information for installing, wiring diagrams, battery requirements, cable connections, etc., are included in our bulletin, "Installing and Maintaining Western Electric Inter-phones," which will be furnished upon request.



No. 6043



No. 1539 C-1



No. 6042 Type
 Hand Set
 Inter-phone

INTER-PHONE SYSTEMS

System No. 14

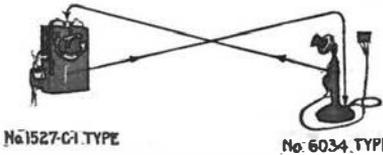
Two Station Private Line

Service. For use where only two stations are required and where the sets are distantly located from each other.

Only two wires are used for connecting the Inter-phones; dry cells being required at each station.

Note. Refer also to pages 117 and 118 for description of Inter-phone outfits composed of two wall or hand set Inter-phones and the necessary installing material complete.

Operation. Either station can ring the other by simply depressing the push button of the set.

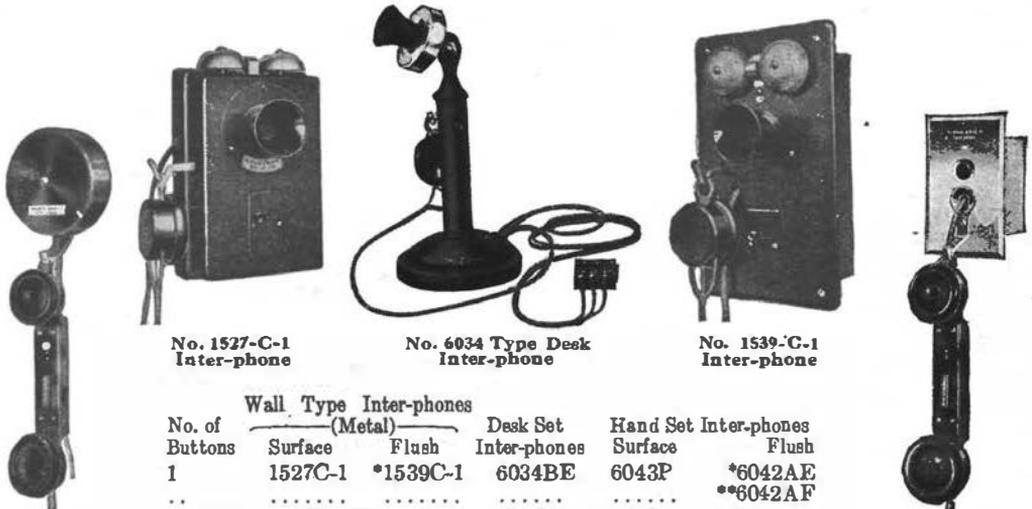


No. 1527-C-1 TYPE

No. 6034 TYPE

System No. 14

Types of Inter-phones. Wall, desk or hand set Inter-phones may be used interchangeably. The Inter-phones listed below are described in detail on pages 90 to 93.



No. 1527-C-1 Inter-phone

No. 6034 Type Desk Inter-phone

No. 1539-C-1 Inter-phone

No. of Buttons	Wall Type Inter-phones (Metal)		Desk Set Inter-phones	Hand Set Inter-phones	
	Surface	Flush		Surface	Flush
1	1527C-1	*1539C-1	6034BE	6043P	*6042AE
..	.....	.....	.....	.....	**6042AF

Note. *For dimension of outlet box refer to page 91.
 **No. 6042AF is same as No. 6042AE but without face plate and wall box. See page 93.

No. 6043 Type Hand Set Inter-phone

No. 6042 Type Hand Set Inter-phone

Wiring and Battery Requirements. A battery of three Blue Bell dry cells is required at each station to furnish current for talking and ringing if the length of line is less than 750 feet. If the length of the line is increased, additional dry cells are required at each station to insure satisfactory ringing. The following list indicates the additional dry cells required at each station:

Length of Line Between Stations	Additional Number of Cells for Each Station			
	B. & S. Gauge Copper Wire			
	No. 12	No. 14	No. 16	No. 18
1750 to 1000 ft.	1	1	1	2
1000 to 1500 ft.	1	1	1	3
3500 to 3000 ft.	1	2	3	..
4000 to 4000 ft.	2	3	..	..
4000 to 5000 ft.	2	..	..	..
5000 to 6000 ft.	3	..	..	..

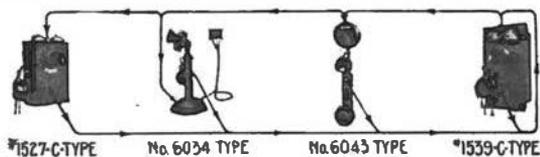
Blue Bell dry cells are listed on page 121.

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

INTER-PHONE SYSTEMS

System No. 15-C

Code Ringing—Common Talking



System No. 15
Showing 4 stations in one system

Service. A simple and inexpensive system for small residences, warehouses, stores or mercantile establishments, where only a few stations are required and the number of calls between the stations are not frequent.

Requires only three line wires throughout the system for two or more stations.

Only one conversation can be carried on at a time.

Operation. Each station is equipped with one push button which, when depressed rings the bells at all the other stations.

The various stations are called by signalling each one with a different code ring; for instance: Two rings for Station No. 2, three rings for Station No. 3, etc.

If more than six stations are in service, signalling codemistakes are likely to occur, due to the possibility of misunderstood signals. System No. 11 is recommended where the initial installation comprises more than four or six stations.

Note. In case only two stations are required (wall or hand set Inter-phones), complete equipment ready for installation can be obtained by referring to Inter-phone outfits on pages 117 and 118.

Capacity. Two to six stations may be operated in this system. More stations can be added but at the expense of ease and certainty in signalling.

Types of Inter-phones. Wall, desk or hand set Inter-phones may be used in the system. The Inter-phones coded below are described in detail on pages 90 to 93.



No. 1527C-1



No. 6034 Type Desk Inter-phone



No. 1539C-1



No. 6042 Type Hand Set Inter-phone

No. of Buttons	Metal Wall Type Inter-phones		Desk Set Inter-phones	Hand Set Inter-phones	
	Surface	Flush		Flush	Surface
1	1527C-1	*1539C-1	6034BE	*6042AE	6043P
				*6042AF	

Note. *For dimension of outlet boxes refer to page 93.

**No. 6042AF is same as 6042AE, but without face plate and wall box, see page 93.

ACCESSORIES
Retardation Coil

A No. 51E retardation coil must be ordered separately and installed near the battery of the system.

Wiring

Three wires are required for connecting the Inter-phones for two or more stations.

Batteries

Five Blue Bell dry cells (described on page 121) are required for the operation when the length of the line is 750 feet or less, and not more than four stations are to be used, connected by Nos. 20 or 22 B. & S. gauge copper wire. If more than four Inter-phones are required or if the line is longer than 750 feet, larger wires should be used in accordance with the installation instructions. The Blue Bell dry cells can be placed in the basement or any other accessible place.

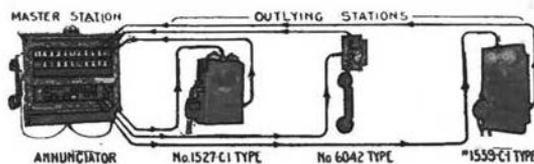
Note. Detailed information for installing, including wiring diagrams, battery requirements, cable connections, etc., are included in our bulletin, "Installing and Maintaining Western Electric Inter-phones," which will be furnished upon request.



No. 6043 Type Hand Set Inter-phone

INTER-PHONE SYSTEMS

System No. 18

MASTER ANNUNCIATOR SYSTEM
(Non-Interfering)

System No. 18 (Showing Master and 3 Outlying Stations)

Service. For use in hotels, clubs, Y. M. C. A. buildings, schools, hospitals, etc., to provide for communication between a central or master station and a larger number of outlying stations, as follows:

1. The Master Station can selectively ring and talk with any of the outlying stations and the outlying stations can call the Master Station.

2. Communication can be arranged between any two outlying stations through the medium of one or two connecting cords at the Master Station.

No connection can be made between this system and a public telephone system.

Operation. The Master Station Annunciator consists of a number of drops and jacks (one for each outlying station in the system), a push button for ringing, a hand set Inter-*phone* and a cord and plug for calling and answering.

1. To call an outlying station, the Master Station operator inserts the plug into the jack corresponding to the station wanted and depresses the ringing button of the annunciator. The operator converses with the outlying station by pressing the talking lever of the Hand Set Inter-*phone*.

2. Each outlying station Inter-*phone* is equipped with a push button for ringing the Master Station and at the same time operating one of the annunciator drops, thereby registering the call. The Master Station operator answers by inserting the answering plug into the jack corresponding to the drop operated and pressing the talking lever of the hand set.

3. If one outlying station wishes to converse with another outlying station, a connection can be established by means of a pair of connecting cords (equipped as part of the annunciator when so specified), each cord terminating in separate plugs. This connection is effected as follows:

The Master Station operator withdraws the answering plug from the jack of the station calling, inserting in its place one of the connecting cord plugs, and proceeds to call the station wanted as explained above, in item 1. Having secured an answer from the station wanted, the operator again withdraws the answering plug and inserts in its place the other plug end of the connecting cord. This completes the connection between the two outlying stations.

No annunciator supervisory features are provided to indicate the termination of a conversation between outlying stations, it being assumed that such connections are required only on special occasions. Where a large number of connections are required between outlying stations, our No. 1801 lamp signal, Private Exchange Switchboard, is recommended.

INTER-PHONE SYSTEMS
System No. 18 (Continued)

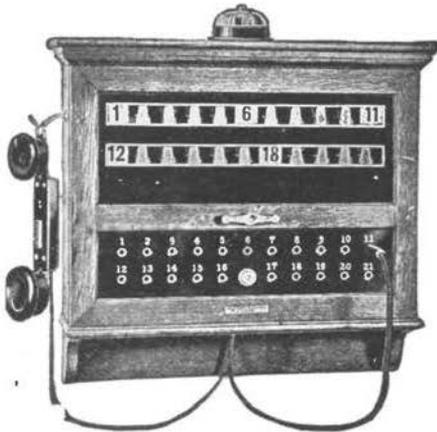
MASTER ANNUNCIATOR SYSTEM

Capacity. One master station and 10 to 70 or more outlying stations.

TYPES OF INTER-PHONES

Master Station Annunciator

Wood case with standard oak finish. Other special finishes can be furnished. Drops and jacks will be numbered from one up, unless otherwise specified. For further description see page 91.



Master Station Annunciator

List No.	No. of Drops	List No.	No. of Drops
1028	10	1034	36
1029	12	1035	42
1030	18	1036	48
1031	20	1037	56
1032	24	1038	60
1033	30	1039	70

Note. 1. Refer to page 95 for dimensions of annunciator.
 2. Each of the above list numbers covers the annunciator only and does not include the hand set inter-phone which must be ordered separately. See page 95.

Hand Set Inter-phone for Annunciator

This consists of a No. 1003K hand set as described on page 92.

Hook

A No. 141A hook can be used for supporting the hand set, the hook to be screwed into the side of the annunciator.

Connecting Cords

If Inter-communication between outlying stations is desired, one or two pairs of connecting cords may be ordered as described under "Operation" (Item 3).

Outlying Stations

Wall or hand set Inter-phones may be used. The Inter-phones as coded below are described in detail on pages 90 and 93.



No. 1527-C-1 Inter-phone



No. 1539-C-1 Inter-phone

No. of Buttons	Metal Wall Inter-phones		Hand Set Inter-phones	
	Surface	Flush	Flush	Surface
1	1527C-1	1539C-1	*6042L	6043G
..	.....	.....	**6042G	.....

Note. *For dimensions of outlet boxes refer to page 93.
 **No. 6042G is same as No. 6042L, but without face plate and wall box. See page 93.

Wiring

One wire, common to all stations in the system is required, and, in addition, two individual wires between the master and each outlying station. Where there is a long run of a large number of wires, it will be found economical to use cable and install cable terminals or connecting blocks at all distributing and junction points. From there, the installation can be continued by means of separate wires to the various outlying stations. The size of cable and number of connecting blocks should be determined by the installer in accordance with the installation requirements.

Cables, cable terminals and connecting blocks are listed on pages 119 and 120.

Batteries

Five or more Blue Bell dry cells are required for operating the system. The cells can be placed in the basement or any other accessible place.

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



No. 6043 Type Hand Set Inter-phone

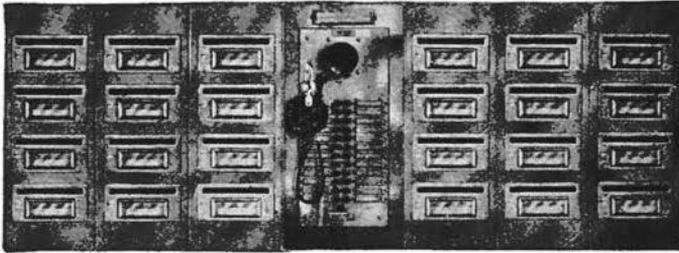


No. 6042 Type Hand Set Inter-phone

APARTMENT HOUSE INTER-PHONES

Systems 7, 8, 9 and 10

Selective Ringing—Selective Talking—Non-Interfering Service



No. 1362 Vestibule Inter-telephone with Letter Boxes

Service. Apartment house Inter-phones are designed to provide service between the vestibule apartments, janitor and tradesmen. The systems are planned throughout with the utmost care to give the most reliable service.

Systems Nos. 7, 8, 9 and 10 cover the practical service requirements of most apartment houses. One system may be expanded into another at any time by the use of additional apparatus.

These systems are designed for selective ringing and talking or non-interfering service, making it possible for the master station, such as the vestibule, the tradesmen and the janitor to communicate with different apartments simultaneously without interference with each other.

Operation. The vestibule, janitor's and tradesmen's Inter-phones are equipped with push button keys (one for each apartment station). By depressing the button marked with the name or number of the apartment desired, the bell at that station will ring and the only.

The apartment Inter-phones can be provided with one or two push buttons for ringing the janitor's station or operating an electric door opener.

Separate conversation may take place simultaneously between the vestibule, janitor or tradesmen and different apartments.

Types of Inter-phones. Wall type Inter-phones are specified throughout for the various systems.

Types of Systems. See descriptions on following pages.

Accessories for Systems Nos. 7, 8, 9 and 10.

Coil and Condenser Box

One retardation coil and one condenser are required for each vestibule, janitor's (either wall Inter-telephone or master annunciator) or tradesmen's station. See page 97 for description of coil and condenser boxes.

Cable

For connecting the various stations, either cable or insulated wires can be used, depending largely upon the layout of the building. Where there is a long run of a large number of wires (for instance, between the janitor, vestibule, and tradesmen Inter-phones or for the vertical riser from floor to floor) it will be found economical to use cable, and to install cable terminals or connecting blocks at all of the distributing and junction points.

For connecting the Inter-phones of the various apartments to these distributing points, insulated wires (No. 22 B. & S. gauge) can be used. The number of wires are outlined in the description of each system on the following pages. This data should be used when selecting the cable, as described on page 119.

Cable Terminals

Cable terminals and connecting blocks are described on pages 119 and 120.

Batteries

Not more than 12 Blue Bell dry cells will be necessary for operating any of the above systems (5 cells for the talking circuits and 4 to 7 cells for the ringing circuits, depending upon the length of the line). The cells can be placed in the basement or any other accessible place.

Note. This battery data is based on the use of standard Inter phone cable or No. 22 B. & S. gauge wire.

Door Opener

If a door opener is included in the system, additional dry cells will be required. Generally, two or three cells have been found sufficient for this purpose.

Any standard type of door opener may be used.

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

APARTMENT HOUSE INTER-PHONES
Systems Nos. 7, 8, 9 and 10 (Continued)

Selective Ringing--Selective Talking

Non-Interfering Service

SYSTEM No. 7

Service. Vestibule can call apartments. Apartments can open door, if desired.

Capacity. One vestibule and any number of suite Inter-phones up to 24.

Inter-phone Apparatus Required for System No. 7

Vestibule	See Page
1 No. 1362 type Inter-phone and letter boxes as required.....	96

Apartments

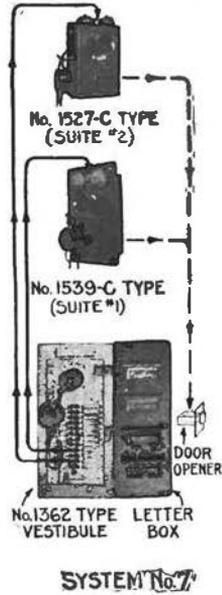
1527C-0 Surface type Inter-phones or 1527C-1 Surface type Inter-phones, 1 button (for door) or	} 90 and 91
1539C-0 Flush type Inter-phone or 1539C-1 Flush type Inter-phone, 1 button (for door).....	

Miscellaneous

1 No. 295BC coil and condenser box.....	97
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Wiring and Battery Requirements

*2 wires common to entire system.	} 111
1 wire for each suite Inter-phone.	
Battery to furnish operating current.	
1 door opener and miscellaneous installing material.	



SYSTEM No. 7

SYSTEM No. 8

Service. Vestibule can call apartments and janitor. Apartments can call janitor and open door, if desired. Janitor can call apartments.

Capacity. One vestibule, one janitor and any number of suite Inter-phones up to 24.

Inter-phone Apparatus Required for System No. 8

Vestibule	See Page
1 No. 1362 type Inter-phone and letter boxes as required.....	96

Apartments

1527C 1 Surface wall Inter-phone, 1 button (for janitor) or 1527C-2 Surface wall Inter-phone, 2 buttons (for janitor and door)	} 90 and 91
1539C-1 Flush wall Inter-phone, 1 button (for janitor) or 1539C-2 Flush wall Inter-phone, 2 buttons (for janitor and door).....	

Janitor

1 No. 1350 Type Inter-phone, 1 janitor's annunciator and	} 97
1 No. 295 AS Coil and condenser box.....	

Wiring and Battery Requirements

*2 wires common to entire system.	} 111
2 wires for each suite Inter-phone.	
4 wires for connecting vestibule to janitor and coil and condenser box.	
Battery to furnish operating current.	
1 door opener and miscellaneous installing material.	

SYSTEM No. 9

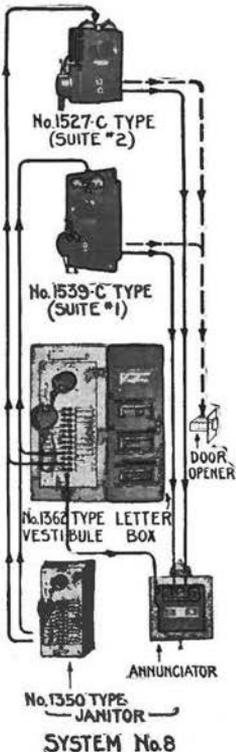
Service. Vestibule can call apartments and janitor. Apartments can call janitor and open door, if desired. Janitor and tradesmen can call apartments.

Capacity. One vestibule, one janitor, one tradesman and any number of suite Inter-phones up to 24.

Inter-phone Apparatus Required for System No. 9

Vestibule	See Page
1 No. 1362 Type Inter-phone and letter boxes as required.....	91

Note. *1 common wire to be omitted when door opener is not required.



SYSTEM No. 8

APARTMENT HOUSE INTER-PHONES
Systems Nos. 7, 8, 9 and 10 (Continued)

Selective Ringing—Selective Talking

Non-Interfering Service

SYSTEM No. 9 (Continued)

Apartments

- 1527C-1 Surface wall Inter-phone, 1 button (for janitor) or
 - 1527C-2 Surface wall Inter-phone, 2 buttons for janitor and door or
 - 1539C-1 Flush wall Inter-phone, 1 button for janitor or
 - 1539C-2 Flush wall Inter-phone, 2 buttons, for janitor and door
- } See Pages 90 and 91

Tradesmen

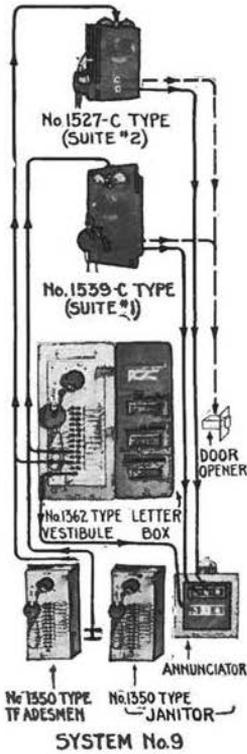
- 1 No. 1350 type Inter-phone

Janitor

- 1 No. 1350 type Inter-phone, 1 janitor's annunciator and
 - 1 No. 295BD coil and condenser box
- } Page 97

Wiring and Battery Requirements

- *2 wires common to entire system
 - 2 wires for each suit Inter-phone
 - 4 wires for connecting vestibule to janitor, tradesmen's set and coil and condenser box
 - Battery to furnish operating current
 - 1 door opener and miscellaneous installing material
- } Page 111



SYSTEM No. 10

Service. Provides the same service as outlined under System No. 9, but on a larger scale, intended for use where several vestibules in the same or adjoining apartment houses are to be served by one janitor. The janitor's equipment consists of a master annunciator.

Capacity. One janitor's switchboard, two or more vestibule and tradesmen's Inter-phones and any number of suite Inter-phones up to 70.

Inter-phone Apparatus Required for System No. 10
Vestibule

- 2 or more No. 1362 type Vestibule Inter-phones and letter boxes as required
- } Page 96

Apartments

- 1527C-1 Surface wall Inter-phone, 1 button for janitor or
 - 1527C-2 Surface wall Inter-phone, 2 buttons for janitor and door or
 - 1539C-1 Flush wall Inter-phone, 1 button-for janitor or
 - 1539C-2 Flush wall Inter-phone, 2 buttons, for janitor and door...
- } Pages 90 and 91

Tradesmen

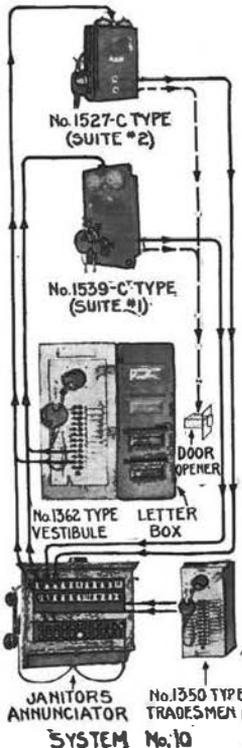
- 2 or more No. 1350 type Inter-phones

Janitor

- 1 annunciator switchboard and
 - **1 or more No. 295 type coil and condenser boxes
- } Page 97

Wiring and Battery Requirements

- *2 wires common to entire system
 - 2 wires for each suite Inter-phone
 - 5 wires for connecting each vestibule to janitor, tradesmen's sets and coil and condenser box
 - Battery to furnish operating current
 - 1 door opener and miscellaneous installing material
- } Page 111



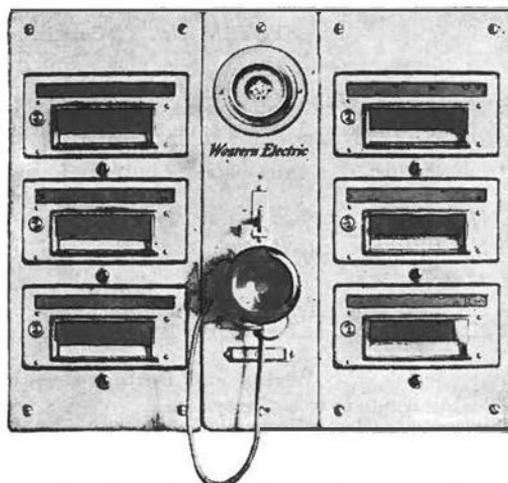
Note. **One retardation coil and one condenser are required for the janitor's annunciator and each vestibule and tradesmen's Inter-phone.
*One common wire can be omitted if door opener is not required.

APARTMENT HOUSE INTER-PHONES

(Continued)

System No. 20

Selective Ringing—Common Talking



Vestibule Equipment for Six Apartments

Service. The No. 20 Inter-phone Systems are designed to provide an inexpensive and reliable means of communication between vestibule, apartments, janitor's quarters, laundry and tradesmen's entrance. This system differs from Systems Nos. 7, 8, 9 and 10 (as described on the preceding pages) in that only one conversation can be carried on at a time, as all sets are connected to one talking circuit.

There are six combinations of the No. 20 System, differing from each other in the number of locations in the apartments which are to be connected for inter-communicating service. The operation of each of these combinations, however, is the same.

Operation. The vestibule Inter-phone is equipped with a push button for calling the janitor. Each letter box is provided with two or three compartments and below each compartment a push-button is mounted. To call an apartment, the push-button having the name of the apartment wanted is depressed; this rings the bell at the apartment selected and there only.

The apartment Inter-phones can be provided with push-buttons for operating the door opener, calling the janitor, laundry or any other station in accordance with the combination selected.

The janitor's laundry and tradesmen's Inter-phones can be arranged either for receiving calls from the other stations without being able to signal back, or for receiving calls and for signalling back to any one of the apartments.

Only one conversation can be carried on at a time.

Types of Inter-phones. Wall type Inter-phones are specified throughout for the No. 20 Systems.

Types of Systems. (See descriptions on following pages.)

ACCESSORIES FOR No. 20 SYSTEMS

The cabling, terminals, door opener (if required) for these systems are the same as outlined for Systems 7, 8, 9 and 10.

BATTERY REQUIREMENTS

For the operation of each system a battery of not more than five Blue Bell dry cells is required. These can be placed in the basement or any other accessible place.

Note. Detailed information covering wiring diagrams, connection of wires and cables, connecting blocks, etc., can be found in our booklet, "Installing and Maintaining Western Electric Inter-phones," which will be furnished upon request.

APARTMENT HOUSE INTER-PHONES

System No. 20--(Continued)

Selective Ringing--Common Talking

SYSTEM No. 20A

Service. Vestibule can call apartments; apartments can open door.

Vestibule

1 No. 1520U Inter-phone and 1 or more No. 3 type letter boxes. Pages 88

Apartments

Code No.		Pages
1527C-0	Surface Wall Inter-phone, or	} 90 and 91
1527C-1	Surface Wall Inter-phone (button for door), or	
1539C-0	Flush Wall Inter-phone, or	
1539C-1	Flush Wall Inter-phone (button for door).....	

Wiring and Batteries

*3 wires common to all Inter-phones. 1 wire for each apartment Inter-phone, batteries to furnish operating current, 1 door opener and miscellaneous installing material.....Pages 114

SYSTEM No. 20C

Service. Vestibule can call apartments and janitor; apartments can open door.

Apartments

Code No.		Pages
1527C-0	Surface Wall Inter-phone, or	} Pa es 90 and 91
1527C-1	Surface Wall Inter-phone, 1 button (for door opener), or	
1539C-0	Flush Wall Inter-phone, or	
1539C-1	Flush Wall Inter-phone, 1 button (for door opener).....	

Janitor

1 No. 1527C-0 Surface Wall Inter-phone.....Pages 90

Wiring and Batteries

*3 wires common to all Inter-phones, 1 wire for each apartment Inter-phone, 2 extra wires for connecting battery with vestibule and janitor's Inter-phone.....Pages 114

SYSTEM No. 20D

Service. Vestibule can call apartments and janitor; apartments can open door and call janitor. Inter-phone apparatus.

Vestibule

1 No. 1520U Inter-phone and 1 or more No. 3 type letter boxes.....

Apartments

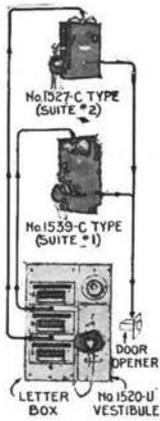
Code No.		Pages
1527C-1	Surface Wall Inter-phone, 1 button (for janitor), or	} Pa es 90 and 91
1527C-2	Surface Wall Inter-phone, 2 buttons (for janitor and door), or	
1539C-1	Flush Wall Inter-phone, 1 button (for janitor), or.....	
1539C-2	Flush Wall Inter-phone, 2 buttons (for janitor and door).....	

Janitor or Laundry

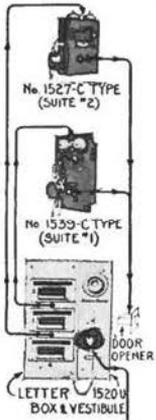
1 No. 1527C-0 Surface Wall Inter-phone.....Pages 90

Wiring and Batteries

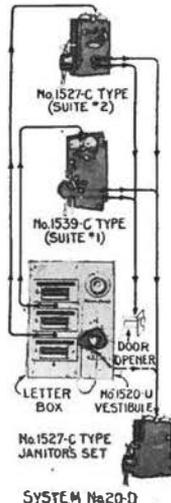
*4 wires common to all Inter-phones. 1 wire for each apartment Inter-phone, batteries to furnish operating current, 1 door opener and miscellaneous installing material.....Pages 114
*One wire may be omitted if door opener is not used.



SYSTEM No. 20A.



SYSTEM No. 20C.



SYSTEM No. 20D.



No. 1520 Type Vestibule Inter-phone



No. 3 Letter Box

APARTMENT HOUSE INTER-PHONES

System No. 20--(Continued)

Selective Ringing—Common Talking

SYSTEM No. 20E

Service. Vestibule can call apartments and janitor; apartments can open door and call janitor and laundry.

Vestibule

1 No. 1520U Inter-phone and 1 or more No. 3 type letter boxes. Page 98
Code

Apartment

1527C-2 Surface Wall Inter-phone, 2 buttons (for janitor and laundry) or
1527C-3 Surface Wall Inter-phone, 3 buttons (for janitor, laundry and door) or } Pages 90 and 91
1539C-2 Flush Wall Inter-phone, 2 buttons (for janitor and laundry) or
1539C-3 Flush Wall Inter-phone, 3 buttons (for janitor, laundry and door)

Janitor and Laundry.

2 No. 1529C-0 Surface Wall Inter-phones. Page 91

Wiring and Batteries

*Five wires common to all Inter-phones. A wire for each apartment Inter-phone, batteries to furnish operating current, one door opener and miscellaneous installing material. Page 114

SYSTEM No. 20G

Service. Vestibule can call apartments and janitor; apartments can open door and call janitor, and janitor can call apartments.

Vestibule

1 No. 1520U Inter-phone and 1 or more No. 3 type letter boxes. Page 98
Code

Apartment

1527C-1 Surface Wall Inter-phone, 1 button (for janitor) or
1527C-2 Surface Wall Inter-phone, 2 buttons (for janitor and door) or . . . } Pages 90 and 91
1539C-1 Flush Wall Inter-phone, 1 button (for janitor) or
1539C-2 Flush Wall Inter-phone, 2 buttons (for janitor and door)

Janitor and Laundry

1 Nos. 1527C-2 to 1527C-8 surface wall Inter-phones (depending upon number of push buttons required). Page 91

Note. For more than 8 buttons, add push button block.

Wiring and Batteries

*Four wires common to all Inter-phones. One wire for each apartment Inter-phone, batteries to furnish operating current, one door opener and miscellaneous installing material. Page 114

SYSTEM No. 20H

Service. Vestibule can call apartments and janitor, apartments can open door and call janitor and laundry, janitor and laundry can call apartments.

Vestibule

1 No. 1520U Inter-phone and 1 or more No. 3 type letter boxes. Page 98
Code

Apartment

1527C-2 Surface Wall Inter-phone, 2 buttons (for janitor and laundry) or
1527C-3 Surface Wall Inter-phone, 3 buttons (for janitor, laundry and door) or . . . } Pages 90 and 91
1539C-2 Flush Wall Inter-phone, 2 buttons (for janitor and laundry) or
1539C-3 Flush Wall Inter-phone, 3 buttons (for janitor, laundry and door)

Janitor and Laundry

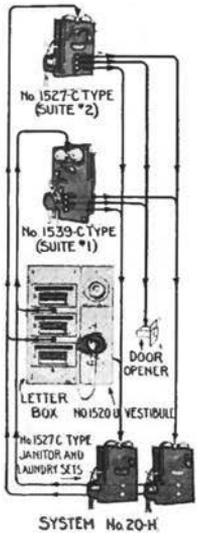
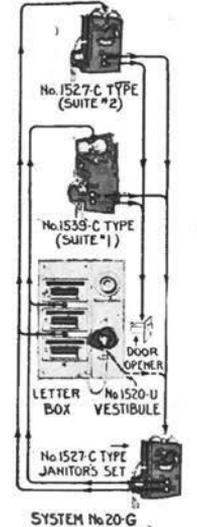
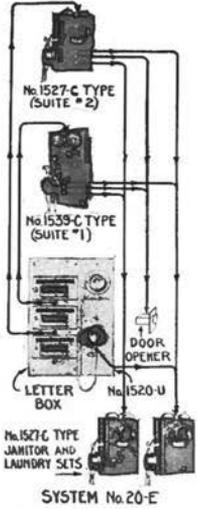
1 Nos. 1527C-2 to 1527C-8 surface wall Inter-phones (depending upon number of push buttons required). Page 91

Note. For more than 8 buttons, add push button block.

Wiring and Batteries

*Five wires common to all Inter-phones. One wire for each apartment Inter-phone, batteries to furnish operating current, one door opener and miscellaneous installing material. Page 114

*One wire may be omitted if door opener is not used.



INTER-PHONES

Inter-phone Outfits

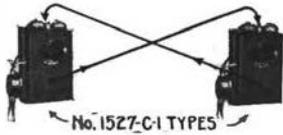
General. Where intercommunication is desired between two points in the home or in business, Western Electric Inter-phones can be furnished in "a-pair-in-a-package" outfit; that is, two Inter-phones complete with all the installing materials and instructions necessary to put them up. The outfits do not, however, include batteries, which must be ordered separately. For average conditions four or five dry cells will be sufficient.

This standard package idea for Inter-phones has been devised as a means of assisting purchasers in selecting the proper equipment for their needs without requiring them to make a study of the subject. At the same time it assures them of getting uniformly good materials, and in the proper amounts. The outfits are packed in a box ready to be sold over the counter or mailed by parcel post.

Service. Consists of two wall or hand set type Inter-phones suitable for a private telephone line between house and barn or garage, or for a line that is wholly within a house, also for use in offices or shops between two buildings or in one building.

Operation. Either station can ring and talk to the other.

Types of Outfits. The Inter-phones are the same as those specified for the Nos. 14 and 15C Inter-phone systems.



OUTFIT No. 30

Outfit No.

Description

30 Includes two surface wall No. 1527C-1 Inter-phones and 1 No. 51E retardation coil in one box but no installing or wiring material.

30A For use where the wiring is to be run entirely under cover and not exposed to moisture or weather. Includes one No. 30 outfit in one box, and another box containing 75 feet of insulated 3 conductor copper wire, two battery connectors, insulated nails for fastening wires, and illustrated installing instructions.

30B For use where the wiring is to be run in the open between or outside of buildings, and exposed to weather and moisture. Includes one No. 30 outfit in one box, and another box containing 150 feet of outside 3 conductor copper wire, two brackets with screws, hooks and knobs to attach wires to building, two porcelain tubes to insulate wires when entering building, two battery connectors, 25 insulated nails for fastening wires inside building, and illustrated installing instructions.



No. 30 Outfit

INTER-PHONES

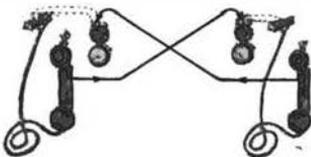
Inter-phone Outfits—(Continued)



No. 31 Outfit



No. 17 Outfit



No. 17 Outfit

OUTFIT No. 31

- | Outfit No. | Description |
|------------|---|
| 31 | Includes two hand set type No. 6043P Inter-phones and No. 51E retardation coil in one box but no installing or wiring material. |
| 31A | For use where the wiring is to be run entirely under cover and not exposed to moisture or weather. Includes one No. 31 outfit in one box, and another box containing 75 feet of insulated 3 conductor copper wire, two battery connectors, insulated nails for fastening wires, and illustrated installing instructions. |
| 31B | For use where the wiring is to be run in the open between or outside of buildings, and thus exposed to weather and moisture. Includes one No. 31 outfit in one box, and another box containing 150 feet outside 3 conductor copper wire, two brackets with screws, hooks and knobs to attach wires to buildings, two porcelain tubes to insulate wires when entering building, two battery connectors, 25 insulated nails for fastening wires inside building, and illustrated installing instructions. |

OUTFIT No. 17

This consists of two No. 1003 type hand set Inter-phones with all the material required to install a simple intercommunicating system between two points not over 80 feet apart, and where the wire will be wholly indoors and not exposed to weather conditions or moisture.

When installed in accordance with the directions furnished with each outfit, either station can call or talk to the other. Although intended primarily for business use, the No. 17 outfit can be used equally well in the home.

Outfit No.	Description
------------	-------------

- | | |
|----|---|
| 17 | Includes two hand set type Inter-phones, two connecting blocks with mounting screws, 80 feet of insulated twisted pair copper wire, 60 insulated nails for fastening wire, two hooks for holding hand sets, two bells, two battery connectors, and illustrated installing instructions. |
|----|---|

INTER-PHONE ACCESSORIES

Inter-phone Cable



Cable for Interior Use

Cable for Outside Use

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

The impregnation with wax prevents the insulation from fraying when the cables are installed. It also serves to protect the formed ends against moisture.

Three general types of cable are provided. Each type has its particular use, and care should be taken to order the proper cable for any desired purpose. These types are as follows:

1. Interior cable with outside braiding treated with gray fireproofing paint. Use only in dry places.
2. Interior cable with green glazed cotton outside braiding. Use only in dry places where exposed to view.
3. Outside cable, lead covered. Always use this cable outside, and inside in every case where there is apt to be moisture even in a small degree. In conduit installations lead covered cable should be used.

Lead-covered cables are not listed with separate Code Nos. Any fireproofed type of cable may be ordered with a lead sheath.

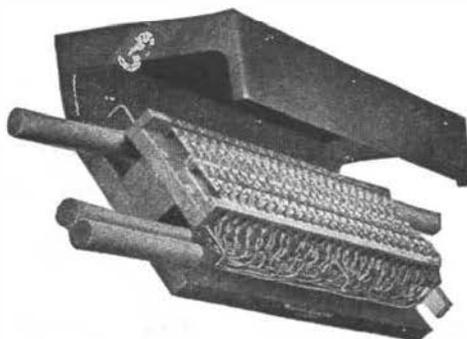
All cables are provided with a standard color scheme, so that each pair can be distinguished from any other. The pairs are properly twisted to prevent inductive disturbances. Each cable contains two spare pairs of No. 22 gauge conductors.

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

Note. Until present stocks are depleted, the right is reserved to substitute Inter-phone cables having double silk and single cotton insulated conductors instead of single silk and single cotton as above described.

No. 19 Type Cable Terminals

The No. 19 type cable terminal is admirably suited for interior distributing work. It was designed after a great deal of study, and is thought to be the best of its kind on the market. Made of hard wood, numbered and shellacked, and equipped with a japanned sheet metal cover.



No. 19B. Cable Terminal (Showing 4 Cables Attached)

Code No.	Capacity in Pairs	Length Ins.	Width Ins.	Depth Ins.
19A	14	8	5 1/8	2 1/2
19B	26	14	5 3/8	2 1/2

INTER-PHONE ACCESSORIES



No. 6B. Connecting Block



No. 11A. Connecting Block



No. 1B Hand Set Hanger



No. 141A Switch Hook

Connecting Blocks

No. 6 Type

These consist of brass studs embedded in a hard composition base. Studs fitted with two nuts (one a split check nut) and two washers.

Code No.	Capacity in Pairs	Length, Ins.	Width, Ins.	Code No.	Capacity in Pairs	Length, Ins.	Width, Ins.
6G	6	4 ⁷ / ₈	1 ³ / ₈	6C	16	12 ³ / ₈	1 ⁷ / ₈
6B	11	8 ⁵ / ₈	1 ⁷ / ₈	6D	21	16 ¹ / ₈	1 ⁷ / ₈
6F	13	10 ¹ / ₈	1 ⁷ / ₈	6E	26	19 ⁷ / ₈	1 ⁷ / ₈

Nos. 11 and 12 Types

These consist of a composition base in which the screw terminals are imbedded. Each terminal consists of two screw bushings electrically connected by means of a metal strip, and provided with screws and washers.

Code No.	No. of Terminals	Size, Ins.	Code No.	No. of Terminals	Size, Ins.
11A	2	1 ³ / ₈ x 1 ¹ / ₂	12A	3	1 ¹ / ₂ x 1 ¹ / ₂
11B	Same as No. 11A except equipped with a cover.		12B	Same as No. 12A except equipped with a cover.	

Hand Set Hanger

Code No.	Description
1B	A black finish hanger for holding No. 1001 type hand set.

Hand Set Hook

Code No.	Description
141A	A hook to be screwed into wall for holding No. 1003 type hand set.

Push Button Blocks

For use with Inter-phone Systems Nos. 12A, 20G and 20H, also in private installations and for call bell service.

WOOD PUSH BUTTON BLOCK

Stock finish of this type is dark golden oak with nickel trimmings. The directory plate is backed with a strip of transparent celluloid to protect the directory list.



Wood Base Code No.	Weighted Base Code No.	No. of Buttons
7900	7980	4
790	798	6
7910	7990	8
7921	79010	12
7930	79020	16
793	7902	20

Green mercerized cord per foot per button and attaching cord per button, are furnished at extra charge.

METAL PUSH BUTTON BLOCK

A black finished metal box, bushed for the entrance of connecting cord or wires. A base plate is provided having two punched holes for mounting, if desired. Felt pads are attached to the bottom of the plate.

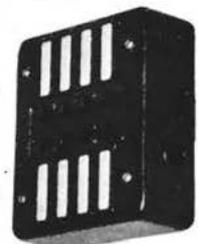
The push button groups and escutcheons, also the finish of these boxes are the same as specified for Unit Wall Inter-phones on the preceding pages. The box is 3³/₄ x 4¹/₄ x 1³/₈ inches in size.

Push Button Blocks Without Cords

Code No.	No. of Buttons	Code No.	No. of Buttons
101A	1	104A	4
102A	2	106A	6
103A	3	108A	8

Push Button Blocks With Cords (6 Ft. Lengths)

104AC	4	108AC	8
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INTER-PHONE ACCESSORIES



No. 11B Extension Bell



Blue Bell Battery



No. 1A Battery Box

Extension Bell

Code No.

Description

- 11B This bell is wound to 10 ohms, and may be used as an extension bell for any Inter-phone system. It should also be used for any separate signaling circuit, such as a door-bell operating from the Inter-phone batteries.

If a loud ringing extension bell is to be installed, a relay is equied to operate it. Power relays and bells are listed elsewhere.

Blue Bell Battery

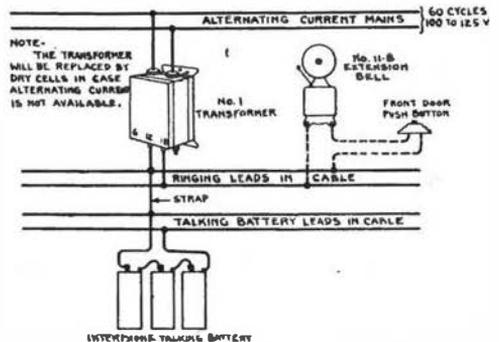
This dry cell is specially made for telephone work, and for this purpose is the most satisfactory cell on the market. Size overall, 2 5/8 inches by 6 3/4 inches. Fahnestock clip top.

Battery Boxes

- 1A Black japanned sheet metal box lined with an insulating material. Holds 3 Blue Bell dry cells. Size of box 9 1/8 inches long by 3 1/4 inches wide by 7 1/8 inches high.
- 2B Similar to the No. 1A. Holds 9 Blue Bell dry cells. Size of box, 14 1/2 inches long by 5 1/8 inches wide by 7 1/8 inches high.



No. 1 Transformer



Connections showing use of Bell-ringing Transformer for ringing Inter-phone Bells and Door-bells. Dotted lines show wiring for Door-bell using same source of Ringing Current

Bell-ringing Transformers

List No. 1

Description

Self-contained unit for use on 60 cycle alternating circuits at 100-125 volts. May be used for ringing the bells on system 1. Not suitable for use in any other system. Delivers current at three voltages 6, 12 and 18.

Cannot be used for furnishing talking current.

INTER-PHONE—ACCESSORIES



No. 51E Retardation Coil



Interior Telephone Wire



Insulating Tape

Retardation Coils

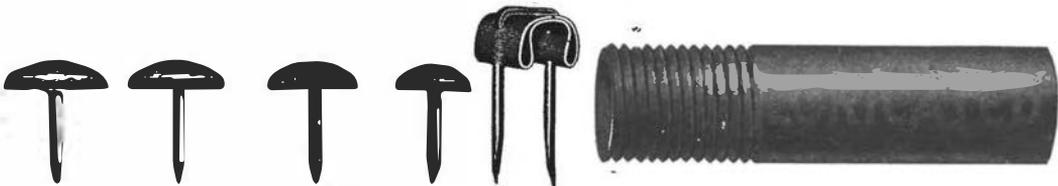
Code No.	Description
51C	Has two 50 ohm windings, which are not connected together. Size overall, 1 1/8 inches diameter by 1 1/8 inches high.
51E	Coil for use in Inter-phone Systems Nos. 11, 12, 15C and outfits 30 and 31. Same as No. 51C but mounted on a maple base having screw terminals. Windings connected in series.

Telephone Wires

We carry a wide variety of insulated wires for both interior and outdoor service, in single conductors, twisted pairs and triples.
Full information and prices on wire, to suit any condition, on request.

Insulating Tape

Furnished in 1/2 lb. rolls and in widths varying from 1/2 inch to 3 inches. Black or white. Western Electric "Victor," 3/4 inch wide.



No. 22

No. 20

No. 18

No. 15

No. 1

Blake Insulated Staples

Iron Conduit

Milonite Nails

"Milonite" perfection insulated nails.

Diameter of head in four sizes. Length of nail to suit. Prevent short circuiting. Color matches wire or wall. Wire can be taken down without cutting or injuring insulation.

Blake Insulated Staples

Designed for use on all low voltage circuits of interior wiring, such as telephone, telegraph, messenger call, annunciator and bell work.

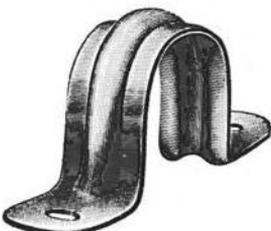
List No.	Description
1	For hardwood, for single and twisted pair wire.
3	For general use, for single and twisted pair wire.
5	For hardwood, for twisted 3 wire and extra heavy pair wire.
6	For general use, for twisted 3 wire and extra heavy pair wire.
7	For soft wood, for twisted 3 wire and extra heavy pair wire.

Iron Conduit and Fittings

We carry large stocks of both galvanized and enameled iron conduit and conduit fittings such as bushings, locknuts, etc. Consult our general supply catalog and write for market prices.

Pipe Straps—Tinned

These are very useful in supporting Inter-phone cable, conduit, etc.



Pipe Strap

List No.	Size	Approx. Quantity per Lb.	Std. Pkg.
291	3/8 inch pipe strap	30	1000
292	1/2 inch pipe strap	25	1000
293	3/4 inch pipe strap	20	500
294	1 inch pipe strap	18	100
295	1 1/4 inch pipe strap	16	50
296	1 1/2 inch pipe strap	10	25

LEAD COVERED TELEPHONE CABLE



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

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

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

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

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

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

experts in the world.

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

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

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

Extra Pairs

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

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

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

Transmission

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

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

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

LEAD COVERED TELEPHONE CABLE**Transmission—Continued**

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

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

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

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

Electrostatic Capacity

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

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

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

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

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

Special Cables

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

Submarine Cables

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

1. High dielectric strength, tight core cable, designed for use in comparatively long lengths, where the cost of repairing a break in the cable will be less than the cost of an entirely new cable.

2. High dielectric strength, loose core cable, designed for use in comparatively short lengths, where high transmission efficiency and high dielectric strength are of importance; for example: a short river crossing cable connecting important open wire lines.

3. Single paper insulated loose core cable designed for use in comparatively short lengths where so high a dielectric strength is not necessary; for example: a short river crossing cable connecting land cables.

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

LEAD COVERED TELEPHONE CABLE

(Continued)

Composite Cables

Composite cable, that is, composed of conductors of two or more gauges can be furnished if desired. The combinations of pairs which will utilize the space within the lead sheath most economically are somewhat limited and our cable engineers will make recommendations along this line upon receipt of detail information as to the conditions to be met.

High Dielectric Strength Cables

Paper insulated cable designed to withstand test potentials up to 1500 volts A.C. is supplied for special circuits such as for telegraph or signal circuits.

Terminating Cables

The general practice of terminating paper insulated cable in the past has been to splice on a short piece of wool insulated cable. It has been found, however, that double silk and single cotton insulation is satisfactory for this purpose and it is less expensive. Double wool insulation can be furnished, if desired.

Prices

Owing to the fluctuations of the market price of raw material, it is impracticable to list prices on cable in a catalog. We will be pleased to furnish full information and prices on request.



Cable Yard at Hawthorne Works

LEAD COVERED TELEPHONE CABLE

Type "NM" Cable

For Aerial or Underground Use

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

Characteristics per Mile of Cable

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

Transmission is equivalent to 1.95 miles of standard No. 19 A.W.G. cable having a mutual electrostatic capacity of .054 microfarad, and 88 ohms resistance, per mile.

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

Type "SM" Cable

For Underground Use

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

Characteristics per Mile of Cable

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

Transmission is equivalent to 2.07 miles of standard No. 19 A.W.G. cable having a mutual electrostatic capacity of .054 microfarad, and 88 ohms resistance, per mile.

Code No. and No. of Pairs	No. of Pairs Guaranteed	Thickness of Sheath, Ins.	Mean Outside Diameter Ins.	Approximate Wt. per Ft., Lbs.	Convenient No. of Ft. on Reels
SM- 909	900	115	2.23	6.34	600
SM-1212	1200	125	2.63	8.31	600

LEAD COVERED TELEPHONE CABLE

Type "M" Cable

For Underground Use

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

Characteristics per Mile of Cable

Mutual Electrostatic capacity not greater than (A. C. Testing).....	.085 microfarad
Approximate equivalent grounded capacity.....	.140 microfarad
Insulation resistance not less than.....	500 megohms
Dielectric strength. Insulation capable of withstanding a test potential up to.....	500 volts D.C.

Transmission is equivalent to 2.11 miles of standard No. 19 A.W.G. cable having a mutual electrostatic capacity of .054 microfarad and 88 ohms resistance, per mile.

Code No. and No. of Pairs	No. of Pairs Guaranteed	Thickness of Sheath, Ins.	Mean Outside Diameter, Ins.	Approximate Wt. per Ft., Lbs.	Convenient No. of Ft. on Reels
M-1212	1200	.125	2.63	8.42	600

Type "NR" Cable

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

Characteristics per Mile of Cable

Mutual Electrostatic capacity not greater than (A. C. Testing).....	.095 microfarad
Approximate equivalent grounded capacity.....	.155 microfarad
Insulation resistance not less than.....	500 megohms
Dielectric strength. Insulation capable of withstanding a test potential up to.....	500 volts D.C.

Transmission is equivalent to 1.83 miles of standard No. 19 A.W.G. cable having a mutual electrostatic capacity of .054 microfarad and 88 ohms resistance, per mile.

Code No. and No. of Pairs	No. of Pairs Guaranteed	Mean Outside Diameter, Ins.	Thickness of Sheath, Ins.	Approximate Wt. per Ft., Lbs.	Convenient No. of Ft. on Reels
NR- 6	5	3/8	5/8	.388	2500
NR- 11	10	7/16	5/8	.523	2500
NR- 16	15	1/2	5/8	.584	2500
NR- 21	20	11/16	5/8	.644	2500
NR- 26	25	5/8	5/8	.742	2500
NR- 31	30	3/4	5/8	.803	2500
NR- 41	40	13/16	5/8	.924	2000
NR- 51	50	7/8	5/8	1.046	2000
NR- 61	60	1 1/8	5/8	1.129	1500
NR- 76	75	1 1/8	5/8	1.312	1500
NR-101	100	1 1/8	5/8	1.776	1500
NR-152	150	1 3/8	5/8	2.281	1200
NR-177	175	1 1/2	5/8	2.486	1200
NR-202	200	1 3/4	5/8	2.691	1000
NR-253	250	1 7/8	5/8	3.106	1000
NR-303	300	1 7/8	1/2	4.286	800
NR-404	400	1 3/4	1/2	5.173	700

Type "NP" Cable

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

NP- 6	5	3/8	5/8	.426	2500
NP- 11	10	7/16	5/8	.525	2500
NP- 16	15	1/2	5/8	.624	2500
NP- 21	20	11/16	5/8	.685	2500
NP- 26	25	5/8	5/8	.746	2500
NP- 31	30	3/4	5/8	.847	2500
NP- 41	40	13/16	5/8	.970	2000
NP- 51	50	7/8	5/8	1.093	2000
NP- 61	60	1 1/8	5/8	1.177	1500
NP- 76	75	1 1/8	5/8	1.362	1500
NP-101	100	1 1/8	5/8	1.839	1500
NP-152	150	1 3/8	5/8	2.353	1200
NP-177	175	1 1/2	5/8	2.562	1200
NP-202	200	1 3/4	5/8	2.817	1000
NP-253	250	1 7/8	5/8	3.241	1000
NP-303	300	1 7/8	1/2	4.458	800
NP-404	400	1 3/4	1/2	5.364	700

LEAD COVERED TELEPHONE CABLE

Type "ANA" Cable

For Aerial or Underground Use

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

Characteristics per Mile of Cable

Mutual electrostatic capacity not greater than (A. C. Testing)..... .079 microfarad
 Approximate equivalent grounded capacity..... .155 microfarad
 Insulation resistance not less than..... 500 megohms
 Dielectric strength. Insulation capable of withstanding a test potential up to..... 700 volts A.C.
 Transmission is equivalent to 1.83 miles of standard No. 19 A.W.G. cable having a mutual electrostatic capacity of .054 microfarad, and 88 ohms resistance per mile.

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

Type "SA" Cable

For Underground Use

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

Characteristics per Mile of Cable

Mutual electrostatic capacity not greater than (A. C. Testing)..... .039 microfarad
 Approximate equivalent grounded capacity..... .140 microfarad
 Insulation resistance not less than..... 500 megohms
 Dielectric strength. Insulation capable of withstanding a test potential up to..... 500 volts D.C.
 Transmission is equivalent to 1.73 miles of standard No. 19 A.W.G. cable having a mutual electrostatic capacity of .054 microfarad and 88 ohms resistance per mile.

Code No. and No. of Pairs	No. of Pairs Guaranteed	Thickness of Sheath, Ins.	Mean Outside Diameter, Ins.	Approximate Wt. per Ft., Lbs.	Convenient No. of Ft. on Reels
SA-404	400	1/8	1 3/4	5.085	1000
SA-444	440	1/8	1 3/4	5.382	1000
SA-485	480	1/8	2	5.753	1000
SA-505	500	1/8	2 1/4	5.901	800
SA-606	600	1/8	2 1/4	6.653	700
SA-909	900	1/4	2 3/4	8.856	600

LEAD COVERED TELEPHONE CABLE

Type "ANB" Cable

For Aerial or Underground Use

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

Characteristics per Mile of Cable

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

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

Type "TH" Cable

For Long Aerial and Underground Lines

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

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

Lead-antimony Sheath.

Characteristics per Mile of Cable

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

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

LEAD COVERED TELEPHONE CABLE

Type "T J" Cable

For Long Aerial and Underground Lines

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

Lead-antimony Sheath

Characteristics per Mile of Cable

Mutual Electrostatic capacity not greater than (A. C. Testing).....	.071 microfarad
Approximate equivalent grounded capacity.....	.115 microfarad
Insulation resistance not less than.....	500 megohms
Dielectric strength. Insulation capable of withstanding a test potential up to.....	500 volts D.C.

Transmission is equivalent to 0.55 miles of standard No. 19 A.W.G. cable having a mutual electrostatic capacity of .054 microfarad, and 88 ohms resistance, per mile.

Code No. and Guaranteed No. of Pairs	Thickness of Sheath, Ins.	Mean Outside Diameter, In.	Approximate Wt. per Ft., Lbs.	Convenient No. of Feet on Reels
TJ-11	1/4	1 1/8	2.452	1500
TJ-16	1/4	1 1/8	3.937	1200
TJ-26	1/4	1 1/8	3.906	1200
TJ-31	1/4	1 1/8	4.400	900
TJ-36	1/4	1 1/8	4.74	900
TJ-41	1/4	1 1/8	5.10	900
TJ-51	1/4	1 1/8	5.86	900
TJ-71	1/4	2 1/8	7.33	600
TJ-76	1/4	2 1/8	7.63	600

Type "F" Cable

For Inside Construction

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

Characteristics per Mile of Cable

Insulation resistance.....100 megohms

Code No. and No. of Pairs	No. of Pairs Guaranteed	Mean Outside Diameter, Ins.	Thickness of Sheath, Ins.	Approximate Wt., Per Ft., Lbs.	Convenient No. of Ft. on Reel
F- 6	5	3/8	☆	.272	2500
F- 11	10	3/8	☆	.343	2500
F- 16	15	3/8	☆	.414	2500
F- 21	20	3/8	☆	.490	2500
F- 26	25	3/8	☆	.533	2500
F- 31	30	3/8	☆	.582	2500
F- 41	40	3/8	☆	.701	2000
F- 51	50	3/8	☆	.991	2000
F- 56	55	3/8	☆	1.050	1500
F- 61	60	3/8	☆	1.102	1500
F- 76	75	3/8	☆	1.240	1500
F- 91	90	1 1/8	☆	1.410	1500
F-101	100	1 1/8	☆	1.491	1500
F-111	110	1 1/8	☆	1.610	1200
F-121	120	1 1/8	☆	1.685	1200
F-152	150	1 1/8	☆	1.968	1200
F-182	180	1 1/8	☆	2.220	1200
F-202	200	1 1/8	☆	3.140	1000
F-222	220	1 1/8	☆	3.800	1000
F-242	240	1 1/8	☆	3.501	1000
F-253	250	1 1/8	☆	3.836	1000
F-303	300	1 1/8	☆	4.985	800

Types "G" and "U" Cables

For Inside Construction

Conductors No. 22 A.W.G. double silk and single cotton insulation, colored in accordance with a standard color scheme so that each pair is distinguishable from other pairs in the cable.

Pure Lead Sheath

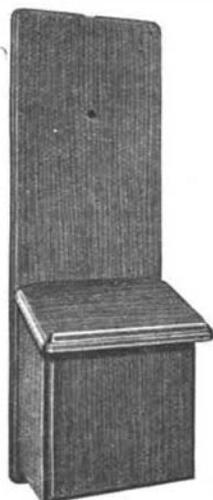
Characteristics per Mile of Cable

Insulation resistance.....100 megohms

Code No. and No. of Pairs	No. of Pairs Guaranteed	Mean Outside Diameter, In.	Thickness of Sheath, Ins.	Approximate Wt., Per Ft., Lbs.	Convenient No. of Ft. on Reels
G- 6	5	3/8	☆	Type "G" .272 Type "U" .289	2500
G-11	10	3/8	☆	.343 .367	2500
G-16	15	3/8	☆	.414 .438	2500
G-21	20	3/8	☆	.485 .527	2500
G-26	25	3/8	☆	.533 .581	2500
G-31	30	3/8	☆	.582 .635	2500
G-41	40	3/8	☆	.701 .775	2000
G-51	50	3/8	☆	.991 1.080	2000

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

BACKBOARDS



No. 136C Backboard



No. 146A Backboard



No. 148A Backboard



No. 1533 Type Telephone Mounted on a No. 148A Backboard together with a No. 146A Backboard

Backboards

Code No.	Description and Principal Use	Overall Dimensions, Ina.
79	Wood, black finish. Used to facilitate mounting No. 58 type protectors on brick or stone walls.	12½ x 5 x 1½
136B	Wood, oak finish; arranged with battery box for 3 dry cells. Used with No. 1293 and No. 1305 type telephone sets. Top of battery box forms writing shelf.	26 x 8½ x 7½
136C	Wood, black finish; arranged with battery box for 3 dry cells. Used with Nos. 1293, 1533 and 1553 type local battery telephones. Top of battery box forms a writing shelf.	24⅞ x 8½ x 7½
139A	Cast iron bracket, black finish; used to support No. 50A coin collector on a horizontal surface.	18⅞ x 8 x 17⅞
144A	Wood, black finish; for mounting a No. 50 type coin collector and a No. 334 or 534 metal desk set box where it is desired to insulate this apparatus or mount it on irregular surfaces.	27⅞ x 7¼ x ¾
146A	Black finished pressed sheet metal shelf attachment; used with No. 1533 and 1553 telephone sets and No. 534 and 554 type desk set boxes. Has lugs at upper end which engage slots in the base of the telephones. May be used with or without a backboard. Has flanged edge the same as the telephones it is used with.	9⅞ x 7½ x 6¼
147A	Wood, black finish; used with Nos. 1533 and 1553 telephone sets and Nos. 534 and 554 desk set boxes in cases where it is desired to insulate them or facilitate mounting on brick or irregular surfaces.	9⅞ x 7½ x 1½
148A	Wood, black finish; used with Nos. 1533 and 1553 type telephones and Nos. 334 and 534 type desk set boxes in connection with the No. 146A backboard.	18⅞ x 7½ x 1½
148B	Wood, black finish; used with Nos. 1333 and 1533 type telephones and Nos. 334 and 534 type desk set boxes in connection with No. 7A and 7J coin collectors, where it is desired to insulate this apparatus.	18¼ x 7½ x ¾
149A	Wood, finished with slate colored paint; used with No. 392 type extension bells. Has a sloping roof which protects the bell from falling water and other substances. (See No. 342 type extension bells).	14⅞ x 18⅞ x 6¼
150A	Wood, black finish; used with No. 7A and No. 7J coin collectors, where it is desired to insulate them from the walls or mount them on brick or other irregular surfaces.	8⅞ x 6½ x ¾
151A	Black finished sheet metal wiring shelf for use in connection with No. 50 type coin collectors.	4⅞ x 7½ x 5⅞

BATTERIES

Columbia Gray Label Dry Batteries

For Telephone Service



Gray Label Dry Cell

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

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

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

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

Size of Zinc Cans	Size Overall	Description	Wt. per Cell	No. in Bbbs.	Shipping Wt. per Bbls.
2½ x 6	2½ x 7	Standard Fahnestock Clip	2	125	300 lbs.

No. 540 Cord Battery Connector

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

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



No. 1A—Battery Box

Battery Boxes

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

Code No.	Dry Cell Capacity	Dimensions Ins.
1A	3 No. 6 cells	3¼ x 7 ½ x 9 ⅞
2A	4 No. 6 cells	3¼ x 7 ⅞ x 12 ⅞
2B	9 No. 6 cells	5 ⅞ x 7 ⅞ x 14 ⅞

BELLS AND BUZZERS



No. 10 Type D. C. Bell



No. 10 Type D. C. Buzzer

Bells For Direct Current

No. 10 Type

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

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

No. 11 Type

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

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

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

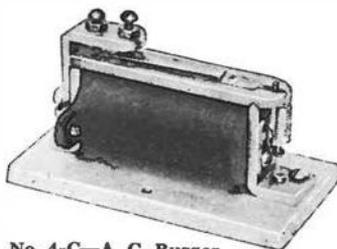
Buzzers For Direct Current

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

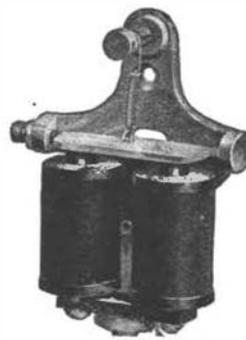
Code No.	Resistance Ohms	Rated Voltage	Code No.	Resistance Ohms	Rated Voltage
10A	2.5	3	10D	325	24
10B	15	7	10E	650	36 and 48
10C	100	15			



No. 1-A—A. C. Buzzer



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



No. 2-D—A. C. Buzzer

Buzzers For Alternating Current

Code No.	Resistance Ohms	Type	Dimensions Inches	Principal Use
1A	1000	Polarized	$3\frac{1}{2} \times 2\frac{1}{8} \times 1\frac{1}{2}$	Telephone and switchboards.
1B	2500	Polarized	$3\frac{1}{2} \times 2\frac{1}{8} \times 1\frac{1}{2}$	Telephone and Switchboard.
2A	100	Not polarized	$2\frac{3}{4} \times 2\frac{1}{4} \times \frac{27}{32}$	No. 1006 Type Test Sets
2C	1000	Not polarized	$2\frac{3}{4} \times 2\frac{1}{4} \times \frac{27}{32}$	Test Sets
2D	100	Not polarized	$2\frac{3}{4} \times 2\frac{1}{4} \times \frac{27}{32}$	No. 1017 Type Test Sets
4B	1200	Not polarized	$3\frac{1}{8} \times 1\frac{1}{8} \times 2\frac{1}{4}$	P.B.X. Switchboards operates on A.C. ringing current only
4C	1200	Not polarized	$3\frac{3}{8} \times 2\frac{1}{4} \times 2\frac{1}{8}$	P.B.X. Switchboards operates on A.C. ringing current, also on 24 volts D.C. Has a dustproof cover.

BINDING POSTS

Self-mounting Screw Type

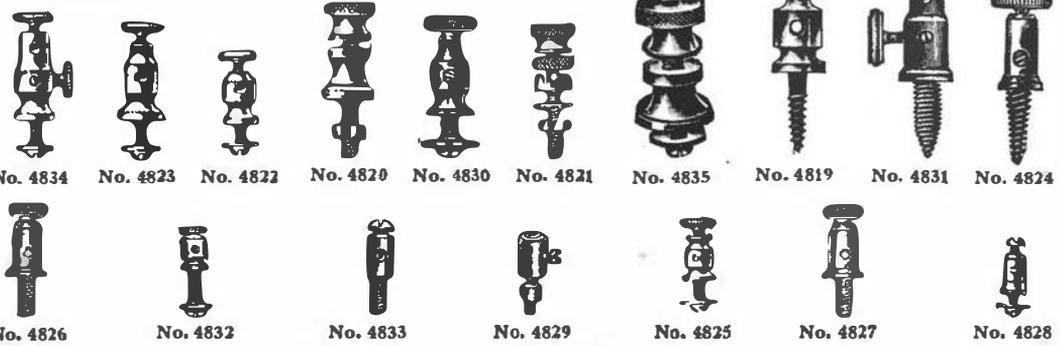
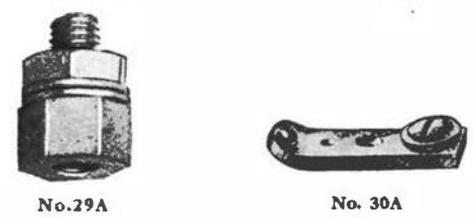
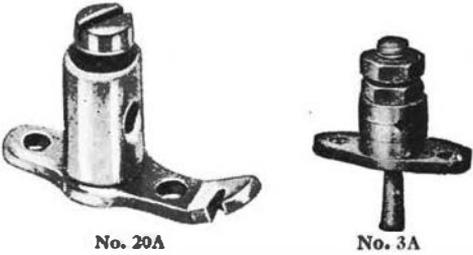
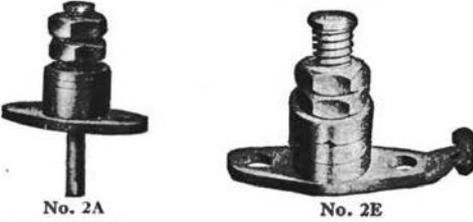
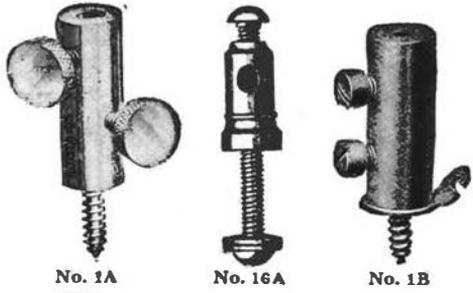
Code No.	Description	Finish
1A	Thumb screw connections, no soldering terminals.....	Brass
1B	Screw connections, one front soldering terminal.....	Tin dipped

Screw Mounting Type

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
16A	To take one tubular tip.....	Nickel
20A	Screw connections, one front soldering terminal.....	Nickel
30A	Screw connection, one soldering terminal.....	Tinned

No. 29A Type

29A	Used in No. 8 and No. 10 cable terminals when the original binding posts break off above the lower nut. For 10-32 thread only.....	Tinned
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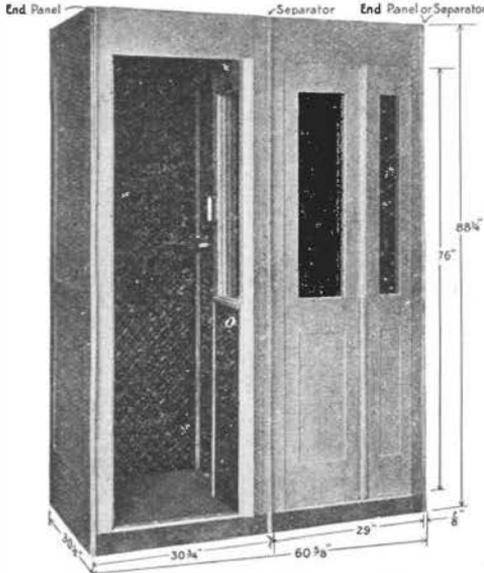


Miscellaneous Binding Posts
Illustrated Full Size

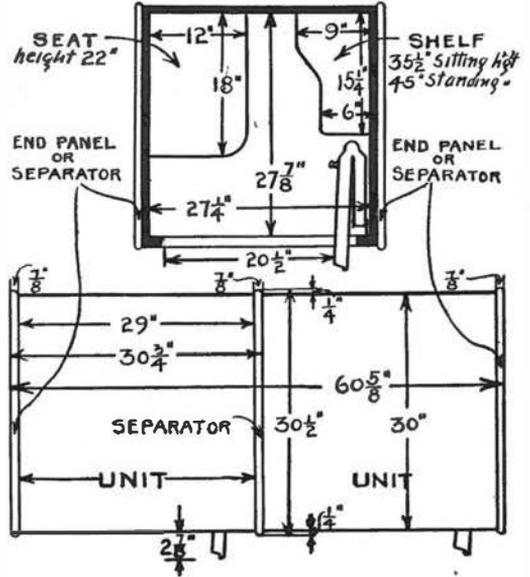
These binding posts are made of brass and can be furnished in plain brass or nickel plate at same price.

List No.	Finish	List No.	Finish	List No.	Finish
4834	Nickel plated	4830	Nickel plated	4827	Nickel plated
4823	Nickel plated	4826	Nickel plated	4828	Nickel plated
4822	Nickel plated	4832	Nickel plated	4819	Nickel plated
4820	Nickel plated	4833	Nickel plated	4831	Nickel plated
4821	Nickel plated	4829	Nickel plated	4824	Nickel plated
4835	English pattern, nickel plated.	4825	Nickel plated		

BOOTHS—TELEPHONE



No. 1 Folding Door Telephone Booth



No. 1 Type Folding Door Telephone Booths

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

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

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

The ceiling of the booth is 4½ inches below the roof and the intervening space may be used as a wiring chamber and to house an electric light relay or door switch equipment when these features are required.

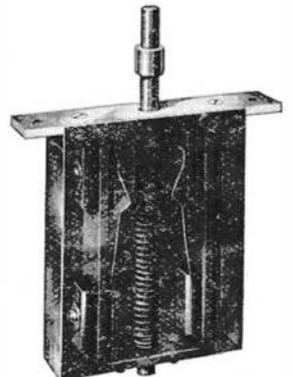
These booths are strong and substantial in construction, and rich in appearance as solid mahogany or quartered oak is used. The door is normally open, which permits the maximum of ventilation. The special folding door design not only economizes space but protects the user.

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

Orders for No. 1 type booths should specify the following items:
 No. 1 (A, B, C, D, E or F) Booths || Seats
 End Panels (State Code No. of Booth) || Locks
 Separators (State Code No. of Booth) || Electric Light Switch Equipment

No. of Units	Overall, Ft.	Dimensions		Overall, Ft.	Width, Ins.
		Width, Ins.	No. of Units		
1	2	6¾	6	15	0½
2	5	0⅝	7	17	6
3	7	6½	8	19	11⅝
4	10	0⅝	9	22	5¾
5	12	6¾	10	24	11⅝

Note. Overall width includes end panels and separators.

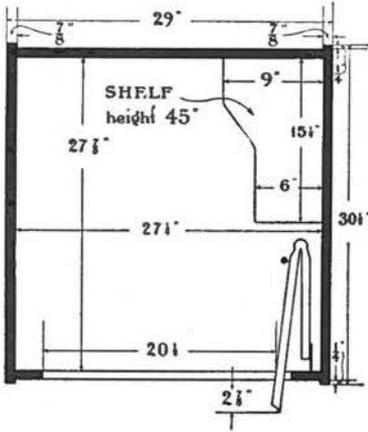


No. 1A Booth Switch

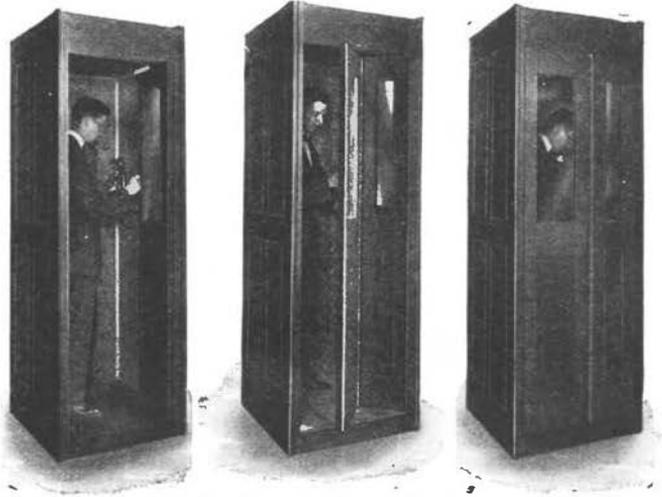
Code No. Booth Switches

1A This switch is used for disconnecting a telephone, located in a booth or pole box, from the line when the booth or pole box is locked. It operates when a hasp is placed over the staple and held in place by a padlock. It guards the telephone set against injury from lightning discharges. The approximate dimensions of the switch case are: width, 3½ ins., depth, 1 in. and length, 4½ ins.

BOOTHS—TELEPHONE



Overall Height, 30 1/2 inches



Folding Door Telephone Booths

No. 2 Type Folding Door Telephone Booths

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

The cuts above show a No. 2G, No. 2H or No. 2J folding door telephone booth and illustrate the operation of the folding door feature.

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

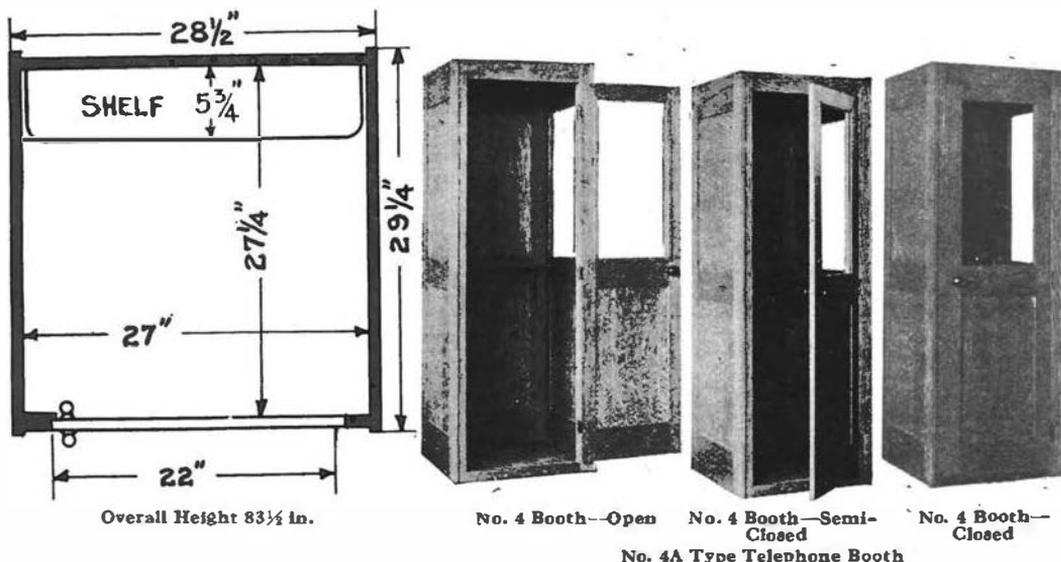
1. **economy of Space.** The movement of the Folding Door takes but three (3) inches of space beyond the front of the booth, making it possible to use this type of booth in narrow passageways.
2. **Ventilation.** The design of the Folding Door is such that the door is open at all times when the booth is not in use. This is the only practical plan for booth ventilation.
3. **Protection from Injury.** The point where the two leaves of the Folding Door meet is of such design as to prevent any chance of injuring the fingers or hand.
4. **Door Operation.** One of the distinctive advantages of the Folding Door is that it can be both closed and opened by pulling on the handle. This feature, which is an important one from the user's standpoint, is possible only with this type of door.
5. **Maintenance.** The Folding Door does not require the use of tracks in the floor, consequently eliminating the main cause of trouble formerly experienced with the booths equipped with sliding doors.
6. **Absence of Latches or Catches.** The design of the Folding Door is such that it will remain open or closed without the use of latches or catches.
7. **Non-Interference with Doors of Adjacent Booths.** The Folding Door folds within the booth; consequently, there is no interference with adjacent doors when two or more booths are in compartment formation.

Code No.	Material	Finish	Description
2A	Plain oak	Medium oak	2 glasses in door, 2 glasses in left side, 1 glass in right side
2B	Birch	Dark mahogany	2 glasses in door, 2 glasses in left side, 1 glass in right side
2C	Birch	Light mahogany	2 glasses in door, 2 glasses in left side, 1 glass in right side
2G	Plain oak	Medium oak	2 glass panels in door only
2H	Birch	Dark mahogany	2 glass panels in door only
2J	Birch	Light mahogany	2 glass panels in door only
Seat	For any No. 2 type booth		
Lock	For any No. 2 type booth		
Electric light switch equipment	For any No. 2 type booth		

EQUIPMENT

- Interior.** Sides, back and ceiling lined with sheet metal. **Floor.** Hardwood flooring.
- Threshold.** Protected with safety tread. **Door.** Always hinged on right-hand side (facing booth).
- Shelf.** Furnished with each booth. Shelf is intended only as an elbow rest.
- Wiring.** Space between ceiling and roof (27 1/4 inches wide, 27 1/8 inches deep, 4 1/4 inches high) is provided as a wiring chamber, and as a housing for electric light relay or door switch equipment. A wiring slot is provided back of inside corner moulding.
- Electric Light.** Ceiling of booth is bored for electric light fixture. (Hole is equipped with a wooden plug.)
- Door Switch.** Ceiling of each booth is bored to receive a door switch designed to operate an electric light by movement of the door. (The hole is equipped with a wooden plug.)
- Seat.** Made of oak or birch. **Lock.** Designed especially for Folding Door booths. Furnished only when specified.

BOOTHS—TELEPHONE



No. 4 "Churchill" Type Swinging Door Telephone Booths

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

This booth is equipped with a reinforced back for mounting either a wall telephone or coin collector set. A writing-shelf 5 3/4 inches wide is also supplied which affords means for mounting a desk telephone.

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

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

Door Opening. 77 inches high and 23 inches wide.

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

A lead aluminum door tread is supplied on this booth.

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

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

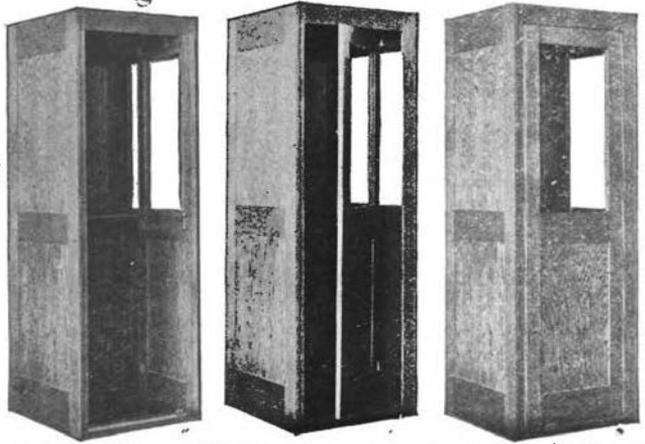
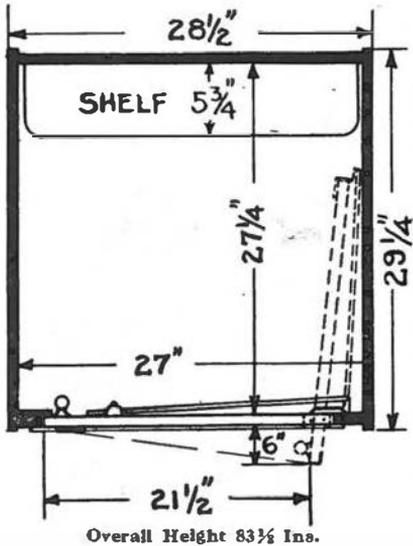
The floor is thoroughly oiled.

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

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

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

BOOTHS—TELEPHONE



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

No. 3 "Churchill" Type Receding Door Telephone Booth

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

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

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

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

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

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

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

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

Door Opening. 77 1/2 inches high, 23 inches wide.

- Door Equipment.** The door is equipped with patented steel, nickel-plated hardware consisting of
- 1 swivel roller guide and track on top of door, and
 - 1 sliding guide on bottom of door which operates on outside edge of tread.
 - 2 roller hinges on back edge of door which operate on tracks fastened to side of cabinet.
 - 1 handle for inside of door.
 - 1 lead aluminum tread at front edge of bottom.

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

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

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

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

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

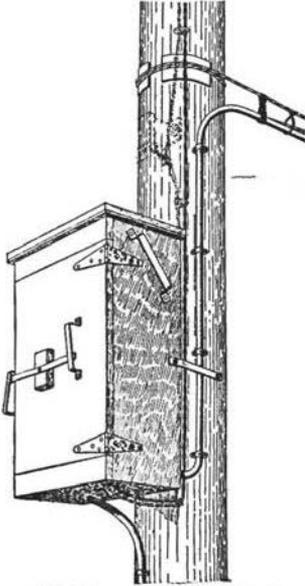
CABLE TERMINALS

General

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

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

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



"B" Type Cable Terminal

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

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

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

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

CABLE TERMINALS

(Continued)



No. 18E Cable Terminal, Open



No. 18E Cable Terminal, Closed

No. 18 Type Cable Terminal (Protected)

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

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

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

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

The terminals, as furnished, are equipped with:

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

No. 1 Protector blocks.

No. 2 Protector blocks.

No. 3 Protector mica.

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

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

CABLE TERMINALS

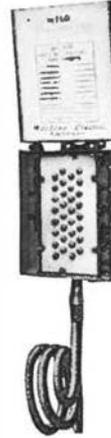
(Continued)



No. 8 Type—
Cable Terminal
Open



Closed
No. 14C—Cable Terminal



Open

No. 8 Type Cable Terminal (Unprotected)

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

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

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

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

Code No.	Capacity Pairs	Overall Height (Less Cable Stub)	Diameter of Hood Ins.
8A	10	15 $\frac{1}{8}$	6 $\frac{1}{4}$
8B	16	15 $\frac{3}{8}$	6 $\frac{1}{4}$
8C	26	19 $\frac{11}{16}$	6 $\frac{1}{4}$
8D	31	19 $\frac{11}{16}$	6 $\frac{1}{4}$
8E	51	28 $\frac{11}{16}$	6 $\frac{1}{4}$

No. 14 Type Cable Terminal (Unprotected)

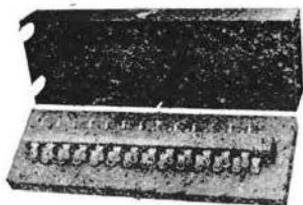
This terminal consists of a cast iron box with hinged cover, containing a porcelain terminal block with binding posts for the line connections. It is neat and attractive in appearance and its small size and rectangular shape make it especially suitable for use in residential districts for the distribution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

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

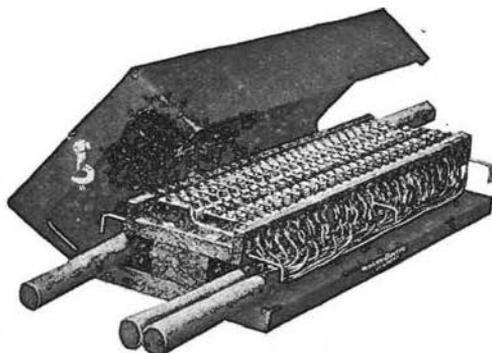
Code No.	Capacity Pairs	Length Including Nipples	Width of Cover Ins.
14B	11	10 $\frac{1}{8}$	7 $\frac{7}{16}$
14C	16	12 $\frac{1}{8}$	7 $\frac{7}{16}$
14D	26	17 $\frac{3}{8}$	7 $\frac{7}{16}$

CABLE TERMINALS, CHAIRS AND CIRCUIT BREAKERS

(Continued)



No. 12A. Cable Terminal



No. 19B. Cable Terminal

NO. 12 AND 19 TYPE CABLE TERMINALS (UNPROTECTED)

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

Code No.	Capacity Pairs	Dimensions, Ins.		
		Length	Width	Depth
12A	13	11 ¹ / ₈	4 ¹ / ₈	1 ¹ / ₈
12B	23	11 ¹ / ₈	4 ¹ / ₈	2 ¹ / ₈
12C	33	11 ¹ / ₈	4 ¹ / ₈	3 ¹ / ₈

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
19A	14	8	5 ¹ / ₈	2 ¹ / ₂
19B	26	14	5 ¹ / ₈	2 ¹ / ₂

Chairs

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

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

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

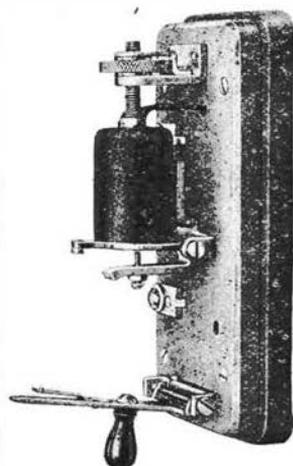


Operator's Chair

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

Circuit Breakers

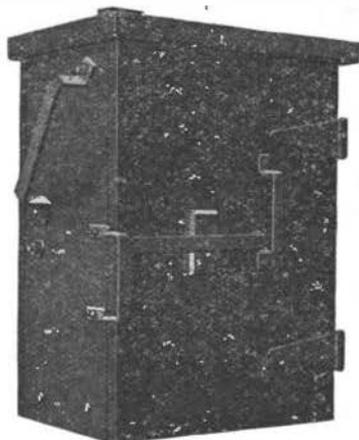
A small overload circuit breaker with 2 ¹/₂ x 5 ⁵/₈ inch slate base, to be mounted vertically. The adjusting nut varies the current value at which it will operate. It will safely carry .2 amperes but, as supplied, is adjusted to carry .3 ampere continuously under actual service conditions and to operate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



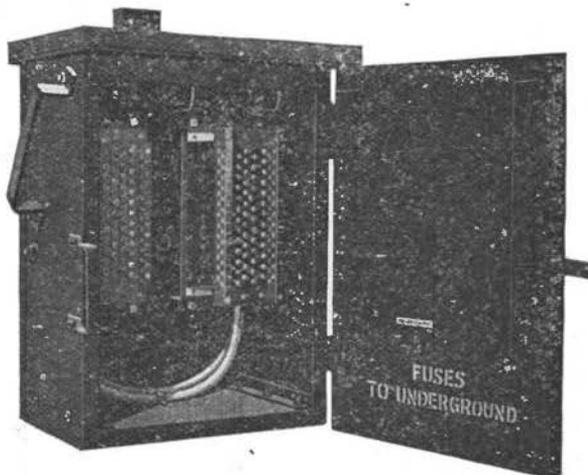
No. 2A Circuit Breaker

CABLE TERMINALS

(Continued)



B-26 Cable Terminal



B-26 Cable Terminal

Type "B" Cable Terminals (Protected)

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

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

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

"B Cable Terminal Boxes" are obtainable without equipment.

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

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

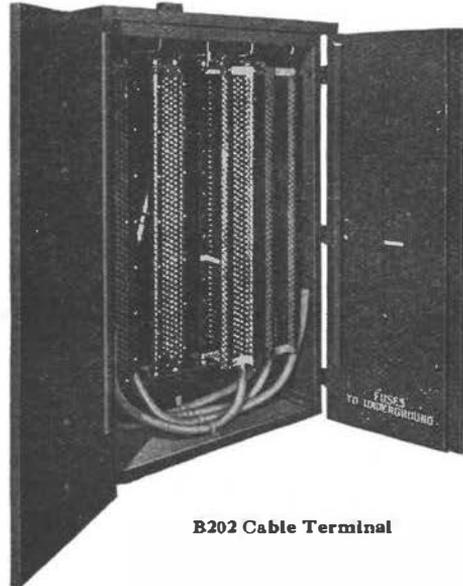
The listing of type "B" cable terminals complete includes a terminal box, equipped with fuse chambers and binding post chambers, each of which is supplied with a cable stub attached and potheaded, but do not include the No. 7T fuses, two of which are needed for each pair of wires and they should be ordered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

CABLE TERMINALS

(Continued)



B202 Cable Terminal



B202 Cable Terminal

Type "B" Cable Terminals

The B-26 Cable Terminal will terminate both a 26 pair underground cable and a 26 pair aerial cable and provides for cross-connection. The other sizes have similar capacity ratings.

Pole seats may be used with the two smaller sizes of "B Cable Terminals" and these together with platforms for the large terminals are listed below.

Type "B" Cable Terminal—Complete

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

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

The chambers of same number (i.e., B-76A, B-76B, B-76C, etc.) are identical except for the length of the cable stubs as shown in the table which lists these chambers.

Cable Terminal Boxes

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

Pole Seats

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

Cable Balconies

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

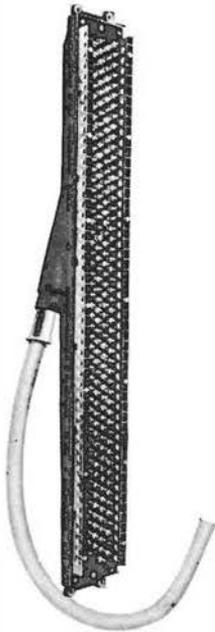
For 101, 152 or 202 pair Cable Terminals order "C" Cable Balcony per Drawing 137A-97.

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

CABLE TERMINALS

“B” Binding Post Chambers

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



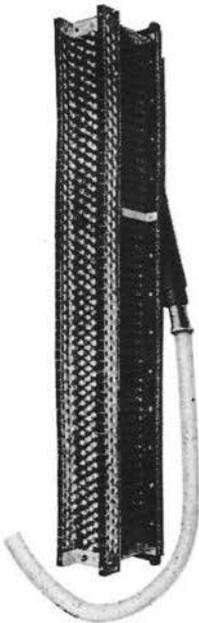
B-101 “B” Binding Post Chamber

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

“B” Fuse Chambers

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

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



B-101 “B” Fuse Chamber (with No. 7T Fuses in place)

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

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

CABLE (SWITCHBOARD)

Switchboard Cable



No. 6084

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

One of the chief features of black enamel insulated cable is that the conductors may be soldered to terminals with an ordinary hot soldering iron without having to first remove the black enamel. The character of the black enamel is such that it will fuse with the solder at a high temperature and result in reliable soldered connections.

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

1. The 1000 and 1100 coded series in which the conductors are provided with a double silk and single cotton insulation.

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

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

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

DRY CORE—LEAD TAPED—BRAIDED
Conductors Black Enamel Insulated

Code No.	No. of Pairs B. & S. Gauge	No. of Singles B. & S. Gauge	Approximate Dimensions (In Ins.)	Code No.	No. of Pairs B. & S. Gauge	No. of Singles B. & S. Gauge	Approximate Dimensions (In Ins.)
Double Silk and Single Cotton Insulation							
1016	20-No. 22	21-No. 22	$\frac{3}{8}$ x $\frac{1}{8}$	1116	20-No. 19		$\frac{7}{8}$ x $\frac{5}{8}$
1024	20-No. 22		$\frac{1}{2}$ x $\frac{1}{8}$	1117	20-No. 19		$\frac{1}{2}$ x $\frac{1}{2}$
1035	20-No. 25		$\frac{3}{4}$ x $\frac{1}{8}$		20-No. 22		
1050	10-No. 22	11-No. 22	$\frac{1}{2}$ x $\frac{1}{8}$	1121	20-No. 19	10-No. 22	$\frac{3}{4}$ x $\frac{1}{8}$
1060	36-No. 22		$\frac{1}{2}$ x $\frac{1}{8}$		20-No. 22		
1062	30-No. 22		$\frac{1}{2}$ x $\frac{1}{8}$	1125	10-No. 19		$\frac{1}{2}$ x $\frac{1}{8}$
1070	40-No. 22		$\frac{7}{8}$ x $\frac{1}{8}$	1126	10-No. 22		$\frac{3}{4}$ x $\frac{3}{8}$
*1074		20-No. 22	$\frac{1}{2}$ x $\frac{3}{8}$		10-No. 19		
1079	10-No. 22		$\frac{1}{2}$ x $\frac{1}{8}$	1127	10-No. 19	10-No. 22	$\frac{1}{2}$ x $\frac{5}{8}$
1084	20-No. 22	21-No. 22	$\frac{1}{2}$ x $\frac{1}{8}$	1186	3-No. 16		$\frac{1}{8}$ x $\frac{1}{8}$
1098	64-No. 22	32-No. 22	$\frac{1}{2}$ x $\frac{1}{4}$	1187	6-No. 16		$\frac{1}{16}$ x $\frac{3}{16}$
1107	39-No. 22	19-No. 22	$\frac{1}{2}$ x $\frac{1}{8}$	1188	8-No. 16		$\frac{1}{16}$ x $\frac{1}{16}$
1115	20-No. 19	20-No. 22	$\frac{1}{2}$ x $\frac{1}{8}$	1200	6-No. 19		$\frac{1}{16}$ x $\frac{1}{16}$
Double Cotton Insulation							
6016	20-No. 22	20-No. 22	$\frac{2}{3}$ x $\frac{1}{4}$	*6122	10-No. 22		$\frac{1}{8}$
6024	20-No. 22		$\frac{1}{2}$ x $\frac{1}{8}$		1-No. 14		
6035	25-No. 22		$\frac{3}{4}$ x $\frac{1}{8}$	*6123	20-No. 22		$\frac{1}{2}$
6050	10-No. 22	10-No. 22	$\frac{1}{2}$ x $\frac{1}{8}$		1-No. 14		
6060	36-No. 22		$\frac{1}{2}$ x $\frac{1}{8}$	*6124	30-No. 22		$\frac{3}{8}$
6062	30-No. 22		$\frac{3}{4}$ x $\frac{1}{8}$		1-No. 14		
*6066	50-No. 22		$\frac{1}{2}$ x $\frac{3}{4}$	6125	10-No. 19		$\frac{1}{2}$ x $\frac{1}{4}$
*6069	100-No. 22		$1\frac{1}{2}$ x $\frac{1}{8}$	6126	10-No. 19		$\frac{5}{8}$ x $\frac{3}{4}$
6070	40-No. 22		$\frac{7}{8}$ x $\frac{1}{8}$		10-No. 22		
*6072	10-No. 19		$\frac{1}{2}$ x $\frac{1}{8}$	6127	10-No. 19	10-No. 22	$\frac{3}{8}$ x $\frac{1}{2}$
*6074		20-No. 22	$\frac{1}{2}$ x $\frac{3}{8}$	*6128	40-No. 18		$\frac{1}{16}$ x $\frac{1}{16}$
6079	10-No. 22		$\frac{1}{2}$ x $\frac{1}{8}$	6143	20-No. 22		$\frac{1}{2}$ x $\frac{1}{8}$
6084	20-No. 22	20-No. 22	$1\frac{1}{4}$ x $\frac{1}{8}$	6144	30-No. 22		$\frac{1}{8}$ x $\frac{1}{8}$
6087	16-No. 22		$\frac{1}{2}$ x $\frac{1}{8}$	*6146	100-No. 22		$1\frac{1}{2}$
6100	40-No. 24		$\frac{1}{2}$ x $\frac{1}{8}$	6147	40-No. 22		$\frac{1}{2}$ x $\frac{1}{8}$
6102	40-No. 24	20-No. 24	$\frac{1}{2}$ x $\frac{1}{8}$	*6166	3-No. 20		$\frac{1}{8}$
6103	20-No. 24		$\frac{3}{8}$ x $\frac{1}{8}$	*6178	102-No. 22		$1\frac{1}{8}$
6106	40-No. 22	20-No. 22	1 x $\frac{1}{8}$	*6179	6-No. 20		$\frac{3}{8}$
6107	39-No. 22	23-No. 22	$1\frac{1}{2}$ x $\frac{1}{8}$	*6180	8-No. 20		$\frac{3}{4}$
6115	20-No. 19	20-No. 22	$\frac{1}{2}$ x $\frac{1}{8}$	6181	11-No. 20		$\frac{1}{8}$
6116	20-No. 19		$\frac{3}{8}$ x $\frac{1}{8}$	6184	10-No. 19		$\frac{1}{2}$ x $\frac{1}{8}$
6117	20-No. 19		$\frac{1}{2}$ x $\frac{1}{8}$		20-No. 22		
	20-No. 22			6189	20-No. 19	No. 20, No. 22	$\frac{1}{8}$ x 1
6119	50-No. 19		$\frac{3}{4}$ x $1\frac{1}{8}$		20-No. 22		
6120	20-No. 24	20-No. 24	$\frac{3}{8}$ x $\frac{1}{8}$				
6121	10-No. 19	10-No. 22	$\frac{1}{8}$ x $\frac{3}{4}$				

*Round shaped cables all other cables are oval shaped.

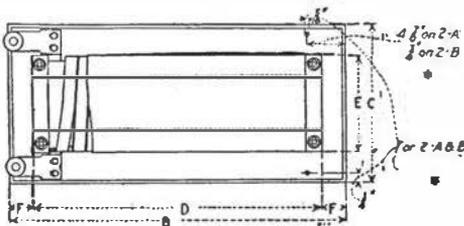
CABLES AND CHOKE COILS
SWITCHBOARD CABLES--Continued

WAXED CORE
Not Lead Taped

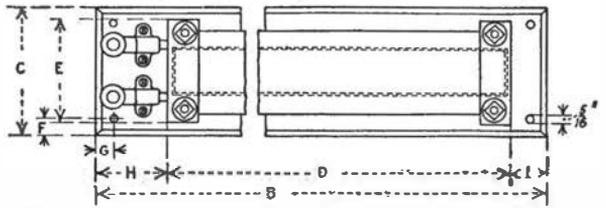
Conductors Black Enamel Insulated

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

Code No.	No. of Pairs B. & S. Gauge	No. of Singles B. & S. Gauge	Triples and Quads	Shape	Approximate Dimensions (In Ins.)
6177	55-No. 22			Round	$\frac{7}{8}$
6208	3-No. 20	2-No. 20	3 Triples 20	Round	$\frac{17}{8}$
6209	3-No. 20	2-No. 20	4 Quads 20	Round	$\frac{21}{8}$
6210	3-No. 20		1 Quad 20	Round	$\frac{21}{8}$
			1 Triple 20		$\frac{21}{8}$
6211	5-No. 20	1-No. 20	1 Quad 20	Round	$\frac{15}{8}$
			2 Triples 20		$\frac{15}{8}$
6212	9-No. 20	2-No. 20			$\frac{29}{8}$
6213	12-No. 20	2-No. 20			$\frac{31}{8}$
6214	9-No. 20				$\frac{17}{8}$



No. 2 Type
*Others have no mounting holes



No. 1 Type

Choke Coils

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

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

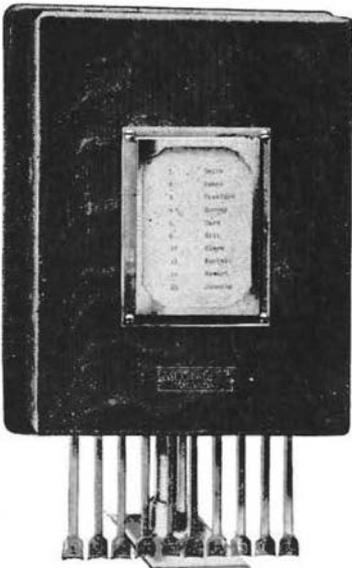
No. 1 Type

Code No.	Approximate Dimensions in Feet and Inches				Approximate Resistance, Ohms	Capacity, Amperes	Wt., Lbs.
	A	B	C	D			
1-A	$5\frac{7}{8}$	$23\frac{7}{8}$	$5\frac{3}{4}$	$19\frac{1}{8}$	.0058	25	40
1-B	$5\frac{7}{8}$	$23\frac{7}{8}$	$5\frac{3}{4}$	$19\frac{1}{8}$	.00435	50	45
1-C	$7\frac{7}{8}$	24	$6\frac{3}{4}$	$20\frac{3}{4}$	.0034	100	75

No. 2 Type

2A	9	$26\frac{1}{4}$	$11\frac{1}{4}$	$22\frac{3}{4}$	.00235	175	170
2B	10	$26\frac{1}{4}$	$12\frac{3}{4}$	$22\frac{3}{4}$	.0022	225	250
2C	$15\frac{3}{4}$	3 ft. $7\frac{1}{2}$	$17\frac{3}{4}$	3 ft. $3\frac{3}{4}$	.00081	600	865
2D	$8\frac{1}{4}$	3 ft. 1	$13\frac{1}{8}$	2 ft. $9\frac{1}{2}$	.00167	300	265
2E	10	3 ft. 6	$14\frac{3}{8}$	3 ft. $2\frac{1}{2}$	.00135	400	380
2F	19	3 ft. $7\frac{1}{2}$	$21\frac{1}{8}$	3 ft. $3\frac{3}{4}$	.00062	800	1550
2G	$21\frac{1}{2}$	4 ft. $4\frac{1}{2}$	23	4 ft. $\frac{3}{4}$	.00048	1000	2950

SEVERANCE CODE SIGNALLING SYSTEM



Severance Call Box



D. C. or A. C. Bell



Jefferson Heavy Duty "B" Transformer



No. 8355-A Signal

A code signalling system performs a useful and inexpensive supplementary service for quickly locating men whose duties require their presence in various parts of an office building or factory.

A Call Box is placed at the telephone switchboard or central point and the electric signals (bells or signal horns) which it controls are located in the rooms, offices and corridors of the building or factory. Each person to be called is assigned a code number corresponding to a lever on the Call Box. When a lever is lifted, the code signal for the person being called is sounded in all parts of the building and he, hearing the signal, at once communicates with the operator by means of the nearest telephone.

The Call Box is made in three sizes which are arranged for individual signals for 10, 20 or 30 persons respectively. The illustration shows the 10 call station which is 12 inches in height, 8 inches wide and 5 inches deep. The box is built of oak and supplied in natural finish unless otherwise specified.

A battery of 4 dry cells may be used to operate the Call Box mechanism.

Severance Call Box. 10, 20, or 30 Call Station as required.

Types of Signal Bells. Specify the number of bells required and whether they are to be equipped with 6, 8, 10 or 12 inch gongs. State whether they are to operate on Direct Current or Alternating Current. Give the voltage of the circuit which is to be used to operate them.

Signal Horns. The No. 8355A Benjamin Signal Horn should be installed where the lighting or power circuit to which it is to be connected is of 100 to 125 volts, 25 or 60 cycles, A.C. This horn is for interior use only. Specify voltage and cycles when ordering.

The No. 8152H Benjamin Signal Horn is weatherproof and designed for use out of doors; otherwise same as No. 8355A.

The No. 8326A Benjamin Signal Horn should be ordered if the current supply is 100 to 125 volts, direct current. This type of signal horn is for interior use only.

The No. 8326H Benjamin Signal Horn is for use where the current supply is 100 to 125 volts, direct current; this signal horn is weatherproof.

Transformers. When dry cells are not to be used as a power source for Call Box operation, one of the following transformers should be ordered. Each transformer is 3 x 4 1/8 x 6 inches and weighs 7 1/2 lbs.

Code	Primary Voltage	Secondary Voltage	Capacity Watts
Type "B" Jefferson Heavy Duty Transformer, 60 cycle.	110	6-14-20	75
Type "B" Jefferson Heavy Duty Transformer, 25 cycle.	110	6-14-20	75

Relays. One "Severance Relay" is necessary for making and breaking the power circuit of every twenty gongs or horns or combination of both.

Specify alternating current relays if a transformer is used in the call circuit, and direct current relays if the call circuit is to be equipped with dry cells.

Each relay is enclosed in a steel case.

COIN COLLECTORS

Electrically Operated—For Central Battery Service Only

No. 7 Type Coin Collector



No. 7J

These are arranged so that the coin dropped into the coin slot remains under control of the central office operator, who may refund or deposit it in the coin box. The coin collector may be arranged for "post-payment" service, but it is ordinarily connected for "pre-payment" service. In "post-payment" service the calling party signals the operator in the usual manner and does not drop a coin in the slot until requested to do so. The coin remains under the control of the operator who may refund it or deposit it in the coin box at the end of the conversation. In "pre-payment" service it is necessary to drop a coin of the proper denomination into the coin slot to signal the central office. This saves a considerable amount of the operator's time over the old practice of waiting for the calling party to drop a nickel before completing the connection. The coin is deposited or refunded as in "post-payment" service. The switchboard cord circuits must be equipped with special keys and circuits for controlling the operation of these coin collectors.

The case is made of heavy sheet steel and has a durable black japan finish. The other exposed metal parts have a nickel plate finish. The locks furnished on the coin box door require the use of keys differing from those furnished on the housing. A burglar alarm switch will be provided, if

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

Code No.	Arranged For	Approximate Dimensions, In.		
		Length	Width	Depth
7J	Nickels	8 ³ / ₁₆	5 ⁵ / ₈	4 ⁷ / ₈
7K	Nickels	11 ¹ / ₁₆	5 ¹ / ₈	4 ¹ / ₂

The No. 7K differs from the 7J only that it has a coin box of larger capacity.

No. 50 Type Coin Collector

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



No. 50G Equipped With 50C Apparatus Blank

Code No.	Arranged For	Approximate Dimensions In.
50G (Equipped with 50C apparatus blank)	Nickels, Dimes and Quarters	18 ¹ / ₄ x 7 x 6

Note. The transmitter, receiver, receiver cord, apparatus blank, dial and dial cord (No. 595B) must be ordered as separate items.

COIN COLLECTORS



No. 7 Mounted on a Central Battery Telephone



No. 11 Mounted on a No. 1317 Wall Telephone



No. 14 Mounted with a No. 1020 Desk Stand

Gray Telephone Pay Stations and Mounting Devices

Non-Electrical—For Local or Central Battery Service

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

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

Gray Code No.	Type of Telephone Used on	Coins Arranged for	Approx Size Ins.
7	Wall Telephone	Nickels, Dimes and Quarters	9 x 4 1/2 x 3

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

8A	Wall Telephone	Nickels	7 x 3 3/8 x 3 3/8
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This pay station will not be provided with a mounting bracket unless specifically so ordered. See next item.

Bracket for No. 8A Pay Station

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

11	Wall Telephone	Nickels, Dimes and Quarters	9 x 4 1/2 x 3
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A mounting plate is included with this pay station for mounting it at the side of a telephone, as shown in the cut.

13A	Desk Telephone	Nickels	9 1/2 x 3 1/2 x 3 1/4
-----	----------------	---------	-----------------------

This is equipped with two clamps of such size as to fit the stem of a standard desk telephone. In ordering, specify the type and make of desk telephone with which it is intended for use.

14	Desk Telephone	Nickels, Dimes and Quarters	11 x 4 1/2 x 3 1/2
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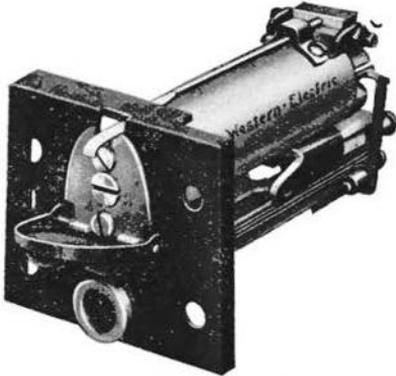
Fittings will be furnished with this pay station to permit of attachment to standard types of desk telephones. In ordering, specify the type and make of desk telephone with which it is intended for use.

20	Desk Telephone	Nickels, Dimes and Quarters	10 3/4 x 4 1/4 x 3 1/4
----	----------------	-----------------------------	------------------------

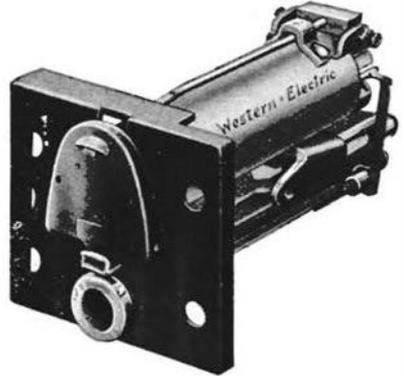
This pay station will be equipped with fittings to permit of its being attached to a standard type of desk telephone. Fittings are arranged so that the unit thus formed may be fastened to a counter or telephone booth shelf. In ordering, specify the type and make of desk telephone with which it is intended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

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

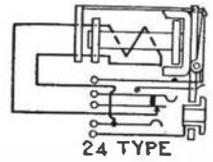
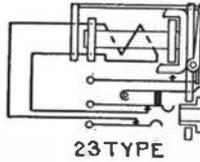
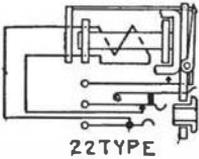
COMBINED JACK AND SIGNALS



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



No. 22 Type on No. 92B Mounting
Signal Operated



Shutter Type

Code No.	Approximate Resistance (Ohms)	Used with Plug No.	Description	Ordinarily Used with Mountings No.
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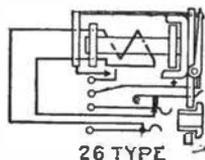
The shutter type combined jack and signals are used as magneto line signals in switchboards where it is desirable to have the jack closely associated with its signal. This arrangement increases the ease and rapidity of operating. The signal is electrically operated and automatically restored by mechanical means when the plug is inserted into the jack by the operator.

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

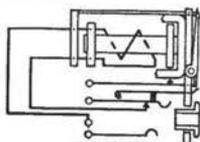
22C	330	47	{ Equipped with night bell contact, which is closed when shutter is in operated position. Has single cut-off jack and is intended for use with Non-Multiple Magneto Switchboards. When plug is inserted, one end of coil winding is disconnected from the line..... }	89B or 92B
23C	330	47	{ Same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

COMBINED JACKS AND SIGNALS

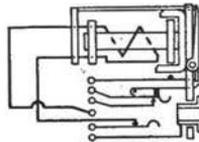
(Continued)



26 TYPE



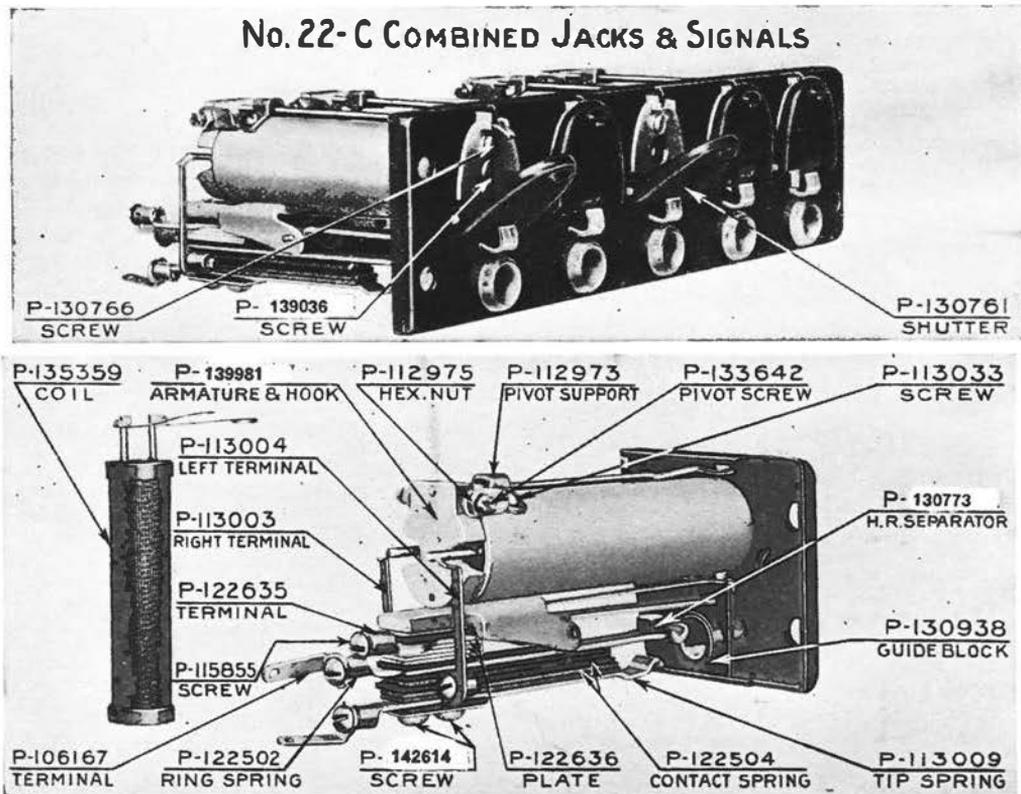
27 TYPE



31 TYPE

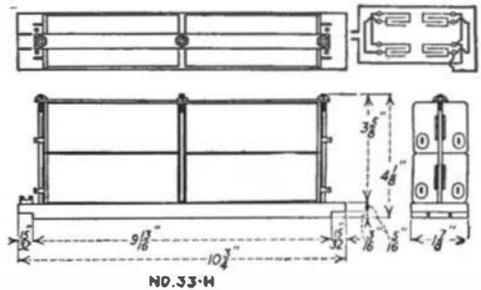
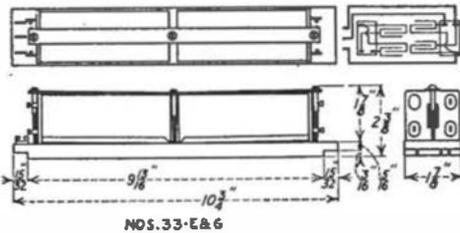
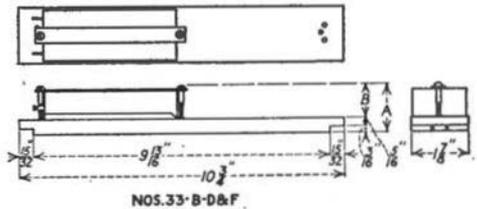
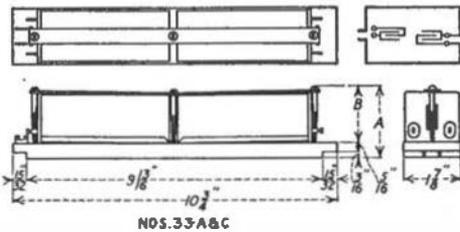
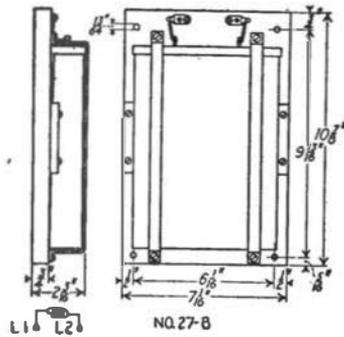
Code No.	Approximate Resistance (Ohms)	Used with Plug No.	Description	Ordinarily Used with Mountings No.
26C	330	47	Same as No. 22 type, except that it has on its armature a relay contact, which is made only during the time ringing current flows through the coil. This permits of code signals being received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

No. 22-C COMBINED JACKS & SIGNALS



CONDENSERS

(Continued)



CONDENSERS—MOUNTED

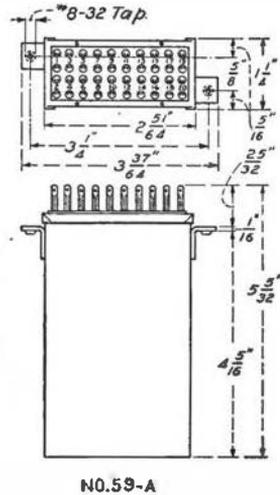
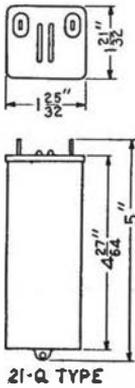
The following condensers are composed of standard units mounted upon wooden bases as illustrated. The No. 33 type mounts on a coil rack.

These condensers are tested to 500 Volts, Direct Current.

Code No.	Condensers Used	Capacity M.F.	Dimensions	
			"A"	"B"
27B	1 No. 23A	1	(see cut)	(see cut)
33A	2 No. 21L	2 (each)	2 3/8	1 7/8
33B	1 No. 21L	2 (each)	2 3/8	1 7/8
33C	2 No. 21M	1 (each)	1 1/8	1 1/8
33D	1 No. 21M	1 (each)	1 1/8	1 1/8
33E	2 No. 21N	{ 0.5 1.0	(see cut)	(see cut)
33F	1 No. 21AC	0.5	1 1/8	1 1/8
33G	2 No. 21AD	{ 1.0 1.0	(see cut)	(see cut)
33H	4 No. 21L	2 (each)	(see cut)	(see cut)

CONDENSERS

(Continued)



Precision Type Condenser

(Unmounted)

When it is necessary that condensers be held to close limits of capacity value, as when they are placed in balanced pairs or groups in certain telephone circuits, the No. 21Q type condensers are used: These condensers are made under five different code numbers as follows:

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

When ordering these condensers for replacement purposes the full code number should be given. Each condenser is tested on 500 volts, direct current.

Mounted

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

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

No. 59A Condenser

This condenser consists of twenty individual units assembled in one case, each unit having two separate terminals. The individual unit have a minimum capacity of .020 microfarad ; each unit is tested on 500 volts, direct current. Two No. 8-36 round head brass machine screws are supplied with each condenser for mounting on mounting plates.

By using varying numbers of the units in series, parallel, or series parallel connection, capacity values which range from .0025 to .400 microfarad may be obtained.

This condenser is principally used in switchboard circuit in which an audible ring-back signal feature is included.

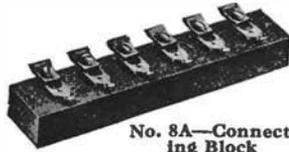
Condenser Straps

Code No.	Description
P-43121	Bent iron straps for use with the No. 21E condenser, similar in form to the straps shown in the illustrations of the No. 27B condenser. Black japan finish.
P-43065	A straight galvanized iron strap for use with No. 21 type condensers as shown in the illustration of the No. 33B, D and F condensers.
P-48022	A straight galvanized iron strap for use with the No. 21 type condenser as shown in the illustration of the No. 33A condenser.

CONNECTING BLOCKS



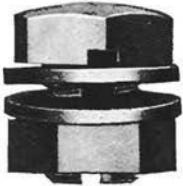
No. 1A—Connecting Block



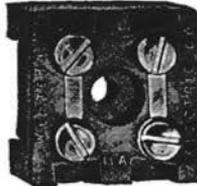
No. 8A—Connecting Block



No. 10A—Connecting Block



No. 3 Test Connector



No. 11A—Connecting Block



No. 6D—Connecting Block

Connecting Blocks

Code No.	No. of Connectors	Type of Connector	Size of Base, In.			Material—Base
			Length	Width	Thickness	
1A	3	.....	2 1/2	1 1/4	1 1/8	Composition
1D	5	.....	3 1/8	3/4	3/8	Hard Rubber
1E	10	.....	6 1/8	3/4	5/8	Hard Rubber
1F	20	Binding posts having lock nuts, with posts spun over to prevent loss of lock nuts	13 3/8	3/4	3/8	Hard Rubber
6B	22		8 5/8	1 1/8	1/2	Composition
6C	32		12 3/8	1 1/8	1 1/2	Composition
6D	42		16 1/8	1 1/8	1 1/2	Composition
6E	52		19 1/8	1 1/8	1 1/2	Composition
6F	26		10 1/8	1 1/8	1 1/2	Composition
6G	12	.....	4 1/8	1 1/8	1 1/2	Composition
8A	6	{ One screw and cord tip terminal on each connector..... }	5	1	5/8	Ebonized wood
8D	4	{ Two screw and one cord tip terminal on each connector..... }	3 1/2	1	3/8	Wood—Maple
8E	8		5 5/8	1 1/8	3/8	Wood—Maple
8F	12		8 1/8	1 1/8	5/8	Wood—Black finish
10A	14	{ Each connector has one lock nut binding post and one soldering terminal, brought out on the side..... }	4 1/2	1 1/8	1/2	Composition
10B	22		6 3/4	1 1/8	1/2	Composition
10C	32		9 1/8	1 1/8	1/2	Composition
10D	42		12 3/8	1 1/8	1 1/2	Composition
10E	52		15 1/8	1 1/8	1 1/2	Composition
11A	2	{ Two screw terminals on each connector..... }	1 1/8	1 1/2	1/8	Composition
11B	2		1 1/8	1 3/4	1/8	Composition

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

12A	3	{ Two screw terminals on each connector..... }	1 5/8	1 1/8	1/8	Composition
12B	3		1 1/8	1 3/4	1/8	Composition

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

Connectors (Bridging Test)

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

CORDS

General

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

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

There is a Western Electric cord to fit every make and style of telephone and switchboard. If none of those described below are suited to your needs, write to our nearest house, telling us of your conditions, and we will quote you prices on cords that will meet your requirements.

In ordering cords of other than standard types be sure to give as complete information as possible. It is best to send us an old cord as a sample, and, in the case of switchboard cords, one of the plugs to be used should be included.

Cord Classifications

- | | |
|-------------------------|---|
| 1. Central office cords | { Switchboard cords
Operator's telephone cords.
Miscellaneous Central Office cords. |
| 2. Telephone set cords | { Receiver cords.
Transmitter cords.
Desk stand and telephone arm cords.
Hand set cords. |
| 3. Miscellaneous cords. | |

The various types of cords are listed in the following pages under the headings given above.

SWITCHBOARD CORDS

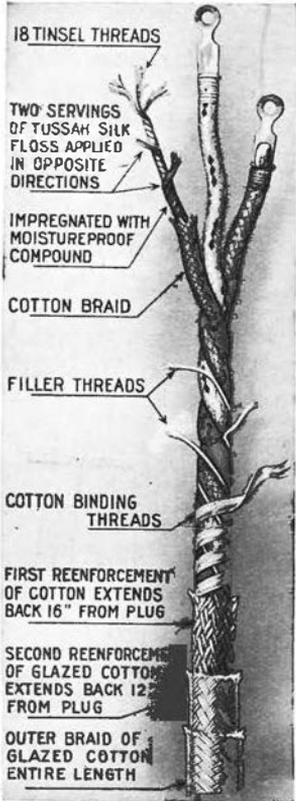
Construction

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

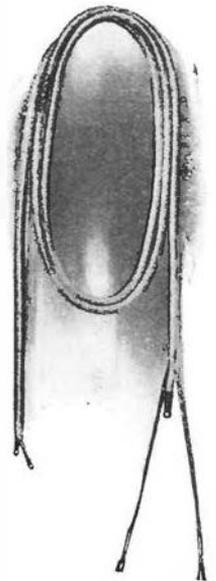
1. Six tinsel threads, each consisting of a metal ribbon wound around a strong cotton thread, are twisted together to form a strand. The tinsel thread used is of special manufacture and made under the Western Electric Company's own rigid specifications. The characteristic most strongly emphasized is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

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

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



Steps in the Construction of a Western Electric Tinsel Switchboard Cord



No. 493 Cord

CORDS

Switchboard Cords—Continued

Advantages

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

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

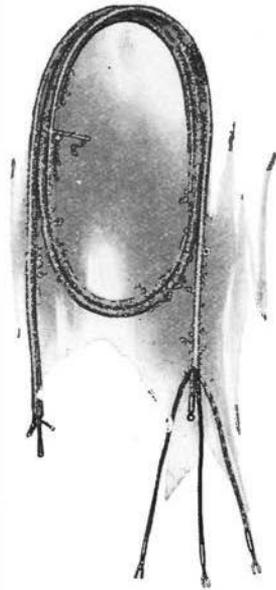
Dampness from the operator's hands has practically no effect on these cords.

3. They are easier to replug than steel conductor cords.
4. The resistance of each conductor is approximately 1 ohm (6 ft. cord) as compared with an average of 2 to 10 ohms per conductor for steel conductor cords.
5. The efficiency of the operating force is increased, due to the fact that this type of cord is much more flexible than a steel cord.
6. The current carrying capacity of each conductor is 3 amperes which is much greater than is ever necessary in telephone service.
7. The same cord can be used interchangeably for either toll or local service. It is not necessary to maintain two stocks of cords.

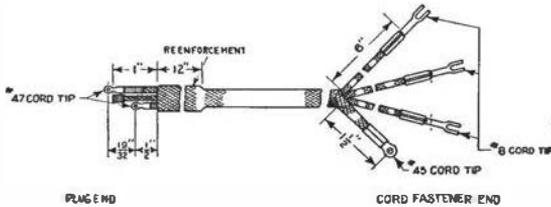
Cords having either white, red, green or black braiding can be supplied. If no color is specified, however, white cords will be furnished.

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

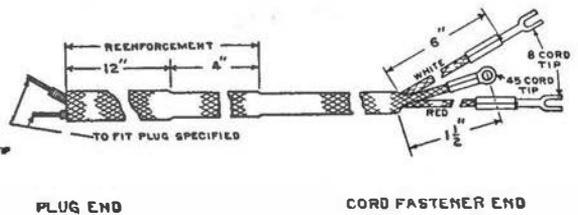
If cords are desired equipped with plugs, that fact should be mentioned in the order and the Code No. of plug desired should be specified.



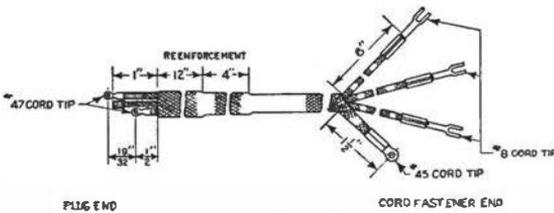
No. 447 Cord



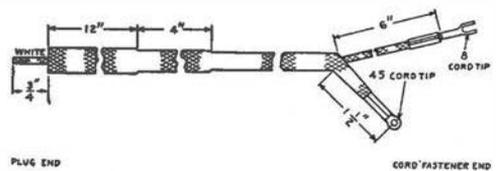
No. 447



No. 493



No. 448



No. 511

Moistureproofed Tinsel Switchboard Cords

Code No.	No. of Conductors	For W.E. Plug No.
447	3	109
448	3	110 as specified
493	2	32, 43, 47, 53 or 65 as specified
511	1	116
632	3	37, 78 as specified
635	2	110
636	2	43

Standard Lengths

- 6 ft. 3 in. and 8 ft.—unless otherwise specified 6 ft. 3 in. white cords furnished.
- 4, 5, 6 ft. 3 in. and 8 ft.—unless otherwise specified 6 ft. 3 in. white cords arranged for No. 110 plug will be furnished.
- 4 ft., 6 ft. 3 in. and 8 ft.—unless otherwise specified 6 ft. 3 in. white cords arranged for No. 47 plug furnished.
- 4 ft. and 6 ft. 3 in.—unless otherwise specified 6 ft. 3 in. white cords furnished.
- 4 ft., 5 ft., 6 ft. 3 in., and 8 ft.—unless otherwise specified 6 ft. 3 in. white cords will be furnished.
- 4 ft., 6 ft. 3 in., and 8 ft. lengths unless otherwise specified 6 ft. 3 in. white cords will be furnished.
- 4 ft., 6 ft. 3 in. and 8 ft. lengths—unless otherwise specified 6 ft. 3 in. white cords will be furnished.

CORDS
(Continued)

Switchboard Operators' Telephone Cords

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

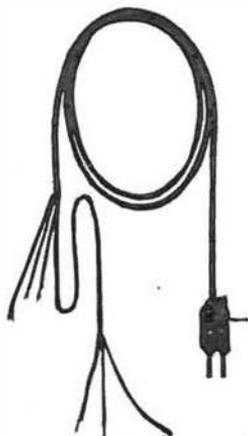
Each conductor consists of 18 threads of tinsel twisted together in 3 strands of 6 threads each.

The conductor is then given a braiding of cotton and over this a braiding of silk.

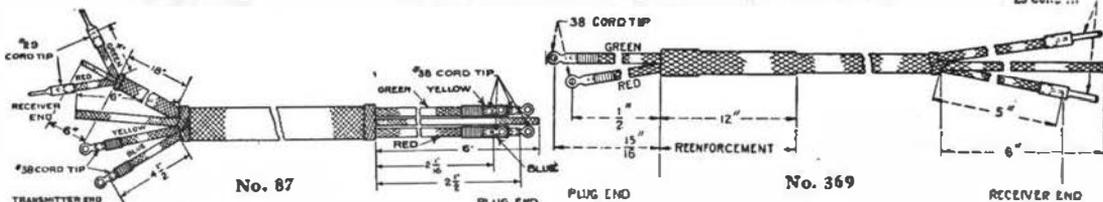
The number of conductors required to make up any desired cord are then grouped together and all covered with a heavy braiding of brown silk.

Cords having two or more conductors are furnished with conductor braiding having different standard color tracer threads, making it easy to distinguish any one conductor at either end of the cord.

In ordering be sure to specify the length desired, observing stock lengths as listed. If cord are to be equipped with cord tips other than regularly furnished as listed, the tips desired should be clearly specified as they will be considered as special. If possible, when ordering cords for use with other than apparatus of Western Electric manufacture, send a sample of the cord now in use.



No. 87 Cord Attached to No. 103 or No. 137 Plug



Code No.	Conductors	Uses	Cord Tips			Length of Terminal Ends			Std. Length Ft.	Remarks
			Swbd. End	Rec. End	Trans. End	Swbd. End Ins.	Rec. End Ins.	Trans. End Ins.		
11	3	Operators' head receiver on multiple magneto switchboards.....	62	29	...	5	5	...	5ft. 2ins.	Unless otherwise specified 4½ ft. cord furnished.
254	2	No. 128W head receiver and No. 103 or No. 137 plugs on Nos. 9 and 105 switchboards using No. 232W transmitters.....	38	29	...	2	5	...	4½ & 6	
369	..	Switchboard head receiver when attached to No. 136 plug on No. 1200 switchboards.....	38	29	...	½, ½	5	...	5ft. 7in.	
538	3	Switchboard head receiver on multiple magneto switchboards with the No. 148 plug.....	38	29	...	1	5	...	5½	Unless otherwise specified 5½ ft. cords will be furnished.
539	2	Wire chief and chief operators' head receiver with No. 148 plug.....	38	29	...	1	5	...	4 & 5½	
562	4	With the No. 137 Plug on parallel double head receiver at service observing desk.....	38	29	...	2 ¾	3	...	6	
87	4	Operator's head receiver and chest transmitter with Nos. 103, 112 or 137 plug.....	38	29	38	2 ⅞	4	4½	4, 6, 10	Unless otherwise specified 6 ft. cords are furnished.
371	4	Double head receiver and chest transmitter. Receivers connected in multiple.....	38	29	38	2 ¾	4	4½	6	
437	1	Suspended or signaling type switchboard transmitters	62	..	29	...	...	...	6	

CORDS

(Continued)

Telephone Set Cords

STANDARD TINSEL TELEPHONE CORDS

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

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

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

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

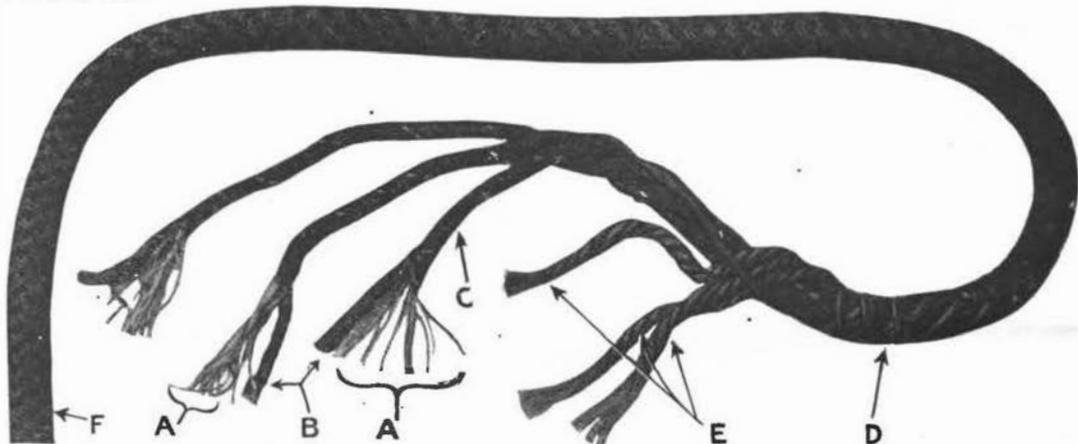
The worsted cord has its individual conductors insulated with a serving of cotton, a braiding of cotton and a braiding of worsted. The required number of conductors are then covered with a final braiding of brown worsted.

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

MOISTURE-PROOFED TELEPHONE CORDS

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

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



Construction of a Typical Three Conductor Moisture-proofed Telephone Cord

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

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

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

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

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

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

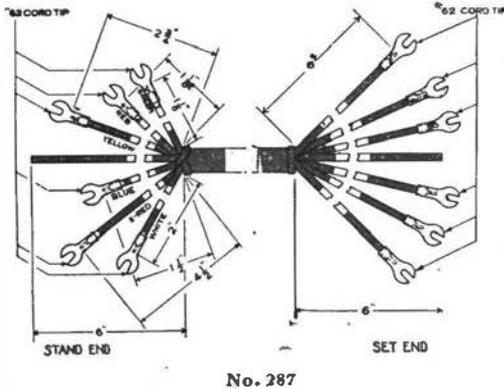
WATER-PROOFED CORDS

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

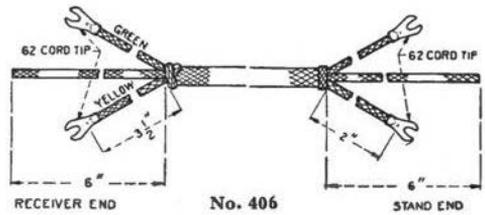
RAILWAY TELEPHONE AND INTERPHONE TYPE CORDS

Cords designed for use in connection with Railway and Interphone Apparatus are not included in the Code number listings on the following pages, but are handled separately in their respective catalog descriptions.

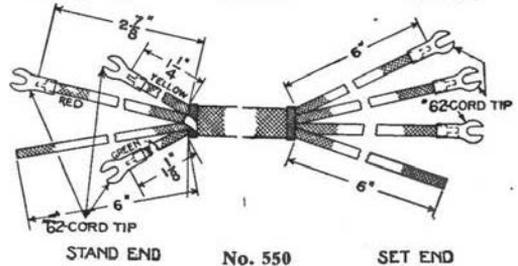
CORDS



No. 287



No. 406



No. 550

Telephone Set Cords (Continued)

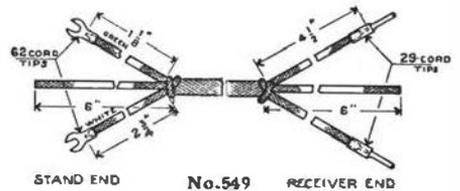
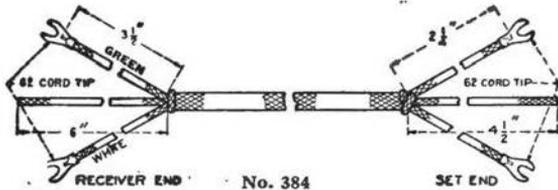
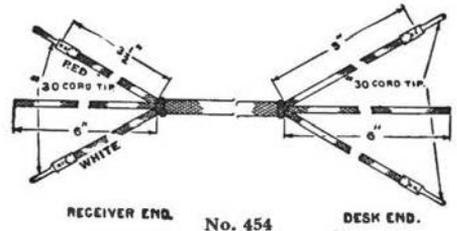
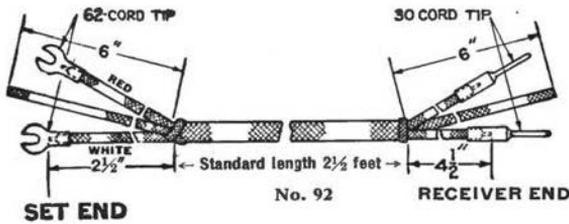
Note: The length of receiver, desk stand and telephone arm cord is measured between the points where the conductors emerge from the external braiding as shown in the cut 92 cord on page 161.

DESK STAND AND TELEPHONE ARM CORDS

Code No.	Type	Used With	No. of Conductors	Outer Braid	Cord Type		Length of Terminal Ends Inches		Box End Inches	Standard Lengths in Feet
					Stand End	Box End	Stand End	Stand End		
287	Standard Tinsel	No. 1020 CH&CN desk stands and No. 1048 type telephone arms.	6	Brown Silk	62	62	1 1/2 green 1 1/2 red 2 3/8 yellow	1 1/2 blue 4 1/2 dbl. red 2 white	6	5 1/2, 8 and 10
355	Standard Tinsel	No. 1020 CH&CN desk stands and No. 1048 type telephone arms.	5	Brown Silk	62	62	4 1/2 dbl. red 1 1/2 green 2 3/8 red	1 1/2 blue 2 3/8 yellow	8 1/2	5 1/2
406	Standard Tinsel	No. 1020 type desk stands and No. 1048 type telephone arms.	2	Gray mercerized cotton.	62	62	2 green	2 yellow	8 1/2	5 1/2
408	Moisture-proofed	No. 1020 type desk stands and No. 1048 type telephone arms.	3	Black and maroon Mercerized cotton	62	62	2 1/2 red 1 1/2 yellow	1 1/2 green	6	6
435	Standard Tinsel	No. 1020 BH desk stands.	3	Gray mercerized cotton.	62	62	1 1/2 yellow 2 1/2 red	1 1/2 green	6	5 1/2
461	Moisture-proofed	No. 1020 type desk stands.	3	Brown Silk Gray	62	28	(red 5 yellow green)		—	5 1/2
541	Water-proofed	Desk stands and telephone arms.	3	Black mercerized cotton.	62	62	1 1/2 yellow 2 1/2 red	1 1/2 green	6	5 1/2
543	Water-proofed	Desk stands.	4	Black mercerized cotton.	62	62	2 red 1 1/2 green	1 1/2 blue 1 1/2 yellow	6	5 1/2
550	Standard Tinsel	No. 1020 desk stand. No. 1048 type telephone arms.	3	Brown silk.	62	62	1 1/2 green 2 3/8 red.	1 1/2 yellow	6	5 1/2
551	Standard Tinsel	No. 1020 type desk stands.	4	Brown silk.	62	62	2 red 1 1/2 green	1 1/2 yellow 1 1/2 blue	6	5 1/2
542	Water-proofed	No. 1020 type desk stands.	2	Black mercerized cotton.	62	30	2 1/2 white 2 1/2 green		6	2 1/2

In ordering specify length, observing stock lengths as listed.

CORDS



Telephone Set Cords (Continued)

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

WALL TELEPHONE RECEIVER CORDS

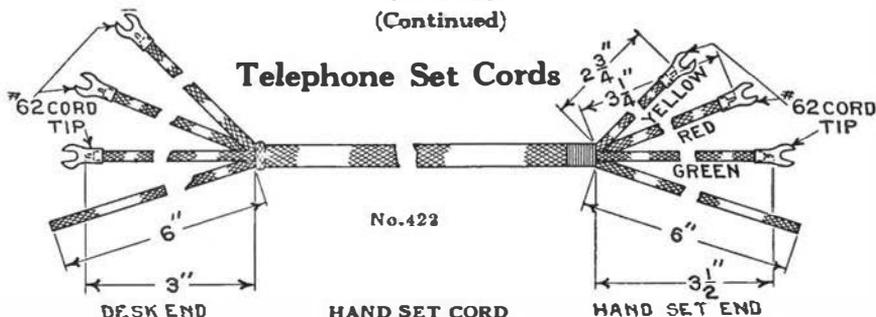
Code No.	Type	Used With	Outer Braid	Cord Type		Length of Terminal Ends (Inches)		Tracer Colors	Standard Length in Feet
				Rec. End	Set End	Rec. End	Set End		
10	Standard tinsel	Exposed binding post receivers on wall type telephones.	Brown silk	29	62	3 1/2	5	Green	2 1/2
92	Standard tinsel	Exposed binding post receivers on wall type telephones.	Brown worsted	30	62	4 1/2	5	Red White	2 1/2
384	Water-proof	No. 1336 type mine telephones and other telephones exposed to moisture and gaseous fumes.	Black mercerized cotton	62	62	3 1/2	2 3/4	Red White	10 1/2 ins.
408	Moisture-proofed	Headband receivers when used on wall telephones.	Black and maroon mercerized cotton	29 & 76	62	3 1/2	1 1/2 2 3/8	Green Green White	2 1/2
454	Standard tinsel	Exposed binding post receivers on wall type telephones.	Brown worsted	30	30	3 1/2	5	Red White	2 1/2
521	Standard tinsel	Concealed binding post receivers on wall type telephones.	Brown worsted	62	62	4 1/2	5	Green White	2 1/2
546	Moisture-proofed	Headband receivers Nos. 186W and 189W wall telephones.	Black and maroon mercerized cotton	69	62	3 1/2	5	Green White	2

DESK STAND AND TELEPHONE ARM RECEIVER CORDS

196	Standard tinsel	No. 1018 type telephone arms.	Brown silk	9	62	4 1/2	2	Green	2 1/2
408	Moisture-proofed	Headband receivers when used on desk telephones.	Black and maroon mercerized cotton	29 & 76	62	3 1/2	1 1/2 2 3/8	Red Green White	2 1/2
412	Standard tinsel	Desk stand for interphone service.	Brown silk	62		3 1/2	2 3/4	Green	3
542	Water proofed	Desk stands and telephone arms.	Black mercerized cotton	30		4 1/2	1 1/2 2 3/8	Red White	2 3/4
549	Standard tinsel	No. 1020 type desk stands and No. 1018 type telephone arms.	Brown silk	29	62	4 1/2	2 3/4	Green White	2 1/2
554	Moisture-proofed	Nos. 186W and 189W headband receivers when used with desk stands and telephone arm	Black and maroon mercerized cotton	69	6	3 1/2	1 1/2 2 3/4 1 3/4	White Green White Green	2 1/2

CORDS
(Continued)

Telephone Set Cords



Code No.	Type	Used With	No. of Conductors	Outer Braid	Cord Tips		Terminal Ends Hand Set End Inches	Box End	Standard Lengths in Feet
					Hand Set End	Box End			
318	Std. tinsel	No. 1002 A.C. band set...	3	Brown silk	56 and Loop	62	1/2 red 7 yellow 7 1/2 green	6 in.	4
422	Waterproof	No. 1001 type hand set..	3	Black mercerised cotton	62	62	3 1/2 green 3 3/4 red 2 3/4 yellow	3 in.	
574	Waterproof	No. 1061A hand set 2 cords per set.	1	Blackmercerised cotton	62	No. 2538	.....	....	5

***WALL SET AND DESK STAND TRANSMITTER CORDS**

Code No.	Type	Use and Description	Outer Braid	Tracer Colors	Transmitter End	Set End	Standard Lengths
329	Std. Tinsel.	No. 1020 type desk stand part of cord No. 430.	Brown silk.	Red	56	62	9 3/4 in.
463	Moisture-proofed.	No. 1020 type desk stand similar to the No. 329 cord.	Maroon mercerised cotton		56	62	9 3/4 in.
547	Std. Tinsel.	No. 1020 type desk stand part of cord No. 450.	Green cotton.	Dbl. Yellow	56	62	5 1/2, 8, 9 3/8 in.
548	Std. Tinsel.	No. 1020 type desk stand part of cord No. 450.	Green cotton.	Yellow	56	62	5 1/2, 8, 9 3/8 in.

HANDSET TRANSMITTER CORDS

243	Std. Tinsel.	No. 1001A handsets.	Brown silk.	Green	62	62	8 in.
336	Std. Tinsel.	No. 1002 type handsets.	Brown silk.		56	Loop	4 1/2 and 14 in.

MISCELLANEOUS TRANSMITTER CORDS

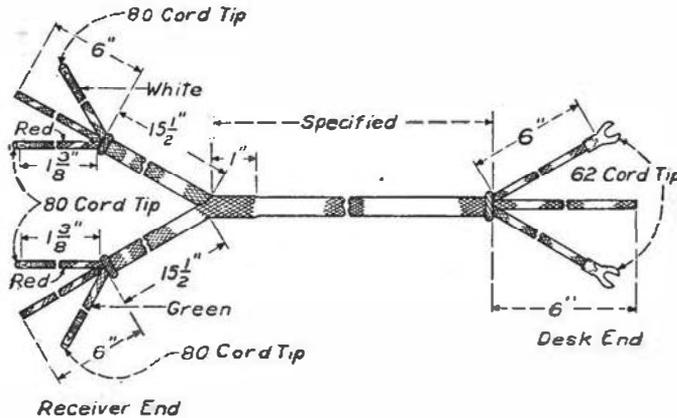
330	Std. tinsel.	Transmitter cord for use on P.B.X. switchboards.	Cotton and brown silk		56	62	5 and 8 ft.
385	Waterproofed.	No. 1336 type mine telephones.	Black cotton.		56	62	7 in.
437	Std. Tinsel.	Transmitter arms and suspended transmitters used on switchboards.	Brown silk.	Green	29	62	6 ft.

*All conductors in this listing are single conductors.

CORDS

(Continued)

Head Set, Loud Speaker and Loud Speaking Telephone Receiver Cords



No. 696

Code No.	Type	Use	No. of Conductors	Outer Braid	Cord Tips		Length of Term. Ends		Tracer Color	Standard Length
					Rec. End	Set End				
696	Std. tinsel.	For connecting two head receivers in series such as 2 No. 528BW.	2 at set end	Brown silk	80	62	15 1/2 in.	6 in.	Green White	4 ft. 3 in.
762	Tinsel cotton.	For No. 521 and No. 522 loud speaking telephone receivers.	2	Black	80	29	3 in.	1 3/8 in.	Green Red	5 ft.
763	Std. tinsel.	For No. 1002 and No. 1004 type head sets.	2 at set end	Black mercerized cotton	80	29	15 1/2 in.	6 in.	Green Red	3ft. 6in.
767	Tinsel cotton.	For No. 518W loud speaking receiver.	2	Black	62	29	2 1/2 in.	3 in.	Green Red	5ft.
768	Std. tinsel.	For No. 1002F head set with No. 47B plug.	2 at set end	Black mercerized cotton	80	(47 plug) 38	15 1/2 in.	6 in.	Green Red	3ft. 6 in.
772	Tinsel cotton.	For No. 1002 and No. 1004 type head sets similar to No. 763.	2 at set end	Black cotton	80	29	15 1/2 in.	6 in.	Green Red	3ft. 6 in.

Miscellaneous Cords

Code No.	Type	Use	No. of Conductors	Outer Braid	Cord Tips		Length of Terminal Ends		Tracer Colors	Standard Length
					Rec. End	Set End		Set End		
509	Tinsel, cotton and rubber.	Nos. 13 OF and 1331F type portable telephone set for use with No. 148 plug.	2	Black glazed cotton.	Plug End No. 62	No. 22				6 ft.
523	Tinsel, cotton and rubber.	No. 1017 type line and test set.	2	Black mercerized cotton.	Receiver end Nos. 30 and 76.	No. 30			White Red	2 ft.
540	Moistureproofed cotton stranded cotton.	For connecting dry cells. (This is merely insulated wire.)	1	Brown cotton.	Both ends bared for a distance of 3/8 in.					5 in.
545	Std. tinsel.	Portable sub. set. Used with No. 148 plug.	2	Brown silk	38	62	1 in.	5 in.	Green Red	6 ft.
736	Waterproofed Tinsel.	No. 1017 type test set.	2	Black mercerized cotton.	No. 62-13 Universal test clips.	62	Test End 2 ft.	4 in.	Green White	6 ft.
735	Std. Tinsel.	Desk stands for portable use. Used with No. 148 plug.	3	Brown silk.	Finished for No. 148 plug.				Yellow Red Gre	6 1/2 ft

In ordering specify length, observing Standard lengths as listed.

CORDS
(Continued)

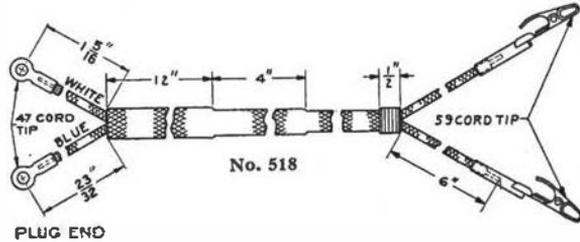
Miscellaneous Central Office Cords

Cords that are used for miscellaneous purposes in a telephone central office must be of the highest quality obtainable and this is especially true of those cords which form a part of testing circuits. Otherwise the results of the wire chief's testing will not be reliable.

That the Western Electric testing cords meet these exacting requirements is attested to by the fact that there are many thousands in daily use in the largest local and long distance telephone exchanges in the country.



No. 555 Cord attached to No. 147 Plug



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

Code No.	Use	No. of Conductors	Outer Braid	Length of Terminal Ends	Cord Tips	Standard Lengths
*510	Patching, arranged for No. 116 lug on each end.....	1	White Glazed Cotton	3/4 in. both ends	2 No. 75	2, 4 and 6 ft.—unless otherwise specified 2 ft. furnished.
*515	Patching arranged for No. 110 plug.....	2	Red White	1 1/8 in. both ends	4 No. 47	3 ft.
*516	Patching, arranged for No. 47 plug on each end.....	2	Red Glazed Cotton	3/8 and 1/8 in. cotton both ends	No. 38 both ends	1, 2, 3, 4 and 6 ft.—unless otherwise specified 3 ft. furnished.
*517	Service observing, arranged for No. 110 lug at one end and No. 143 plug at the other.....	3	Green Glazed Cotton	1 1/8 in. and 1/2 in. on one end; 6 in. long on other end	2 No. 47 2 No. 47 1 No. 59	10ft.

Code No.	Use	No. of Conductors	Outer Braid	Length of Terminal Ends	Cord Tips	Standard Lengths
*518	Service observing, arranged for tip and ring connections to No. 110 plug.....	2	Green Glazed Cotton	Plug end, 1 1/8 and 1 1/4 in. Frame end, 6 in.	Plug end, No. 47 Frame end, No. 59	10ft.
*519	No. 2A and No. 2B test boards.....	1	White Glazed Cotton	6 in.	No. 45 and No. 62 for No. 116 Plug.	3 ft.
520	Patching, arranged for No. 141 type plug on each end.....	2	White Glazed Cotton	1 1/2 ins. both ends	Loop on both ends	1, 2, 3, 4 and 6 ft.—unless otherwise specified 3 ft. furnished.
524	Service observing, arranged for No. 144 plug on one end.....	1	Green Glazed Cotton	Plug end, 3/8 in.	Plug end, loop frame end, No. 59	10ft.
716	Main frame test cord with local test desk, arranged for No. 206 plug on one end.....	4	Green Glazed Cotton	Plug end, 2 3/4 and 3 1/4 ins. Cord fastener end 6 ins.	4 No. 62	9 1/2 ft.
556	Main frame test cord with local test desk, arrange for No. 47 plug at one end and connections 3 and 4 of the No. 131 or No. 132 plug at the other end.....	2	Green Glazed Cotton	No. 47 plug end, 3/8 and 1/2 in. No. 132 plug end, 3 1/2 ins.	No. 47 plug end, No. 38, No. 132 plug end, P-107011	9 1/2 ft.
557	Main frame test cord with local test desk.....	2	Green Glazed Cotton	6 in. both ends	Cord fastener end, No. 62 frame end, No. 50	9 1/2 ft.
733	Distributing frame test cord used with local test desks, arranged for No. 137 plug on one end and for No. 206 plug on the other end.....	4	Green Glazed Cotton	No. 137 plug end, 2 3/4 and 3 1/4 ins. No. 206 plug end, 2 1/2 and 2 3/4 ins.	No. 137 plug end, No. 206 plug end, No. 38 and No. 77	9 1/2 ft.
570	Distributing frame test cord for use with local test desks.....	2	Green Glazed Cotton	No. 47 plug, 1/2 and 3/8 in. Test Clips, 6 in.	Plug end, No. 38 Clip end, No. 50	9 1/2 ft.
637	Patching cord, arranged for No. 47 plug at each end if No. 116 plug is desired order No. 510 cord.....	1	White Glazed Cotton	1/2 in.	No. 38	1, 2, 3, 4 and 6 ft.—unless otherwise specified 2 ft. length will be furnished.

*Moisture proofed. Other cords listed on this page have standard tinsel conductors.

CORD ACCESSORIES

Cord Fasteners



No. 9



No. 3



No. 5



No. 7A, 3 per strip

Code No. 9

Made of brass, tinned.

Description

The screw end is spun over. Used on cord shelves with all types of switchboard cords.

Cord Hooks

Code No. 3
5

No. 3 Type

Description

Bright iron wire screw hook; overall length, 1 1/8 inches.
Brass; overall length 1 1/8 inches.

No. 7 Type

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

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

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

Code No.	Spacing of Hooks Inches	Max. No. of Hooks per Strip
7A	3/8	14
7B	1/2	24
7C	3/4	16
7D	7/8	29
7E	5/8	19
7F	1 1/8	27
7G	1 1/4	22
7H	1 3/8	10
7J	2/8	32

To Obtain Overall Length in Ins.

- { Multiply number of hooks per strip by spacing and subtract 1/8 inch.
- { Multiply spacing by number of hooks
- { Multiply spacing by number of hooks and subtract 3/8 inch.
- { Multiply spacing by number of hooks

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



No. 101 Cord Pulley



No. 106



No. 112 Cord Pulley

Cord Pulleys

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

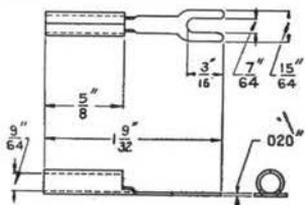
Code No. 101
106
112

Description

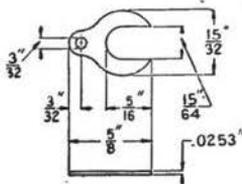
Brass frame with brass wheel 1/2 inch wide; mounting lugs at end of frame. Overall dimensions, 2 1/8 x 2 1/4 inches. The wheel rim surface is a round groove.
Brass frame and wheel 1/2 inch wide. The wheel rim surface is a sharp groove. The mounting lugs are at the side of the frame. Overall dimensions, mounting base, 1/8 x 1 1/8 inches, height overall 1 1/2 inches.
Steel frame and brass wheel. The rim of the wheel is a round groove. The rim surface is 1/4 inch wide. The steel frame is galvanized and the mounting lugs are at the ends. Overall dimensions of the mounting surface are 2 1/8 x 5/8 inches. The overall height is 2 1/2 inches.

CORD TIPS

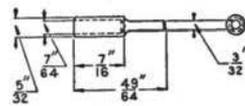
All cord tips are made of brass.



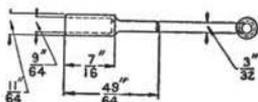
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Tinned



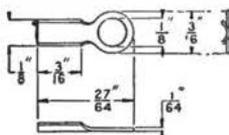
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Tinned



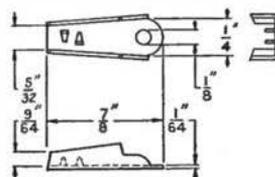
No. 29
Nickel Dipped



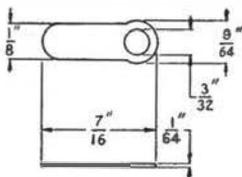
No. 30
Nickel Dipped



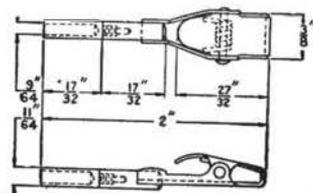
No. 38
Tinned



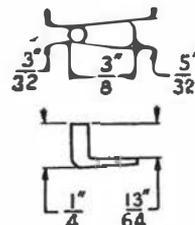
No. 45
Brass



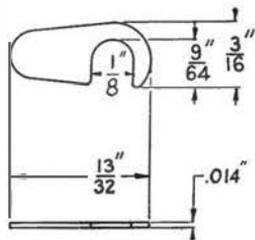
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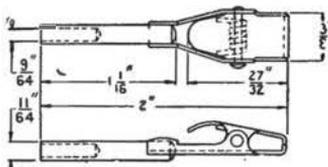
No. 50
Nickel Plated



No. 55
Tinned



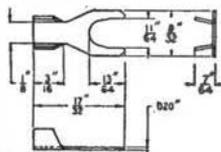
No. 56
Tinned



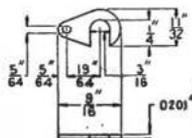
No. 59
Nickel Plated



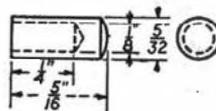
No. 61
Nickel Dipped



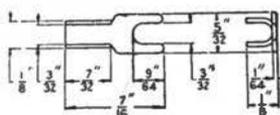
No. 62
Tinned



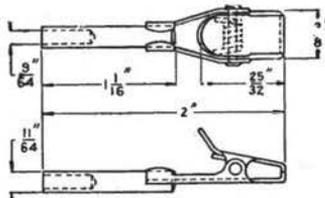
No. 67
Tinned



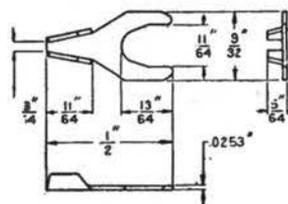
No. 80
Nickel Dipped



No. 70
Tinned



No. 71
Nickel Plated



No. 72
Tinned

CORD WEIGHTS AND CUT-IN STATIONS



No. 103



No. 117



No. 118



No. 119

Cord Weights

Code No.	Description	Used
103	14 ounce, single pulley, brass weight pulley; face 11/32 inches wide; diameter 1 inch and overall length, 4 inches.	In connection with suspended transmitters.
117	18 ounce, single pulley, brass weight. Pulley face 11/32 inches wide. Overall dimensions, 5/8 x 2 1/8 x 4 inches.	General use.
118	29 1/2 ounce, double pulley, iron weight galvanized finish. Pulley face is 1/4 inch wide; wheels spaced 2 3/4 inch centers. Overall dimensions, 1 1/2 x 4 1/8 x 7 3/4 inches.	In switchboards when double length cord are required.
119	9 1/2 ounce, single pulley, cast iron weight with galvanized finish. Pulley face is 1/4 inch wide, overall dimensions are 1 1/8 x 2 5/8 x 4 1/8 inches. Replaces the No. 116 cord weight.	No. 1240, No. 1962, No. 1948 and other types of switchboards.

Cut-In Stations

For Magneto Bridging Service



No. 319 Type

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

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

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

Unbiased ringers are used in these sets.

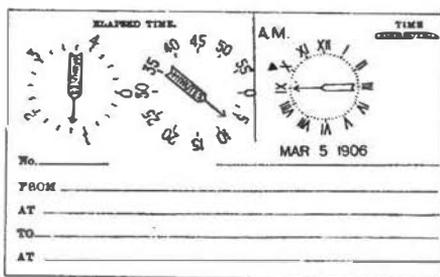
The overall dimensions are: base, 7 1/2 inch square and depth through bells, approximately 6 inches. Woodwork, oak; gongs, black.

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

CALCULAGRAPHS AND TIME RECORDERS



Style B



Style C

Calculagraphs

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

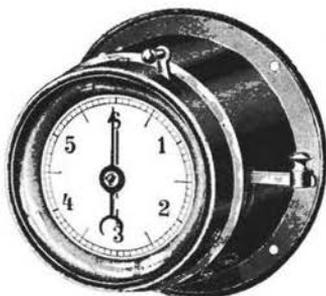
The card reproduced here is from Model 6X and shows a case in which a connection lasting six and one-quarter minutes was made at 9.45 A.M. on March 5, 1906. The size of the card used is 3 x 5 inches.

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



Style A
On Pedestal

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



Chronoscope

Chronoscope

The chronoscope is a convenient and inexpensive instrument for measuring toll or other timed telephone service. It is 3½ inches in diameter at the base and has a six-minute clock dial face. The case is of metal with an oxidized finish.

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

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

Code No.	Description
991½	Signals at 3 and 6 minutes

DESIGNATION STRIPS Wooden Type With Metal Face



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

Code No.	No. 1C		Length, Ina.		Jack Mountings Used with
	Width of Face, Ina.	Overall	Face		
1C	$\frac{1}{8}$	9 $\frac{1}{8}$	9 $\frac{1}{8}$		Nos. 1, 2, 3, 21, 22, 34, 36, 46, 47, 62, 63, 75, 77, 84, 85, 117, 118, 119, 120, 127
1D	$\frac{3}{8}$				
*1G	$\frac{1}{2}$	8 $\frac{1}{2}$	7 $\frac{3}{4}$		Nos. 18, 19, 20, 83, 102, 113
6F	$\frac{3}{8}$				
*6J	$\frac{7}{16}$	11 $\frac{1}{8}$	10 $\frac{1}{2}$		Nos. 4, 5, 6, 7, 8, 35, 37, 45, 89, 115
*54C	$\frac{7}{16}$				
10E	$\frac{1}{8}$	11 $\frac{1}{8}$	11 $\frac{1}{8}$		Nos. 108, 109, 110, 112
51A	1	6 $\frac{3}{4}$	5 $\frac{3}{4}$		Used on No. 105B Magneto Switchboard
53A	$\frac{1}{8}$	9 $\frac{1}{4}$	9 $\frac{1}{8}$		Nos. 1, 2, 3, 21, 22, 34, 36, 46, 47, 62, 63, 75, 77, 78, 85, 114
56A	$\frac{1}{2}$				

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

Wooden Type With Rubber Face



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

Code No.	No. 14A		Number Plate Arranged for	Jack Mountings Used with
	Width of Face, Ina.	Length, Ina. Overall		
2C	$\frac{1}{8}$	9 $\frac{1}{8}$	Nos. 31, 32 and 50	Nos. 1, 2, 21, 22, 34, 77, 84, 118, 119, 120, 127
14A	$\frac{3}{8}$	8 $\frac{3}{8}$	No. 30 or 60	Nos. 18, 19, 20, 83, 102, 113
50A	$\frac{1}{8}$	11 $\frac{1}{8}$	No. 31, 32 or 59	Nos. 108, 109, 110, 112
50B	Same as No. 50A, except equipped with a $\frac{1}{8}$ in. holly strip			Nos. 108, 109, 110, 112

Wooden Type With Celluloid Face



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

Code No.	No. 7A		Length, Ina. Overall	Face	Jack Mountings Used with
	Width of Face, Ina.				
7A	$\frac{1}{8}$	9 $\frac{1}{8}$	9 $\frac{1}{8}$		Nos. 1, 2, 3, 21, 22, 34, 36, 46, 47, 62, 63, 75, 77, 84, 85, 117, 118, 119, 120, 127
7B	$\frac{3}{8}$				
*7C	$\frac{1}{2}$	8 $\frac{1}{2}$	7 $\frac{3}{4}$		Nos. 18, 19, 20, 83, 102, 113
13A	$\frac{3}{8}$				
*13B	$\frac{7}{16}$	11 $\frac{1}{8}$	10 $\frac{1}{8}$		Nos. 6, 7, 8, 35, 37, 45, 89
*13D	$\frac{7}{16}$				
24A	$\frac{1}{8}$	11 $\frac{1}{8}$	11 $\frac{1}{8}$		Nos. 108, 109, 110, 112
55A	$\frac{1}{8}$				
55B	$\frac{1}{2}$				

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

Metal Type

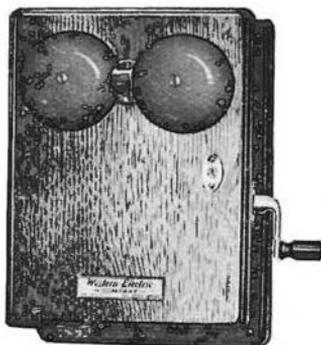


These consist of a black finish metal retaining strip. The Nos. 8G, H and K also have a transparent celluloid strip for protecting a strip of printed figures. Mounting screws are furnished.

No. 8 Type			Code No.		
Code No.	Width, Ina.	Length	Code No.	Width, Ina.	Length
8G	$\frac{1}{8}$	As specified	43B	$\frac{1}{8}$	1 $\frac{1}{2}$ ins.
8H	$\frac{3}{8}$	As specified	43C	$\frac{1}{8}$	1 $\frac{1}{4}$ ins.
8K	$\frac{3}{8}$	6 $\frac{1}{2}$ in. unless otherwise specified	43D	$\frac{3}{4}$	1 $\frac{1}{4}$ ins.

Western Electric

DESK SET BOXES



Nos. 300 and 315 Type Desk Set Boxes

Magneto Desk Set Boxes

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

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

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

Code No.	Generator		Ringer				Condenser	Ind. Coil	Telephone Signals by Sending Out	Ringer in Telephone Is Signalled With	Method of Signalling Employed by Telephone User	Method of Signalling Employed for Signalling Telephone	Line Conditions as Regards Load
	Code No.	Current	Code No.	Resistance (Ohms)	Current	Bias Feature								Cong

No. 300 Type—With No. 48 Type Generators

300K	48A	A.C.	51BG	2500	A.C.	None	29A	None	13	} A.C.	} A.C.	} Code ringing	} Code ringing	} Heavily loaded
300L	48A	A.C.	51FG	1600	A.C.	None	29A	None	13					
300M	48A	A.C.	51FG	1600	A.C.	None	29A	21W	13					
300V	48A	A.C.	51BG	2500	A.C.	Non	29A	21W	13					

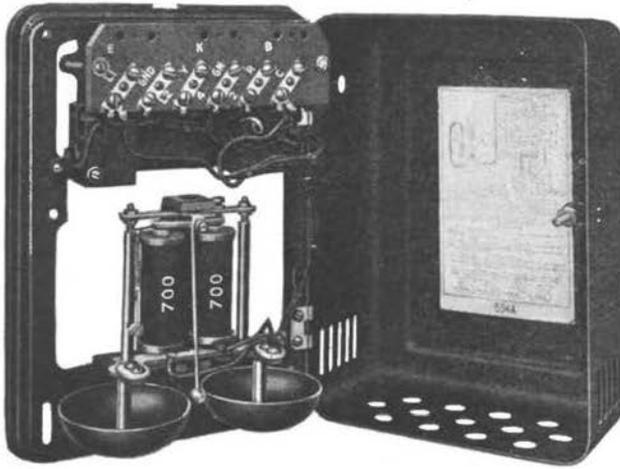
No. 300 Type—With No. 50 Type Generators

300AA	50A	A.C.	51BG	2500	A.C.	None	29A	None	13	} A.C.	} A.C.	} Code ringing	} Code ringing	} Heavily loaded
300AB	50A	A.C.	51FG	1600	A.C.	None	29A	None	13					
300AC	50A	A.C.	51BG	2500	A.C.	None	29A	21W	13					
300AD	50A	A.C.	51FG	1600	A.C.	None	29A	21W	13					

No. 315 Type—With No. 22 Type Generator

315H	22A	A.C.	51AG	1000	A.C.	None Spring and Screws	29A	None	13	A.C.	A.C.	Code ringing	Code ringing	Lightly loaded
315J	22E	A.C.	49BG	2500	P.C.		29A	None	13	A.C.	P.C.	Can only signal central	Four-party selective	Lightly loaded

DESK SET BOXES



No. 534 Desk Set Box—Open



No. 534 Desk Set Box—Closed

CENTRAL BATTERY—NO. 534 TYPE

Combinations of Desk Stands and 534A-, E, F, G, H, K and AR Desk Set Boxes will be found under No. 6054 Type Telephones.

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

Code No.	*Used With Desk Stand	Contents of Desk Set Box					Talking Circuit	Kind of Ringing	Ringing Current
		Code No.	Resistance (Ohms)	Conden-ser	Relay	Induction Coil			
534A	1020AL	8AG	1400†	21AP	.....	46	Std.C.B.	Single party and 2 party selective	AC
534AR	1020AL	42AG	1000 & 3000	21AP	85J	46	Std.C.B.			4 party selective	PC
534E	1020AL	41SG	}	21F	.....	46	Std.C.B.	Harmonic	4 or 8 party selective
534F		38 3/8 cycles							
634G		41TG 50 cycles							
534H		41UG 66 3/4 cycles							
534K	1020AH	8AG	1400†	21F	.....	None	Series C.B.	Single party and 2 party selective	AC
534C***	1020AL	None	.....	21AP	.....	46	Std.C.B.		
534D**	None	8AG	1400†	21AP	.....	None	.....	
534Y	1020AL	8AG	1400†	21AP	.....	13	Local Batt. Talking Cent. Batt. Signaling		
534R****	1020AL	8JG	3500	21AP	.....	46	Std.C.B.		

*The desk stands here listed do not form a part of the Desk Set Box.

**This merely an extension bell.

***This is used principally where the signals will be received by an adjacent telephone on the same line.

****Has high impedance ringer; used on two party selective or four party semi-selective lines where inductive noises are encountered.

†Note—The No. 8AG ringers were formerly wound to 1000 ohms instead of 1400 ohms. The 1000 ohm and 1400 ohm ringers have the same impedance and may be used interchangeably in service.

DESK STANDS



No. 1020 Desk Stand

No. 1020 Desk Stand (Dismantled)

No. 1020 Type Desk Stand

The Western Electric No. 1020 type represents the simplest form of desk stand that has ever been produced, there being but three principal units exclusive of the transmitter and receiver, namely: the terminal plate and switchhook assembly, the base and stem assembly and the base plate assembly. The switchhook lever acts directly upon the main spring of the switch, no intermediate parts being interposed to increase the chance of trouble. The entire terminal plate and switchhook assembly may be withdrawn from the stem and base assembly for inspection without disconnecting the cords or interrupting the service in any way. This is accomplished by merely removing one screw from the bottom of the base plate.

The transmitter lug holder is so designed that the transmitter may be tilted to the desired angle and will remain in that position without any further attention on the part of the telephone user.

The bottom and edges of the base plate are covered with felt so as to prevent damage to highly finished surfaces.

The contact springs are of nickel silver, backed up with stop springs. The adjustment is positive and permanent. The terminals are of an improved machine screw type.

All current carrying parts are insulated from the frame.

The standard finish of desk stands is a dull black japan (baked on) that is extremely durable.

The No. 1020 type desk stand is very rugged in construction and so balanced that the chance of its being overturned is reduced to a minimum.

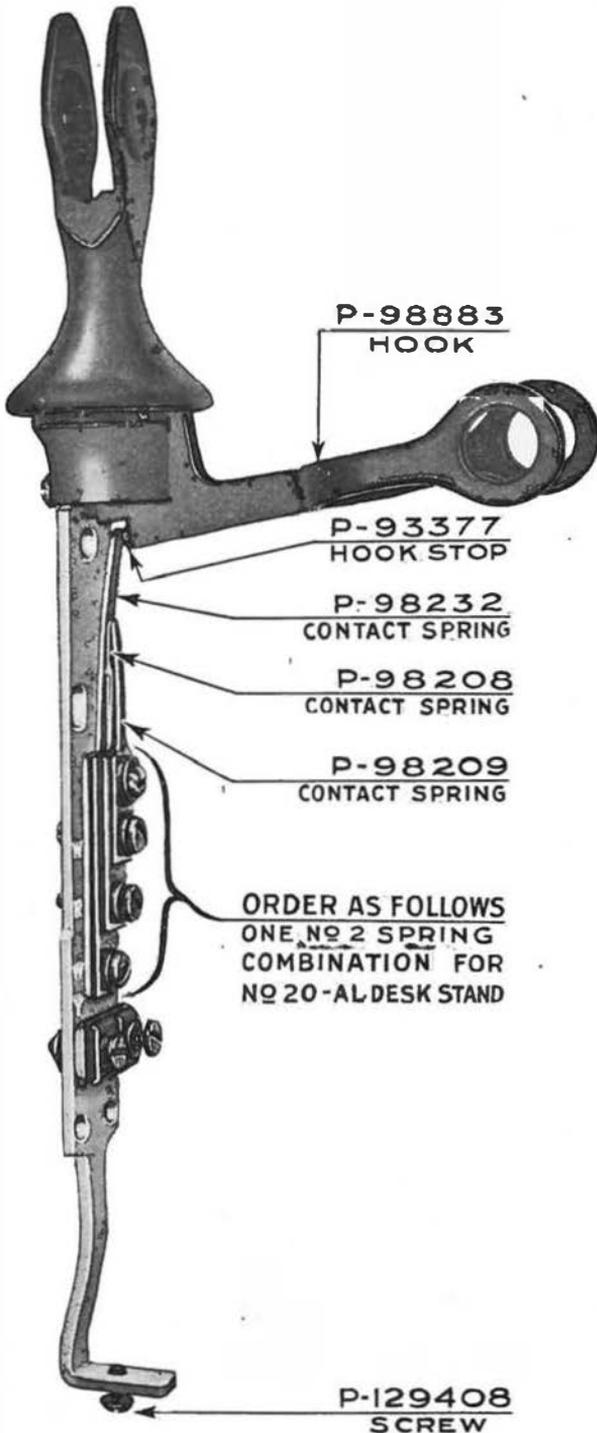
Because of the simplicity of design and the high quality of the apparatus and materials used, the cost of maintaining Western Electric desk stands is practically nothing.

Code No.	Finish	Contact Spring Combinations	Transmitter	Receiver	Cords			Service
					Rec.	Trans.	Desk Stand	
1020AL	Black	Two make contacts	323BW*	143AW	No. 549 2 3/4 ft. long	No. 5 7 No. 548 9 1/2 ins. long	No. 5 0 5 1/2 ft. long	Standard desk stand for central battery and local battery service.
1020AH	Black	One make contact	323BW*	171W (magnetless)	No. 535 2 3/4 ft. long	No. 329 No. 330 9 1/2 ins. long	No. 406 5 1/2 ft. long	Series central battery.
1120CN	Black	Two make and one break	323BW*	143AW	No. 412 2 3/4 ft. long	No. 47 No. 548 9 1/2 ins. long	No. 355 6 1/2 ft. long	Special service requiring a back contact desk stand.

*The No. 323W will be furnished until the stock is exhausted.

Western Electric
DESK STANDS

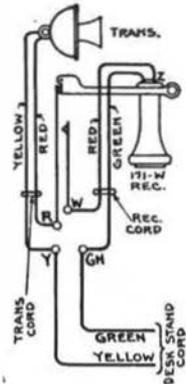
*Parts for No. 20AL Stands



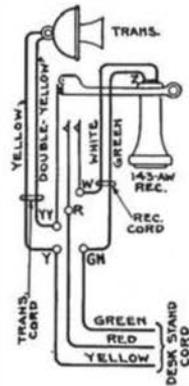
No. 20AL Desk Stand

*The 20AL desk stand when equipped with transmitter, receiver and cords becomes a No. 1020AL desk stand.

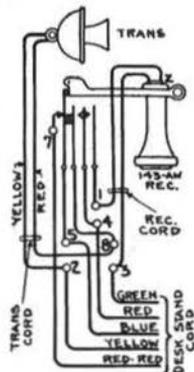
Desk Stand Wiring Diagrams



No. 1020AH



No. 1020AL



No. 1120CN

Western Electric

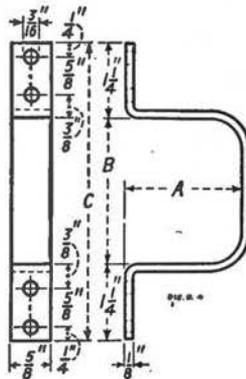
DISTRIBUTING RINGS



No. 1



No. 3



No. 4

Distributing Rings

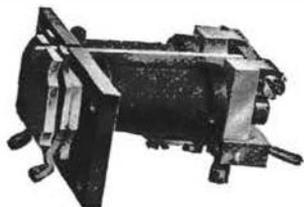
Code No.	Dimensions	Nos. 1, 2 and 3 Types		Use
		Description		
1	2 7/8 ins. inside diameter 3 7/8 ins. outside diameter	Steel, with hard vulcanized rubber covering	Main and intermediate distributing frames Main distributing frames.	
2	3 7/8 ins. inside diameter 4 7/8 ins. outside diameter	Steel, with hard vulcanized rubber covering		
3	3 ins. inside diameter 4 ins. outside diameter	Steel, with hard vulcanized rubber covering		

Code No.	Material	No. 4 Type			Use
		Dimensions, Ins.			
		"A"	"B"	"C"	
4A	Steel, black finish	1 7/8	2 5/8	4 7/8	No. 23 and similar type cable terminals.
4B	Steel, black finish	2 7/8	3 5/8	6 7/8	
4C	Steel, black finish	2 7/8	5 5/8	8 1/8	



Wire Insulating and Twisting Department, Hawthorne Works

DROPS



No. 4A Drop



No. 22A Drop



No. 35A and 56A Drop

DROPS

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

The No. 4, 35 and 56 drops are manually restoring.

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

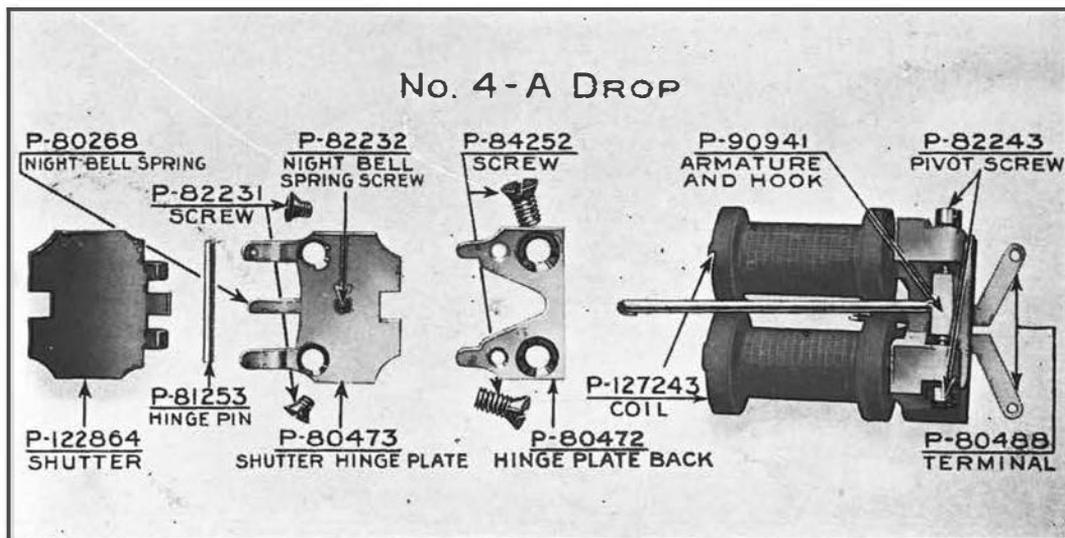
The No. 35 type drop is equipped with two windings, one front, and one back, in order that it may be used in elective signaling. When so used, the middle of the winding (and one side of the associated ringing generators) is grounded.

All drops will operate on alternating ringing current.

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

Code No.	No. of Windings	Approximate Resistance (ohms.)	Finish on Shutters
4A	1	90 (combined)	Black
4C	1	1000	Black
22A	2	700 (Line) 45 (Restoring)	Aluminum
35A	2	285 (each)	Black
35B	2	500 (each)	Black
35C	2	{ 10.05 (inner) 11.30 (outer)	Black
35E	2	341 (each)	Black
56A	1	525	Black
56B	1	670	Black
56L	1	670	Brass
56F	1	525	Black

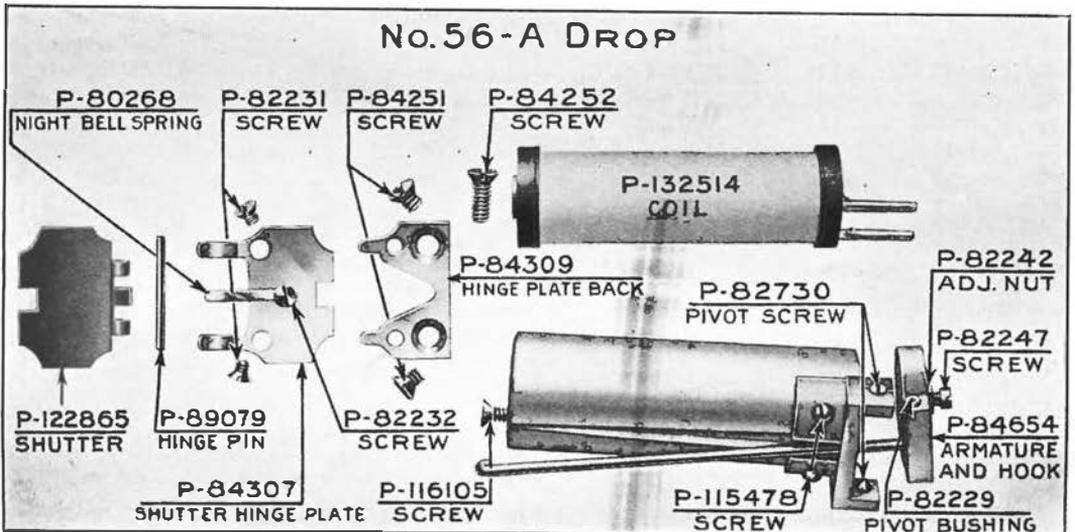
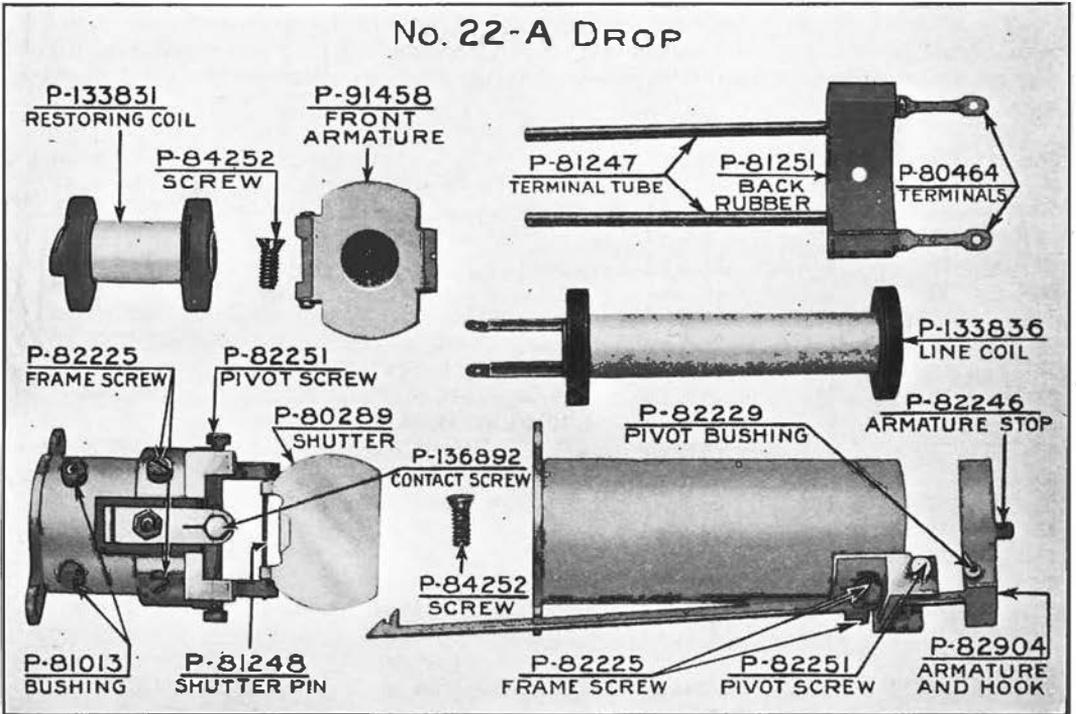
Piece Parts for No. 4A Drop



DROPS

(Continued)

PIECE PARTS FOR No. 22A AND No. 56A DROPS



DROP MOUNTINGS AND SPACES

No. 58 Drop Mounting

Drop Mountings

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

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

Code No.	Number per Strip	Center Inches	Size of Plate Inches	For Drops Number	Used on Switchboards Number
2	10	1 3/8	15 x 1	4, 35	101, 102, 1006, 1010, 1011
6	5	1 3/8	8 1/8 x 1	4, 35, 56	
9	10	1	11 1/2 x 1	56	
43	10	1	10 1/2 x 1	56	
53	2	1 1/8	2 1/8 x 1 3/8	56	
56	20	1 1/2	24 1/8 x 1	55, 56	9, 1800
57	15	1 3/8	24 1/8 x 1	4, 19, 35, 42, 44, 46, 51, 52, 55, 56	1102
58	15	1 3/8	21 3/4 x 1	4, 19, 35, 42, 44, 46, 51, 52, 55, 56	105, 1005
60	4	2	9 x 1	4, 19, 35, 42, 44, 46, 51, 52, 55, 56	
64	5	1 1/2	8 1/2 x 1	19, 35, 56	106
65	5	1 1/2	8 1/2 x 1 1/2	4, 35, 56	106
68	5	1 3/4	11 1/8 x 1	4, 35, 56	
69	10	1	11 1/8 x 1	56	10
71	15	1 1/4	21 3/4 x 1	56	1200 type
72	15	1 1/4	23 1/4 x 1	56	1200 type
73	10	1 1/2	17 3/4 x 1	4, 56	1200 type
74	15	1 1/8	17 3/4 x 1	56	1200 type
75	10	1 3/8	15 1/8 x 1	4, 35, 56	1800 type
76	4	1 1/2	7 3/4 x 1	4, 35, 56	1800 type
77	6	1 1/2	10 3/4 x 1	4, 35, 56	1800 type
78	20	1	21 3/4 x 1	56	1200 type
79	8	1 1/4	21 3/4 x 1	56	1200 type
80	10	1 1/4	21 3/4 x 1	56	1200 type
81	8	1 1/4	23 1/4 x 1	56	1200 type
82	10	1 1/4	23 1/4 x 1	56	1200 type
83	5	1 3/8	7 3/4 x 1	35, 56	
84	5	1 3/4	9 1/8 x 1	35, 56	
85	10	1	11 1/8 x 1	56	
86	9	1	9 1/2 x 1	56	
87	8	1 3/4	10 3/4 x 1	35, 56	1800 type

Drop Spaces

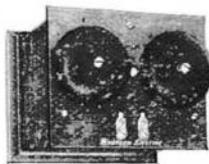
Wooden strips with ebonized face arranged to mount interchangeably with drop mountings as listed below. Intended for use in place of drop mountings when a switchboard is not fully equipped.

Code No.	Size of Face Inches	Corresponding Drop Mountings	Code No.	Size of Face Inches	Corresponding Drop Mountings
2	15 x 1	2	12	21 3/4 x 1	58, 71, 78, 79, 80
6	8 1/8 x 1	6	13	8 1/2 x 1 1/2	65
7	24 1/8 x 3 3/4	56, 57	14	17 3/4 x 1	73, 74
11	24 1/8 x 1 3/4	56, 57	15	24 1/8 x 3 3/4	

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

Western Electric

EXTENSION BELLS



No. 43 and 127 Types

Extension Bells

FOR ALTERNATING, PULSATING AND HARMONIC CURRENT

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

No. 43 Type

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

Code No.	Ringer	Approx. Resistance—Ohms	Gongs	Dimensions, Ins.	Operating Current
43F	6AG	*1400	29A	5 ⁵ / ₈ x 5 ⁷ / ₈ x 4 ⁵ / ₈	} A.C.—biased to prevent tapping
43AC	55A	1000	29A	6 ¹ / ₂ x 5 ¹ / ₂ x 4 ⁷ / ₈	
43AD	55B	2500	29A	6 ¹ / ₂ x 5 ¹ / ₂ x 4 ⁷ / ₈	
43AE	6J	3500	29A	5 ⁵ / ₈ x 5 ⁷ / ₈ x 4 ⁵ / ₈	

No. 127 Type

These extension bells consist of a ringer mounted on the cover of an oak box. Approximate overall dimensions: 6 ¹/₂ inches wide by 5 ⁷/₈ inches high by 4 ⁷/₈ inches deep. The standard finish is golden oak.

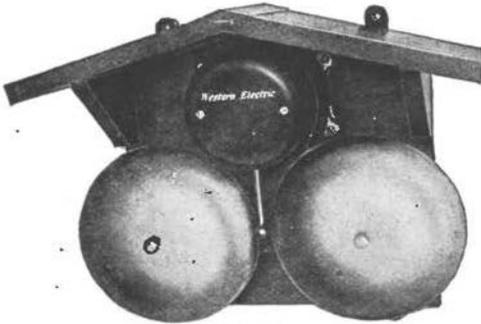
Code No.	Ringer	Resistance, Ohms	Gongs	Condensers	Operating Current
127A	6AG	*1400	29A	21AN	A.C.—biased to prevent tapping
127E	38AG	1020	26A	.....	A.C.—not biased
127F	38BG	2500	26A	.....	A.C.—not biased
127G	38FG	1620	26A	.....	A.C.—not biased
127L	41RG		29A	21F	Harmonic—16 ³ / ₈ cycles
127M	41SG		29A	21F	Harmonic—33 ¹ / ₈ cycles
127N	41TG		29A	21F	Harmonic—50 cycles
127P	41UG		29A	21F	Harmonic—66 ³ / ₈ cycles

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

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

EXTENSION BELLS

(Continued)



No. 342G



No. 392A

Nos. 342 and 392 TYPES—LOUD RINGING

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

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

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

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

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

- One 21D condenser.
- One Condenser Strap P-43065.
- Two Condenser Mounting Screws P-122026.

No. 392 Type—Loud Ringing

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

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

No. 342 Type—Loud Ringing

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

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

Nos. 392 and 342 Type Extension Bells—Biasing Attachments

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

Code No.	Biasing attachment for Nos. 392 and 342 type extension bells.
D-76014	

FANNING STRIPS AND FUSES



No. 2 Fanning Strip

Fanning Strips

Made from well seasoned maple. The overall dimensions are $1\frac{1}{8}$ x $\frac{1}{2}$ inch with lengths as given below. They are designed to mount on edge and fasten in place by means of flat head screws. The outside edge is finished black, so that white characters may be painted upon this surface for identification of the various wires. The holes through which the wires are to pass have their edges carefully chamfered in order that the insulation may not be injured.

Code No.	Capacity Pairs	Length Ins.	Used with Connecting Block	Used in Cable Terminals
1	11	$8\frac{3}{8}$	6B	No. 22A
2	16	$12\frac{3}{8}$	6C	Nos. 22B, 22D
3	21	$16\frac{1}{8}$	6D	Nos. 22C, 22E
4	26	$19\frac{7}{8}$	6E	No. 23 Type
6	13	$10\frac{3}{8}$	6F	No. 23 Type
7	16	$9\frac{7}{8}$	10C	No. 23 Type
8	21	$12\frac{3}{8}$	10D	No. 23 Type
9	26	$15\frac{1}{4}$	10E	No. 23 Type



Mica Fuse, Western Union Style



Mica Fuse, Postal Style

Mica Fuses

Western Union and Postal Type

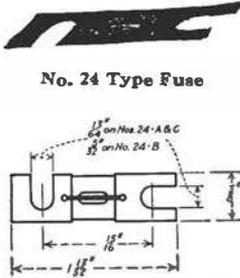
These fuses are furnished with copper or foil in either Western Union or Postal style. The fuse wire is mounted on a mica base, or inclosed between two strips of mica.

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

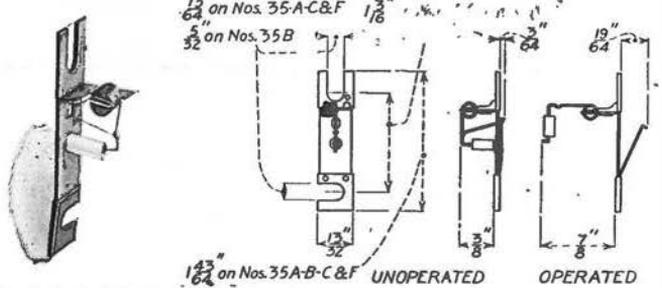
- Ampere capacity.
- Length.
- Style (whether Western Union or Postal).
- Kind of terminals or tips (copper or tin foil).
- Use (whether for exchange or telephone protection.)

Western Electric
FUSES

(CONTINUED)



No. 24 Type Fuse



NOS. 35-A-B-C & F

Mica Fuses
NON-ALARM TYPE

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

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

Code No.	Rated Capacity Amperes	Operates in Less Than One Minute on Amperes	Terminals	
			Finish	Slotted per Screw No.
24A	1 1/2	1	Tinned	10
			Tinned	10
			Copper	6
24B	2	2	Copper	6
			Copper	6
			Copper	6
24C	3	3	Copper	6
			Copper	10

Indicator Alarm Type

These mica fuses have the fuse wire so mounted that one end is fastened to a coiled spring and the other to a flat spring on the opposite side of the mica base.

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

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

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

Code No.	Rated Capacity Amperes	Terminals		Mounting Centers ins.
		Finish	Slotted for Screw No.	
35A	1 1/2	Tinned	10	1 1/4
		Copper	6	1 1/4
35B	3	Copper	6	1 1/4
		Copper	10	1 1/4
35C	2	Tinned	10	1 1/4
35F	1/2	Tinned	10	1 1/4



No. 7A



No. 7T



No. 11C

Tubular Fuses
FIBER SHELL TYPE

These 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
11C	7	Nos. 58AP and 1079 AP Protectors. . .
11D	7	No. 25 Protector Mounting (No. 12 Type P otector)

Western Electric

FUSES, FUSE BLOCKS AND FUSE POSTS

Tubular Fuses (Continued)

No. 60A FUSE

The No. 60A fuse is a sneak current fuse designed for protection of private branch exchanges in connection with the Nos. 58AP and 1079AP protectors. Consists of a red fibre tube approximately 1 1/4 inches long and 3/8 inches in diameter. Will carry .35 ampere for a period of three hours and blow on .5 ampere in less than 210 seconds.

Code No. 60A Protector Mounting No. 18 No. 80 Protector Used With 58AP 1079AP



No. 47A

No. 55A

Telegraph Fuse

WITH PORCELAIN SHELL

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

Code No. 47A Capacity 7 amperes
47B Capacity 14 amperes

WITH GLASS SHELL

This fuse consists of a glass tube equipped at both ends with tinned caps to which the fuse element is attached. The continuous carrying capacity is .4 ampere and the fuse will blow at .8 ampere. The overall length of the fuse is 2 3/4 inches; it mounts in the No. 9A fuse block.

55A .4

TELEGRAPH FUSES

Tubular telegraph fuses for use in the Nos. 2750, 2751, 2752 and 2753 fuse blocks are supplied in sizes up to 5 ampere capacity. The overall length of these fuses is 4 3/4 inches.

2760 As specified



No. 2750

No. 2753

No. 9A Fuse Block

Fuse Blocks

**WITHOUT FUSES
For Telegraph Service**

List No.	Type	Description
2750	Single	Porcelain fuse mounting, 1 x 6 inches, with one pair of brass spring fuse clips on 4 1/4 inch centers.
2751	Double	Porcelain fuse mounting, 2 x 6 inches, with two pairs of brass spring fuse clips on 4 1/4 inch centers.
2752	Single with arrester	Single porcelain fuse mounting, 1 x 6 inches, with one pair of brass spring fuse clips on 4 1/4 inch centers and two carbon block protectors.
2753	Double with arrester	Double porcelain fuse mounting, 2 x 6 inches, with two pairs of brass spring fuse clips on 4 1/4 inch centers and two carbon block protectors.
9A		Fuses for the above Fuse Blocks are listed above. A porcelain block provided with clips for holding one No. 55A fuse.



No. 2A



No. 5A



No. 7A

Fuse Posts

For Mica and Alarm Fuses

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

Fuses up to and including 1 1/2 ampere capacity are applied with tinned terminals; fuses of 2 or 3 amperes capacity have copper terminals.

Code No.	Fuse Screw No.	Finish of Screw	Used with Fuses No.
1C	10	Nickel	No. 24A, No. 35A and No. 35F
2A	10	Nickel	No. 24A, No. 35A and No. 35F
5A	10	Nickel	No. 24A, No. 35A and No. 35F
5B	10	Brass	No. 24C and No. 35C
7A	10	Brass	No. 24C and No. 35C
7B	10	Nickel	No. 24A, No. 35A and No. 35F

HAND GENERATORS AND BOXES



No. 48A



No. 50A

Hand Generators

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

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

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

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

No. 22 TYPE GENERATORS

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

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

No. 29 TYPE GENERATORS

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

No. 48 TYPE GENERATORS

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

No. 50 TYPE GENERATORS

The No. 50 type generator was designed for use on moderately loaded lines and while it only has three magnets, it is considerably more powerful than a good many five bar generators on the market, and will be found satisfactory for use on all but the very heaviest loaded lines. On a line of 12000 ohms, the No. 50 generator will operate six 2500 ohms Western Electric ringers and will operate thirty-five 2500 ohms Western Electric ringers on a line of about 1000 ohms.

The No. 50 generator is approximately 75% as powerful as the No. 48 type.

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.

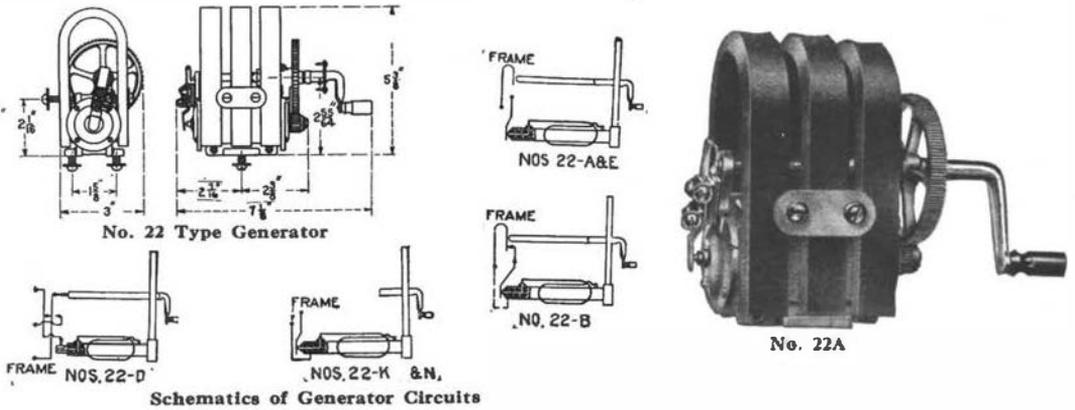


No. 299F

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

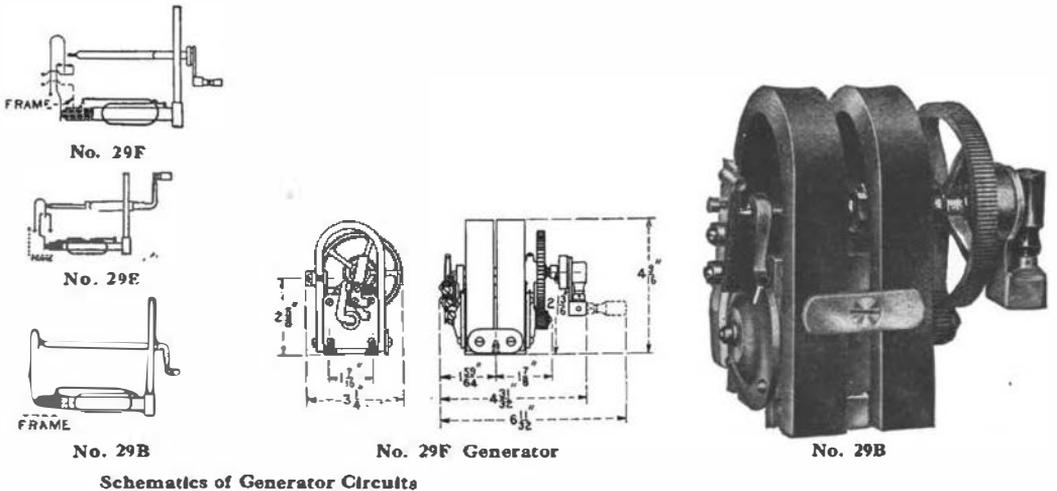
HAND GENERATORS

(Continued)



No. 22 TYPE

Code No.	Voltage and Current	Generator Circuit	Principal Use and Description
22A	60 A.C.	Open	Telephone and small switchboards.
22B	60 A.C.	Short circuited	Test sets and telephone sets.
22D	43 P.C.	Closed	Telephones and small switchboards.
22E	42 A.C.	Open	Telephones. Same as 22A except that only two magnets are used For use on lightly loaded four party selective lines.
22K	60 A.C.	Closed	Small switchboards and test sets. Has no means of opening circuit.
22N	65 A.C.	Closed	Small switchboards and test sets. Has no means of opening circuit.

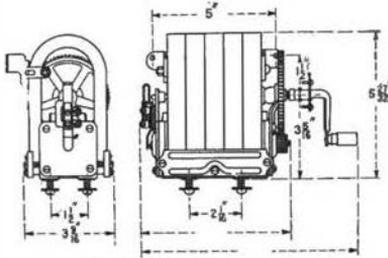


No. 29 TYPE

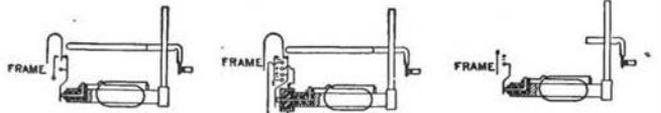
29B	30 A.C.	Short circuited	Used in 1017B test set. Has collapsible handle.
29E	65 A.C.	Open	Has back contact. Used in portable telephones.
29F	60 A.C.	Open	Portable telephones and No. 1017 type test sets. Has folding handle.

HAND GENERATORS

(Continued)



No. 48 Type Generator

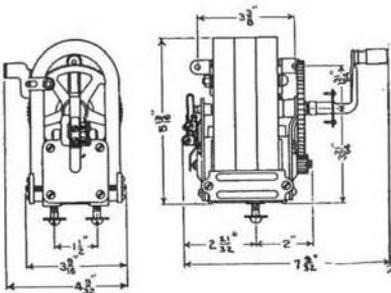


NOS. 48-A, C & G NOS. 48-B & L NOS. 48-H, J, K & P
Schematics of Generator Circuits

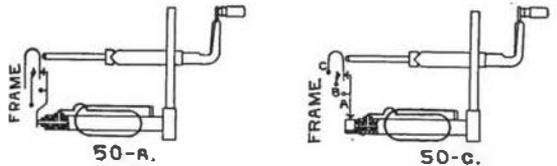
NO. 48 TYPE

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

*No switch. Closed normally and during operations.



No. 50 Type Generator

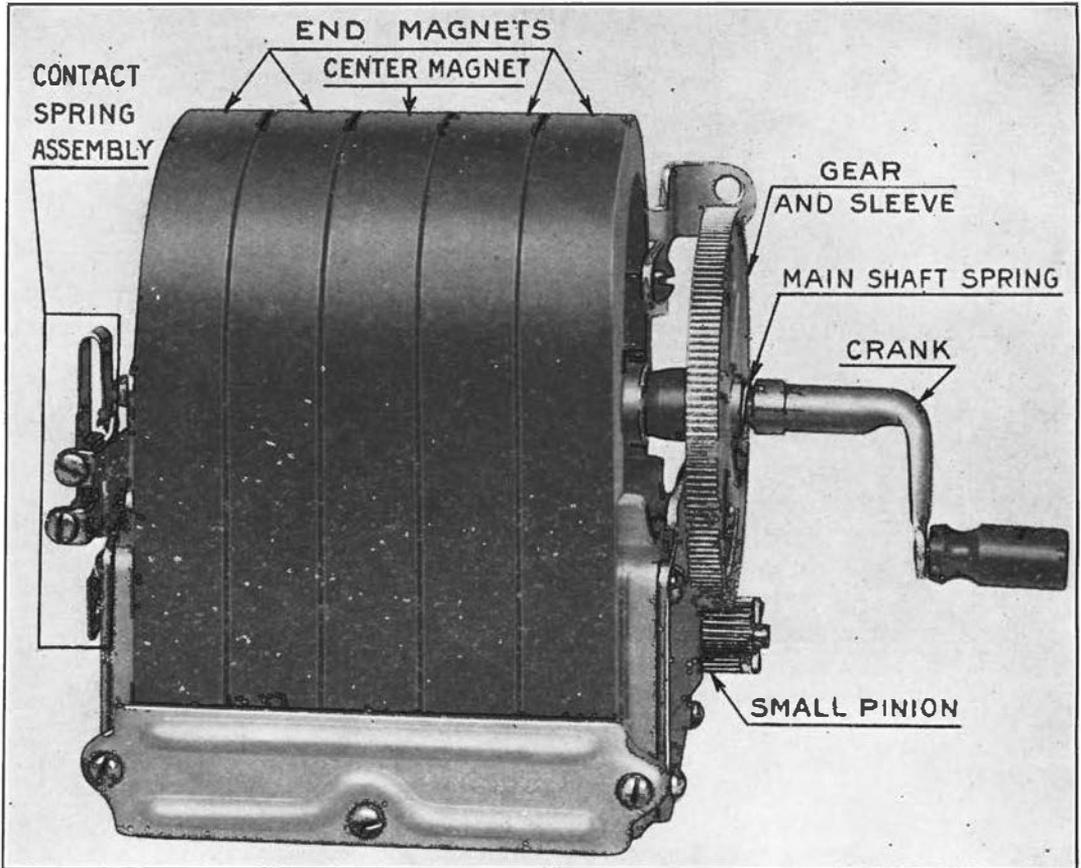


Schematics of Generator Circuits

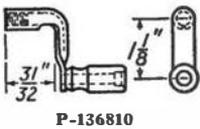
No. 50 TYPE

50A	60 A.C.	Open	For telephones for use on medium loaded lines.
50C	42 P.C.	Open or closed	For center checking telephones.
50E	60 A.C. & 38 P.C.	Open	For telephones arranged for "secret" signalling.
50F	60 A.C.	Open	The Nos. 50F, G and H generators are the same as the 50A, C, and F generators except that a shorter crank is provided and the rear mounting bracket is omitted. These generators are intended for use in telephones in which a mounting bracket forms a part of the telephone.
50G	42 P.C.	Open or closed	
50H	60 A.C. & 38 P.C.	Open	

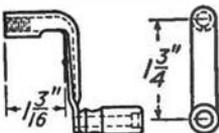
GENERATOR PIECE PARTS



Name of Part	Part Number	Generators
Contact spring assembly	See footnote † P-18383	Nos. 22A, B, D, T, BA, BD and BT
End magnets	See footnote * P-41533 P-106117	Nos. 22E and BE No. 47A No. 48A
Center magnet	P-136786 P-42979 P-136790 P-136793 P-139879 P-139885 P-139892	Nos. 50A, C, E, F, G and H Nos. 22A, B, D, T, BA, BD and BT No. 47A No. 48A
Gear and Sleeve	P-139889	Nos. 50A, C, E, F, G and H Nos. 22A, B, E, T, BA, BE and BT Nos. 22D and BD No. 47A No. 48A'
Main shaft spring	P-141097 P-19671	Nos. 50A, C, E, F, G and H Nos. 22A, B, E, T, BA, BE and BT No. 47A No. 48A
Crank	P-136810 black finish P-143210 black finish P-140300 black finish	Nos. 50A, C, E, F, G and H Nos. 22D and BD Nos. 22A, B, D, E and T Nos. 22BA, BD, BE and BT Nos. 50F, G and H No. 47A
Pinion	P-21624 P-42970 P-101493	No. 48A Nos. 50A, C and E Nos. 22A, B, D, E, T, BA, BD, BE and BT No. 47A
Armature (wound)	P-44621 P-44625 P-44626 P-129835 P-155522 P-113434 P-138552	No. 48A Nos. 50A, C, E, F, G and H Nos. 22A, B, E, T, BA, BE and BT Nos. 33D and BD No. 47A No. 48A Nos. 50A and F Nos. 50C and G Nos. 50E and H



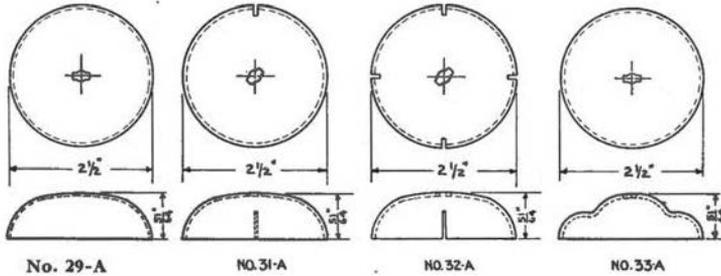
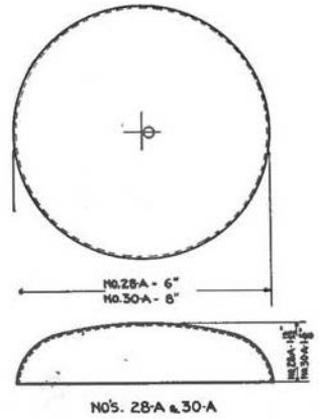
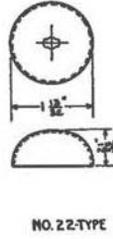
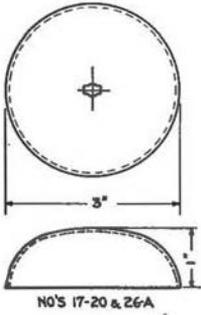
P-136810



P-140300

†Order as follows: Example: 1 contact spring assembly for No 22A generator
*The Nos. 22E and BE generators have only two magnets; P-18383 on the contact spring end and P-136786 on the crank end.

GONGS



Gong Dimension Diagram

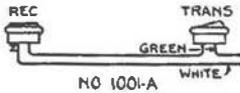
Gongs

Western Electric standard 2½ and 3 inch gongs have mounting screw holes which are slotted for engaging the projections on the gong posts of standard ringers, thus making it impossible for telephone users to inadvertently put the ringer out of adjustment by turning the gongs with the fingers (a frequent source of ringer trouble). These gongs may also be used on gong posts which are not provided with projections for engaging the "wing" holes.

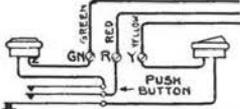
All gongs here listed are formed from sheet metal.

Code No.	Metal and Finish	Diameter Ins.	Principal Use
17	Brass, nickel plated	3	Former standard 3 in. gong for magneto telephones. No. 26A recommended.
20	Brass, special black finish	3	Finished to resist the action of moisture and fumes. For use in No. 1336 type mine telephones and other places where similar service conditions are encountered.
22A	Brass, nickel plated	1 1/2	For use on No. 40 type ringers. Each of these gongs has a different tone.
22B	Steel, nickel plated	1 1/2	
22C	Brass, nickel plated	1 1/2	
22D	Steel, nickel plated	1 1/2	
22E	Brass, nickel plated	1 1/2	
22F	Steel, nickel plated	1 1/2	
26A	Brass, black finish	3	Standard 3 inch gong for magneto telephones.
28A	Steel, hot dipped galvanized	6	No. 392 type extension bells. Mounting screw hole drilled slightly off center to permit of adjustment.
29A	Brass, black finish	2	Standard 2½ inch gong for general telephone use.
30A	Steel, hot dipped galvanized	8	No. 392 type extension bells. Mounting screw hole drilled slightly off center to permit of adjustment
31A	Brass, black finish	2 1/2	Differ from the No. 29A in that they have different tones. Intended for use where a number of telephones are placed close to each other.
32A	Brass, black finish	2 1/2	
33A	Bell metal, black finish	2 1/2	

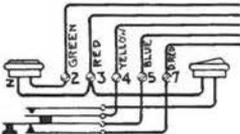
HAND SETS



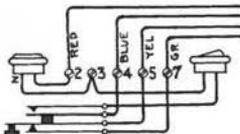
NO 1001-A



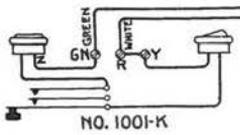
NO 1001-C, H



NO 1001-E



NO. 1001-J



NO. 1001-K



No. 1001A

No. 1001 Type

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

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

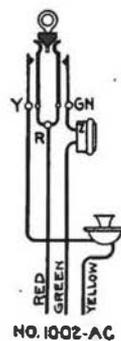
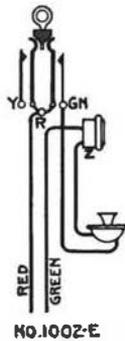
The No. 1001-C, and H hand sets are provided with a push button switch which is connected so that these hand sets function the same as the No. 1020-AL desk stand. In view of this, they may be used in connection with our regular magneto and central battery desk set boxes in place of a desk stand, in cases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

Code No.	Transmitter	Receiver	Cords		Push Button Spring Combination	Principal Use
			Code No.	Length		
1001A	244W	131W	243	8 ins.	None	Used by linemen as a test set on central battery lines. The cord is equipped with spring connection clips
			2-574	3 ft. (water proof)		
1001C	285W	131W	366	6 ft. (water proof)	2 make	Used with Nos. 1330 and 1331 portable magneto telephones
1001E	244W	131W	398	6 ft.	1 make and 1 break	Used with desk type Interphones (where 5 conductor cord is required)
1001H	244W	131W	422	5 ft. 2 ins. (water proof)	2 make	Used with No. 1375B portable magneto telephone.
1001J	244W	131W	502	6 ft.	1 make and 1 break	Used with desk type Interphones.
1001K	285W	131W	384	4 ft. 6 ins. (water proof)	2 make	Private line telephone systems.

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

HAND SETS

(Continued)



No. 1002 Type Hand Sets

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

Code No.	Transmitter	Receiver	Cords		Switch Combination	Principal Use
			Code No.	Length		
1002D	267W	141W	336	14 ins.	1 make and 1 break	Used in place of desk stands and telephone arms in connection with Interphones. Also for general use.
			402	8½ ins.		
			429	4 ft. 6 ins.		
1002E	267W	141W	(4 conductors)		1 make contact	Used in connection with a janitor's switchboard in apartment house equipment. Also for general use.
			402	8½ ins.		
			336	14 ins.		
			430	4 ft. 6 ins.		
1002AC	267W	141W	(2 conductors)		2 make	Used in place of local battery bridging or central battery desk stands. Functions same as No. 1020AJ desk stand. Also No. 1801 swbd.
			318	4 ft.		
			(3 conductors)			
			414	4¼ ins.		
			415	9½ ins.		

No. 1003 Type Hand Sets

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

Hand Set Hangers



Code No.	Description
1B	Mounts on a vertical surface for holding a No. 1001 type hand set when not in use. The hand set is suspended by its receiver, which fits into a recess in the hanger. Cast brass; black finish. Overall dimensions, 3¼ inches wide, 2½ inches deep and 3½ inches high.
1C	Same as the No. 1B, except that it is equipped with rubber studs and a spring, so arranged as to prevent the hand set from swaying. Used principally on steamships.

HEAD BANDS (RECEIVER)



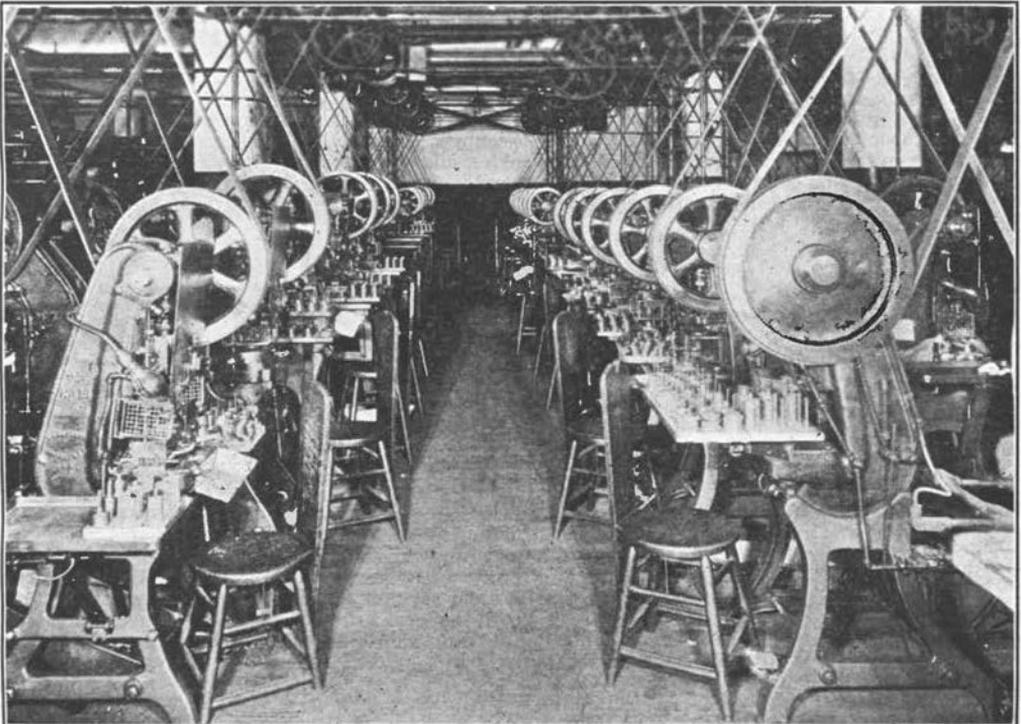
No. 3A Head Band



No. 1B Head Band

Head Bands (Receivers)

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



HEAT COILS

(Continued)



No. 73A Heat Coil

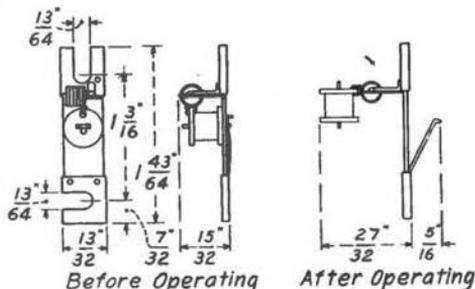


No. 40 Type Heat Coil

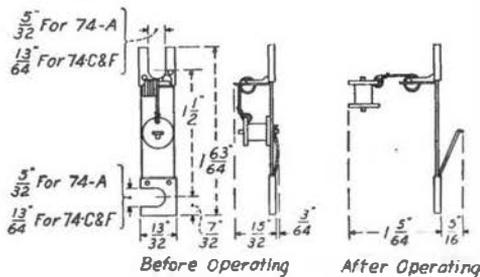
No. 73 TYPE

The No. 73A heat coil is used in the No. 1168A, No. 1168B, 1269A and 1269B protectors and in the No. 1435P, 1435H and 1435T protector groups for protecting central office equipment against sneak currents. It consists of a hard rubber shell containing an insulated wire coil over copper sleeve through which a pin passes. The copper sleeve is normally held in place by means of low melting solder, and when a current greater than that for which the device is designed passes through the special alloy wire winding, the solder melts and allows a spring on the protector mounting to press the pin against a contact, thus grounding the line. This coil is simple both as to construction and operation, and provides reliable protection to equipment in the circuits in which it is used.

Code No.	Approx. Resistance	Will Operate in 210 Sec. On Amperes	For Use As
73A	2.8	.54	Heat Coil
72A	...	...	Composition Dummy
40	...	...	Brass Dummy



NO. 74-B,D,E&G



NO. 74-A,C&F



No. 74 Type Heat Coil

No. 74 TYPE

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

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

Code No.	Rated Max.	Resistance Min.	Will Operate in 210 Sec. on Current of (Amperes)	Size of Mounting Screw Required
74A	18	16	.18	No. 6
74B	3.7	3.3	.40	No. 10
74C	7	5.5	.265	No. 10
74D	3.9	3.8	.34	No. 10
74E	7	5.5	.265	No. 10
74F	57	53	.110	No. 10
74G	57	53	.110	No. 10

Howlers

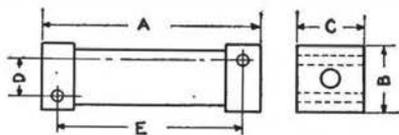
No. 1 TYPE

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



No 1C Howler

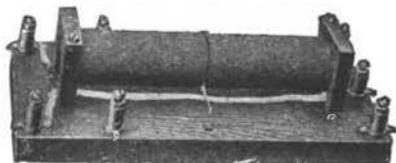
Code No.	Description	Overall Dimensions Ins.
1B	Equipped with an iron mounting bracket	7 7/8 x 3 1/8 x 2 1/4
1C	Mounted on a wooden base.	6 1/4 x 6 x 3 1/8



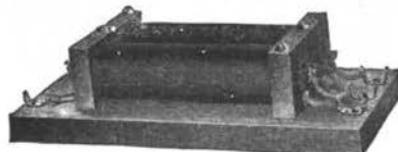
Induction Coil Dimensions



No. 5



No. 10



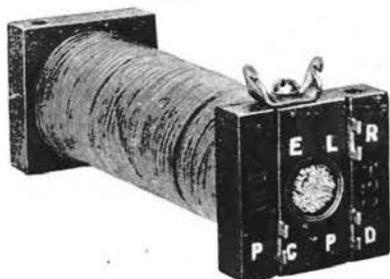
No. 24



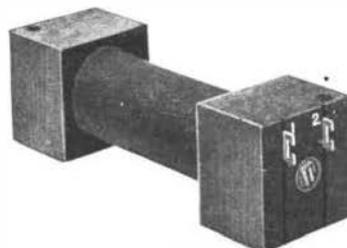
No. 23



Nos. 13, 29 and 31



No. 34



Nos. 46 and 55

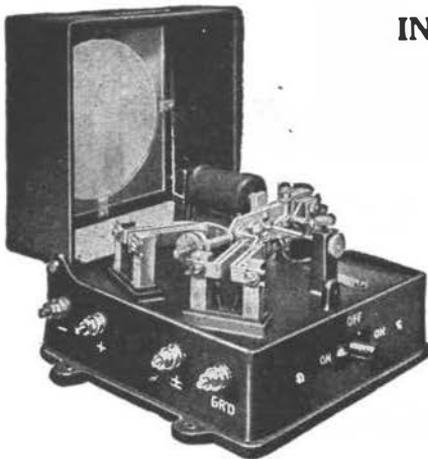
Induction Coils

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

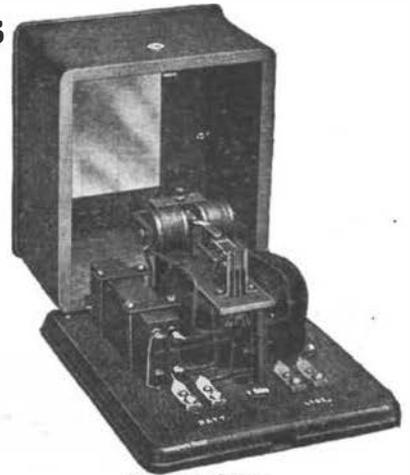
As a result of several years' research work, we have adopted a new core material which consist of a special steel alloy, used in the form of thin stripe. This new material permits of greater transmission efficiency than was heretofore possible with any induction coil core material known to the telephone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

Code No.	Description and Principal Use	Overall Dimensions, In. (See Dimension Diagram)				
		A	B	C	D	E
5	When equipped with a magnetic interrupter (P-101495), this induction coil is used for converting the current from three or four dry cells into a high frequency current for signalling bowlers and No. 1004A band sets. (See High Frequency Current Signalling Device).....	4 3/8	1 1/4	1 1/4	1 1/4	4 1/2
10	Local and toll magneto switchboards. Equipped with a wood base on which are mounted seven binding posts.....	8 7/8	4 1/2	2 3/8	...	...
13	Standard for local battery telephones.....	3 1/2	1 1/2	1 1/4	3/8	2 3/8
23	Nos. 9 and 10 central battery switchboards and associated desks, Nos. 1 and 4 P.B.X. switchboards and magneto switchboards..	4 1/2	1 1/4	1 1/4	1 1/4	3 3/8
24	No. 1 central battery switchboards and Nos. 1 and 2 toll switchboards and associated desks. Consists of two induction coils mounted side by side on a wood base together with five terminals.....	6 1/2	3 1/4	1 1/2	3/8	2 3/8
29	Train dispatching (local battery) telephones.....	3 1/2	1	1 1/4	3/8	2 3/8
31	Same as the No. 13 induction coil, except that it is treated to resist the action of moisture and fumes. Used in No. 1336 type mine telephones.....	3 1/2	1	1 1/4	3/8	2 3/8
34	Magneto multiple switchboards.....	4 1/4	1 1/2	1 1/4	3/8	3 3/8
46	Standard for central battery telephones. Is interchangeable with the No. 20 induction coil, which was formerly the standard..	4 1/4	1 1/2	1 1/4	3/8	3 3/8
55	Central battery telephones. Same as No. 46, except that it is treated to resist the action of moisture.....	4 1/4	1 1/2	1 1/4	3/8	3 3/8

Western Electric
INTERRUPTERS



No. 84A Open



No. 62A Open

Interrupters
(Pole Changers)

The Western Electric Interrupters listed below are suitable for private branch exchange service and for use with magneto switchboards and central battery equipments. They are a convenient means of obtaining alternating or pulsating current, or both, from a direct current source of energy.

The types and the various models differ in mechanical construction and circuit arrangement to suit (a) the source of current used to drive the vibrating element; (b) the source of energy used for producing ringing current and (c) the kind of current output necessary for ringing. These three points are covered in the description of each model. The interrupters may be mounted horizontally or vertically.

No. 62A TYPE

This is a ringing transformer or interrupter for furnishing alternating ringing current. All the current needed for operating the interrupter and for ringing, is supplied by a single battery of from four to eight dry cells. The alternating current is of approximately forty volts.

The outfit is designed for ringing a small number of telephone bells on a low resistance line and is suited to private branch exchange service such as is required in connection with the No. 1801 P.B.X. switchboard when serving a number of stations in the same building.

This interrupter starts quickly, and is therefore adapted for code ringing. As it operates only when a push button or local contact on a ringing key is closed, it is economical, requiring no energy except when actually ringing.

Code No. 62A

No. 84 TYPE

All No. 84 type interrupters act as electrically operated pole changers, producing ringing current from a source of direct current. They have been thoroughly tested by wide application and extended service in all branches of the operating field.

The Nos. 84A, 84C, 84F and 84G interrupter are for use in central battery offices.

The Nos. 84D and 84E models are designed for magneto exchanges.

Each No. 84 type interrupter is mounted on the top of a metal case, 8 inches square at the base, in which condensers, resistance and a switching key for starting and stopping the machine, are mounted. A metal cover with a glass window is hinged on this case and protects the moving parts. A circuit label is pasted on the inside of the cover. These interrupters occupy a small amount of space, are easy to install, have their adjustable parts readily accessible, and require a minimum amount of maintenance.



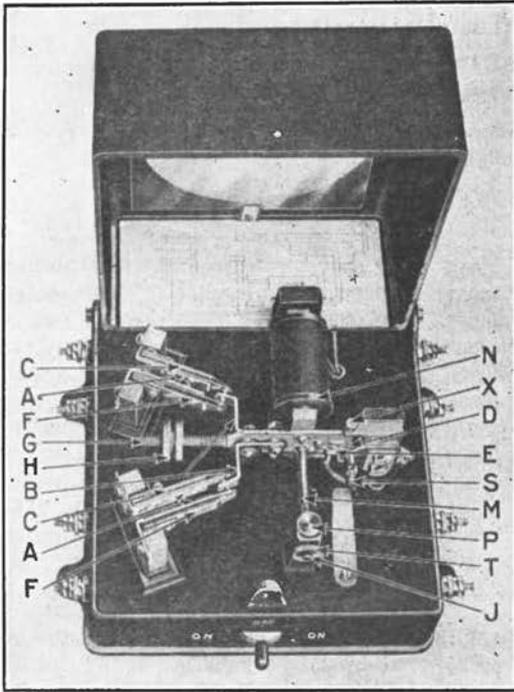
No. 84A Interrupter

Code No.

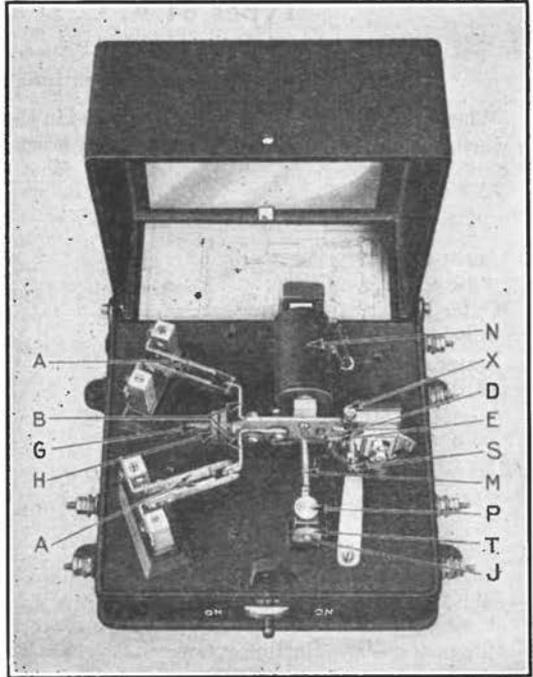
- 84A The operating coil of this interrupter is wound for current from a 24 volt storage battery. Ringing current is derived from a 100 volt battery of dry cells. The current available for ringing is positive and negative pulsating (61 volts on A.C. meter) and alternating current (83 volts).
- 84C The operating coil is wound for current from a 36 volt storage battery; it is otherwise the same as the No. 84A.
- 84D The operating coil is wound for current from a two-cell Edison BSCCO primary battery. Dry cells are used for supplying ringing current, which is alternating only, at 83 volts, when a 100 volt dry cell battery is used.
- 84 Similar to the No. 84A model but operating coil wound for two cell of Edison BSCCO primary battery. Furnishes positive and negative pulsating and alternating current for ringing.

INTERRUPTERS

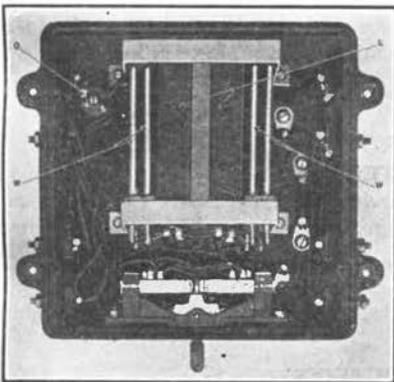
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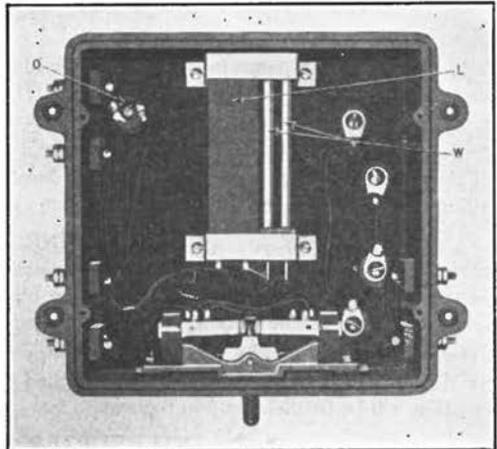
Nos. 84A, C and E Interrupter
Open View



No. 84D Interrupter
Open View



No. 84A, C and E Interrupter
Bottom View



No. 84D Interrupter
Bottom View

Interrupters
PIECE PARTS

When ordering parts listed on following page give "P" number, indicated in the column headed with the Code No. of the interrupter for which the piece part is wanted, and also give name of part.

INTERRUPTERS

(Continued)

Types 84 A, C, D and E, Interrupters

PIECE PARTS

See Illustrations on Previous Page

When ordering give "P" number, indicated in the column headed with the Code No. of the interrupter for which the piece part is wanted, and also give name of part.

Key	Name	Code No. of Interrupter			
		84A	84C	84D	84E
A	Inner ringing spring	P-46665	P-46665	P-103970	P-106359
B	Vibrator arm	P-46651	P-46651	P-46651	P-46651
C	Outer back ringing spring	P-46667	P-46667		P-106356
D	Inner magnet spring	P-46668	P-46668	P-46668	P-46668
E	Outer magnet spring	P-46669	P-46669	P-46669	P-46669
F	Outer front ringing spring	P-46666	P-46666		P-106358
G	Armature arm assembly	P-46673	P-46673	P-103975	P-46673
H	Weight nut	P-46650	P-46650	P-103972	P-103972
J	Spiral spring adjusting screw	P-46648	P-46648	P-46648	P-46648
L	Condenser	No. 21J	No. 21J	No. 21J	No. 21J
M	Spiral spring	P-106011	P-106011	P-106011	P-106011
N	Electric magnet spools	P-132829	P-128185	P-133769	P-132828
O	Resistance across contacts	No. 21B	No. 21B	Spl. No. 21 (P-103977)	Spl. No. 21 (A-38625)
P	Spring adjusting screw lock nut	P-123818	P-123818	P-123818	P-123818
S	Magnet spring adjusting screw	P-39625	P-39625	P-39625	P-39625
T	Spring adjusting screw nut	P-46649	P-46649	P-46649	P-46649
W	Resistance in series with con- denser	No. 18AC	No. 18AC	No. 18AC	No. 18AC
X	Pivot screw	P-46654	P-46654	P-46654	P-46654

HIGH FREQUENCY SIGNALLING

Code No.

D-16411 This device consists of a No. 5 induction coil equipped with a magnetic type interrupter (P-101495), a 21U condenser, a 21H condenser, a special strap key and 4 binding posts, mounted on a wooden base. The overall dimensions are 9 inches wide x 4 3/4 inches deep x 2 3/4 inches high.

The purpose of this device is to convert current from three or four dry cells into a high frequency signalling current. It is intended principally for use in signalling 1004A hand sets and 1B and 1C howlers.

MACHINE INTERRUPTERS

A large number of attachments are manufactured for use with Western Electric ringing machines. These attachments are designed for interrupting battery current and ringing current in various circuits for such uses as tone tests, howlers, busy signal and machine ringing.

The number and variety of these interrupter rings and other tone producing interrupters, make impractical their listing here. They can be supplied to meet any desired frequency of interruption; detailed information will be furnished upon request.

INTERRUPTER RINGING OUTFITS

Interrupter ringing outfits, consisting of an electrically operated interrupter (pole changer) and accessory apparatus, have been devised as economical means for furnishing ringing current in exchanges operating local battery lines and for use in central battery offices that are so small that there is not sufficient ringing load for the economical use of a motor driven ringing machine.

They may also be used where there is no source of power supply for the operators of a motor-driven machine. Where the power source is subject to frequent accidental shut downs or where the power is discontinued for several hours every night, these outfits supply a convenient means for obtaining ringing current during the power shut down period. They may also be installed as emergency equipment in exchanges having regular motor machine ringing service.

Western Electric

INTERRUPTERS

(Continued)

Interrupter Ringing Outfit No. 1

This outfit has been designed for magneto switchboard service and constitutes a complete ringing equipment which makes use of one interrupter and one set of batteries each for ringing and operating.

It consists of:

1 No. 84E interrupter for furnishing alternating and positive and negative pulsating current.

1 No. 1440 battery cabinet, oak finish, for holding one set of operating and ringing batteries.

1 BSCO No. 403 type, Edison 400 ampere hour battery for operating interrupter.

3 No. 62A protectors with 2 ampere fuses.

100 feet No. 14 B.R.C. wire.



No. 2 Interrupter Ringing Outfit, with 2 Extra Edison Batteries

Interrupter Ringing Outfit No. 2

This outfit is intended for magneto switchboard service and constitutes a complete ringing equipment which makes use of two sets of both ringing and operating batteries. It provides one complete reserve ringing outfit for emergency service. The outfit consists of:

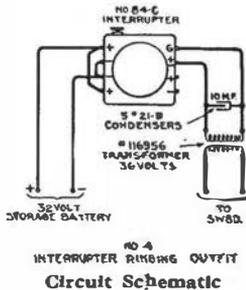
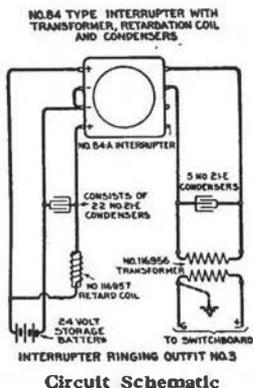
2 No. 84E interrupters for furnishing alternating and positive and negative pulsating current.

1 No. 1441 battery cabinet, oak finish, for holding two sets of ringing and operating batteries.

2 B.S.C.O. No. 403 type, Edison 400 ampere hour batteries for operating interrupter.

6 No. 62A protectors with 2 ampere fuses.

100 feet No. 14 B.R.C. wire.



INTERRUPTER RINGING OUTFIT No. 3

This outfit is intended for use in central battery central offices for furnishing straight alternating ringing current only. It makes use of an interrupter, transformer, retardation coil and condensers, and operates from a 24 volt storage battery or 18 cells of dry battery. In operating from dry batteries or any source of current other than storage battery and which is supplying at the same time current for other purposes, the retardation coil and condensers may be omitted. The small amount of current required makes the outfit economical from a maintenance standpoint.

The No. 3 outfit will ring fifty 1600 ohm bells at the far end of a 400 ohm line.

It consists of:

1 No. 84A interrupter for furnishing alternating current only.

1 No. 116956 transformer.

1 No. 116957 retardation coil.

27 No. 21E condensers.

INTERRUPTER RINGING OUTFIT No. 4

To Operate from 32 Volt Farm Power and Light Plant

This outfit is designed for use with a 32 volt farm power and light plant and will furnish straight alternating ringing current only. An interrupter, a transformer and a condenser are used.

The amount of current for operation is small and this fact makes the outfit economical from an operating standpoint. It will ring fifty 1600 ohm bells at the far end of a 400 ohm line.

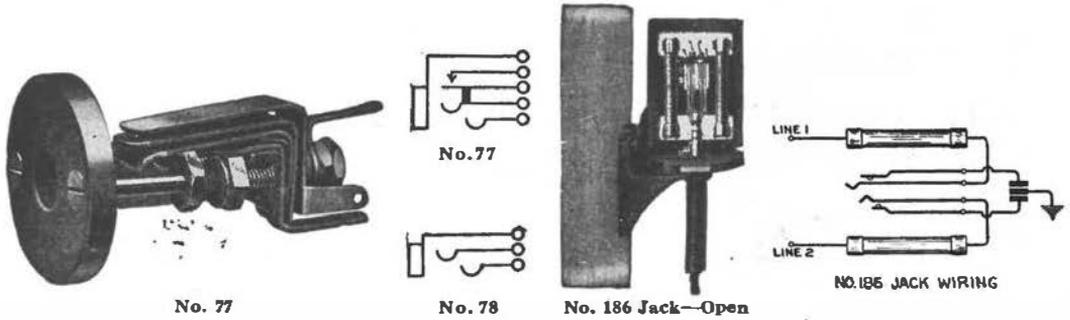
This outfit consists of:

1 No. 84C interrupter.

5 No. 21D condensers.

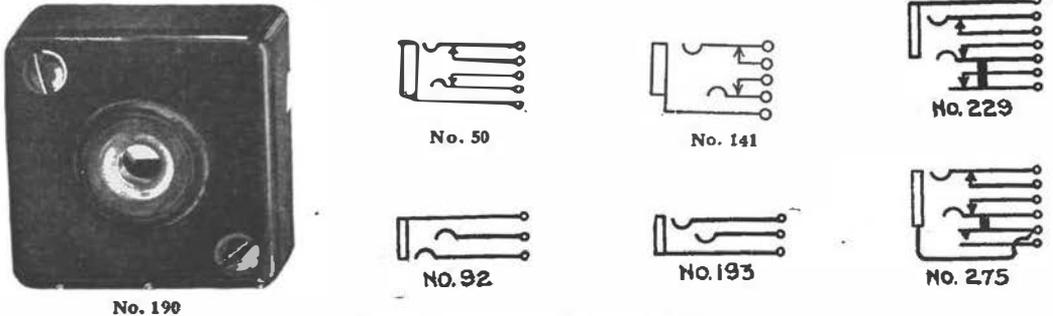
1 No. 116956, 36 volt transformer

Western Electric JACKS



Singly Mounted

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 plug, except that the make contact is omitted. Diameter of mounting plate $1\frac{1}{8}$ inches.
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 A lock will be supplied when specified as a separate item. This jack is used with the No. 146 plug.
187	Same as No. 186 jack except that it is not equipped with protective apparatus.
190	This jack is intended for use in restaurants and similar locations where it is desirable to move a desk stand from place to place. The No. 148 plug is used with this jack; it is provided with tip, ring and sleeve connections. The cover is $1\frac{1}{8}$ inches square and 1 inch deep, and is finished black. The base and cover are slotted to allow wires to be brought in from wire moulding.



JACKS MOUNTED IN STRIPS

These jacks are designed for mounting in groups in jack mountings, a few of which are listed under "Jack Mountings." In ordering, the code number of the jack and the code number of the jack mountings should be given as well as the total number of jacks and mountings required.

The number of jacks to be mounted per strip should be specified and the numbering desired, as they will otherwise be furnished unnumbered.

These jacks are not supplied unmounted.

Code No.	Used with Plug No.	Used with Jack Mounting	No. per Strip
50	110	1-2-34-77	5 and 10
92	109	18-19-113	10 and 20
141	110	109-110-112	10 and 20
193*	110	117-118-119	10 and 20
		120-122-123	
		125-127	
229	109	145	10
275	110	109-110-112	10 and 20
		115-116-136	
		137	

*The No. 119 tool is designed for extracting and replacing the sleeve of the No. 193 jack.

JACKS
JACKS—WELDED FRAME (Continued)

Code No.		Corresponding Punched Frame Type	Mounting Centers (Ins.)	Used with Plugs	Code No.		Corresponding Punched Frame Type	Mounting Centers (Ins.)		Used with Plugs
"A" Type	"C" Type				"B" Type	"D" Type		Hor'l	Vert.	
215A	.....	.....	Horizontally 5/8 Vertically 3/8	47 & 116	.....	.....	.....	.....	.....
216A	216C	204		47 & 141	.....	.....	.....	.....	.....
217A	217C	209		47 & 116	.....	.....	.....	.....	.....
218A	218C	207		47 & 116	.....	.....	.....	.....	.....
219A	219C	155		47, 116 & 141	219B	219D	175	5/8	1 1/8	47 & 116
220A	.....	154		47 & 116	220B	220D	176	5/8	1 1/8	47 & 116
221A	221C	152		47 & 116	221B	221D	173	5/8	1 1/8	47 & 116
223A	.....	.....		47 & 116	.....	.....	.....	.....	.....	.....
225A	225C	166		47, 116 & 141	225B	225D	177	3/8	1 1/8	47 & 116
226A	226C	.....		47 & 116	.....	.....	.....	.....	.....	.....
227A	227C	206		47	.....	.....	.....	.....	.....	.....
230A	230C	167		47 & 116	230B	230D	167	5/8	1 1/8	47 & 116
231A	231C	147		47 & 116	231B	231D	168	5/8	1 1/8	47 & 116
232A	232C	148		47 & 116	232B	232D	169	5/8	1 1/8	47 & 116
233A	233C	149		47 & 116	233B	233D	170	5/8	1 1/8	47 & 116
234A	234C	151		47, 116 & 141	234B	234D	172	5/8	1 1/8	47 & 116
235A	235C	153		47, 116 & 141	235B	235D	174	3/4	1 1/8	47 & 116
236A	236C	189		47 & 116	236B	266D	188	5/8	1 1/8	47 & 116
237A	237C	185		47 & 116	.....	.....	.....	.....	.....	.....
238A	238C	159		110	238B	.....	178	5/8	1 1/8	110
239A	239C	160		110	239B	.....	179	5/8	1 1/8	110
240A	.....	161		110	240B	.....	180	5/8	1 1/8	110
241A	.....	162		110	241B	.....	181	3/4	1 1/8	110
242A	242C	163		110	242B	.....	182	3/4	1 1/8	110
243A	.....	165		110	243B	.....	184	3/4	1 1/8	110
246A	.....	.....		109	246B	.....	.....	5/8	1 1/8	109
248A	.....	.....		109	.....	.....	.....	.....	.....	.....
249A	.....	.....		109	.....	.....	.....	.....	.....	.....
267A	.....	.....		110	.....	.....	.....	.....	.....	.....
280A	280C	.....		110	280B	.....	.....	1 1/2	1 1/8	.....
281A	.....	.....		47, 116 & 144	.....	.....	.....	.....	.....	.....
284A	.....	.....		110	.....	.....	.....	.....	.....	.....
285A	.....	.....		110	.....	.....	.....	.....	.....	110
.....	.....	.....	110	289B	.....	.....	1 1/2	1 1/8	110	
.....	.....	.....	110	290B	.....	.....	1 1/2	1 1/8	110	
.....	.....	.....	110	291B	.....	.....	1 1/2	1 1/8	110	
.....	.....	.....	110	293B	.....	.....	1 1/2	1 1/8	110	
297A	.....	.....	47, 116 & 141	.....	.....	.....	.....	.....	.....

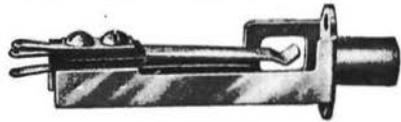
Orders should call for alternatives of welded frame or the corresponding punched frame jack as noted above, if prompt deliveries are required.

Jacks—Punched Frame

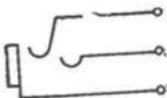
OTHER THAN LISTED IN ABOVE TABLE UNDER CORRESPONDING PUNCHED FRAME TYPE



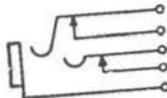
No. 160



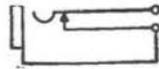
No. 175 Jack



No. 159
No. 178



No. 160
No. 179



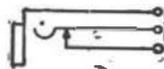
No. 169



No. 162



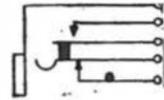
No. 173



No. 175



No. 176



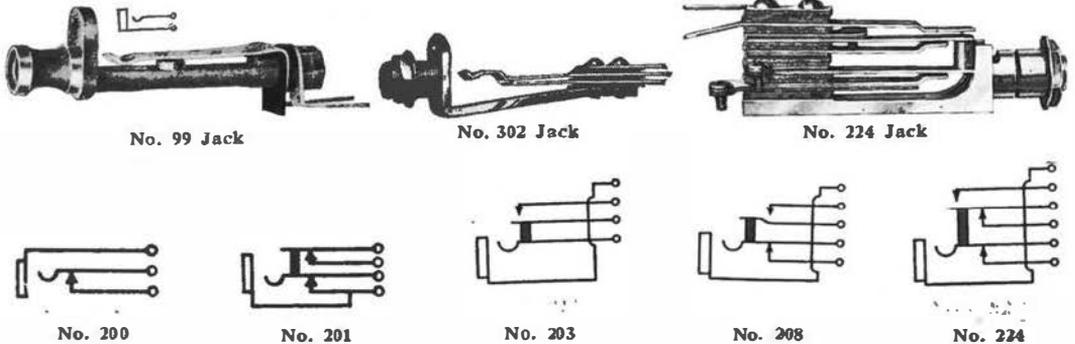
No. 177

JACKS

(PUNCHED FRAME CONTINUED)

Code No.	Arrangement of Springs and Lugs	Mounting Centers (In.)		Used with Plug
		Horizontal	Vertical	
159	Fig. A	3/4	1 1/8	110
160	Fig. A	3/4	1 1/8	110
162	Fig. A	7/8	1 1/8	110
169	Fig. D	1 1/8	1 1/8	47A, B & 116
173	Fig. D	1 1/8	1 1/8	47A, B, 116 & 141
175	Fig. D	1 1/8	1 1/8	47A, B, 116 & 141
176	Fig. D	1 1/8	1 1/8	47A, B & 116
177	Fig. D	1 1/8	1 1/8	47A, B, 116 & 141
178	Fig. B	3/4	1 1/8	110
179	Fig. B	3/4	1 1/8	110

Jacks—Miscellaneous Types



The Nos. 200, 203, 208 and 224 are highly insulated jacks having mica insulators. They will mount on any thickness of wood from 3/4 to 7/8 inch, the jack shank being threaded and the jack held in place by means of a nickel finished nut.

The No. 302 jack is equipped with two hexagonal lock nuts to make it adjustable for mounting on any size panel.

Code No.	Mounting Centers (In.)		Used with Plugs
	Horizontal	Vertical	
99	3/4	1 1/8	47A, B & 116 137 & 144
200	1 1/8	1	1A, 47 & 116
201	1 1/8	1 1/4	1A, 47 & 116
203	1 1/8	1 1/4	1A, 47 & 116
208	1 1/8	1 1/8	1A, 47 & 116
224	1 1/8	1 1/2	1A, 47 & 116
302	..	...	47 & 219

JACK FASTENERS

These fasteners serve the purpose of holding either jack mountings or lamp socket mounting in place on the switchboard frame. They are made of brass.

The No. 103 tool listed under "Tools" should be used in placing and removing fasteners.



No. 16



No. 19

Code No.	Used on
16	No. 92 jack sections having drilled stile strips.
18	No. 92 jack sections having drilled stile strips and where fire screens prevent the use of No. 16.
19	Nos. 49 and 198 jack sections having drilled stile strips on 1 inch centers.

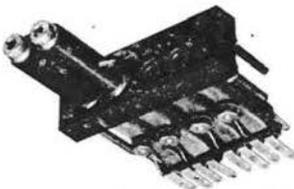
Jack Mountings

For central battery exchanges it is customary to have the multiple jack strips in each panel separated into groups of five rows by thin white holly strips. Each group consists of one hundred jacks numbered 0 to 99. Each strip has 20 jacks and is divided into four smaller groups (each having five jacks) by a distinctive mark so that an operator may readily choose the proper jack. It is also usual to furnish these jack mountings with a groove on the lower edge for marking the jacks for various purposes such as signifying that several adjoining jacks are connected to one private exchange, etc. This groove is shown in the illustration of the No. 113 jack mounting.

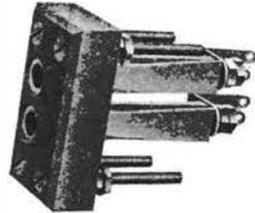
In ordering, specify the number of jacks and the Code No., the Code No. of the jack mounting with the numberer strip, together with the numbering desired. If the holly strips are to be attached to the upper edge of any of the jack mountings, the order should specify which ones.

JACK MOUNTINGS (NOT ARRANGED FOR NUMBER PLATES)

The Nos. 30, 78 and 80 jack mountings are so designed that the twin plug of an operator's head set may be inserted in each pair of jacks; associated jacks are on 1/8 inch centers while 1/4 inch spacing is used between pairs. With the exception of the three mountings mentioned above, the other mountings in the list will be numbered as ordered but will be furnished unnumbered unless otherwise specified.



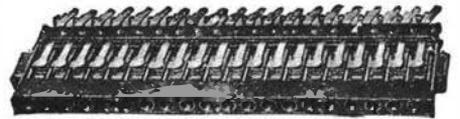
No. 30 Jack Mounting with No. 99 Jacks



No. 80 with No. 99 Jacks



No. 109 Jack Mounting with No. 141 Jacks



No. 113 Jack Mounting with No. 92 Jacks

Code No.	Used with Mounting Jack No.	Ordinarily Used with Plug No.	No. of Jacks per Strip	Mounting Face Dimensions, Ins.—		Material
				Length	Width	
1	50	110	10	9 1/8	7/8	Hard rubber
18	92	109	10	7 1/8	3/8	
30	99-152	137	4	3 3/8	1 1/4	Metal mounting with hard rubber face
77	50	110	5	9 1/8	1 1/8	
78	99-152	137	6	5 1/8	1 1/4	
80	99-152	137	2	2 3/8	1 1/4	Hard rubber
109	141	110	10	11 1/8	1 1/2	
112	141	110	20	11 1/8	1 1/2	Composition
113	92	109	20	7 1/8	3/8	
115	141	110	20	10 1/2	1 1/8	Composition
116	141	110	10	10 1/2	1 1/8	
*118	193	110	20	9 1/8	1 1/8	Metal mounting with hard rubber face.
*119	193	110	20	9 1/8	1 1/8	
*120	193	110	20	9 1/8	1 1/8	
*122	193	110	20	11 1/8	1 1/8	
127	193	110	10	9 1/8	1 1/8	
128		47	10	6 1/8	1 1/4	
129	155 or similar jack	47	20	6 1/8	2 1/2	Hard rubber with metal mounting blocks
130		47	10	6 1/8	1 1/4	
133	147	47	30	21 3/4	1 3/8	Hard rubber
*136	141	110	10	11 1/8	1 1/2	
138	92	109	10	7 1/8	3/8	Metal mountings with hard rubber face
141	50	110	10	9 1/8	1 1/8	
143	159 or similar jack	110	10	9 1/8	1	Hard rubber
145	229	109	10	7 1/8	1 1/8	
158	99-152	47	4	3 3/4	1 1/4	Dull black composition

*Note. Lower edge grooved.

JACK MOUNTINGS

(Continued)



No. 148 Jack Mounting



No. 19 Jack Mounting with No. 92 Jacks



No. 110 Jack Mounting with No. 141 Jacks

JACKS WITH MOUNTINGS—ARRANGED FOR NUMBER PLATES

These mountings are not numbered. In ordering, specify the number of jack required, the code number of the jacks, the code number of the mounting, and the number of jacks to be mounted per strip. The proper number of jacks should be ordered to fully equip the mounting.

Code No.	Used with Jack No.	Ordinarily used with Plug No.	No. of Jacks per Strip	Face Dimensions, Ins.		For No. Plates	Material
				Length	Width		
2	50	110	10	10½	½	32-59 types	Hard rubber Metal mounting with hard rubber face
19	92	109	10	7½	¾	30-60 types	
34	50	110	5	9¼	¼	32-59 types	
110	141	110	10	11¼	½	5B	Hard rubber
134	154	47	15	21¼	1¾	21B	
135	156	47	30	21¼	1¾	21B	
*137	141	110	10	11¼	½	5B	Metal mountings with hard rubber face
*139	92	109	10	7½	¾	30-60 types	
142	50	110	10	9¼	¼	31-32-59 types	Hard rubber
146	218 or similar jacks	47	20 (two rows)	6½	2½	No. 8K designated strip and 130A number plate	
147	218 or similar jack	47	10	6½	1¼	No. 130	Hard rubber with brass mounting lugs

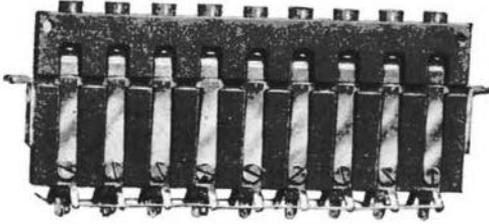
148 JACK MOUNTING

This ebony finished wood box is primarily designed for mounting a No. 218 jack on the side of a desk. Two wood screws with washers are provided for fastening it in place. The over-all dimensions are length, 5 inches, width 2¼ inches, and depth 1½ inches.

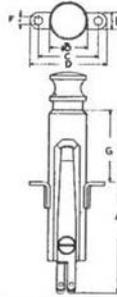
*Note. Lower edge grooved.

KEYS

The following list represents a few of the commonly used types of key. A complete line of standard keys which will be found to satisfy any service requirements are manufactured, information on which will be furnished upon request.



No. 69A Keys on a Typical Key Mounting



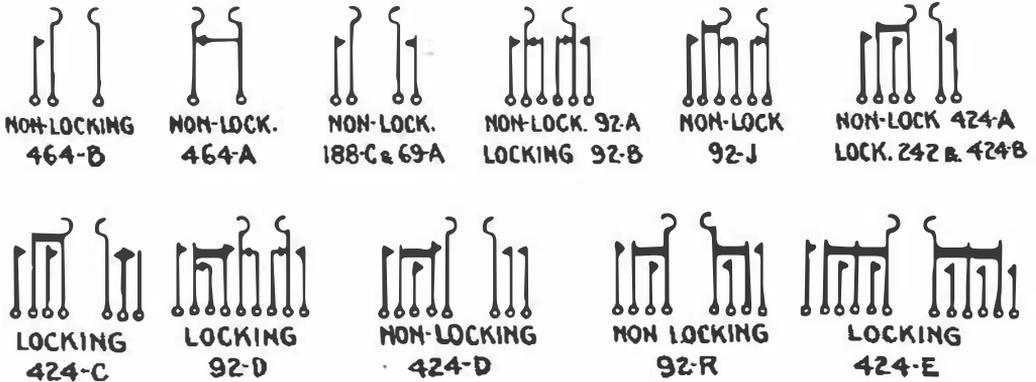
Dimension Cut No. 92, Type



No. 92B

Push Button Type Keys
(GROUP MOUNTED TYPE)

- | Code No. | Description |
|----------|--|
| 69A | Push button type non-locking order wire key. Mounted in strips on various key mountings. Red plungers. Make two contacts when operated. The "A3A" Type Keys are now supplied on new equipments. |
| 242B | Push button type non-locking order wire key with local contact. Mounted in strips on various key mountings. Red plungers. Make three contacts when operated. Similar in appearance to No. 69A. The "A3G" type keys are now supplied on new equipments. |



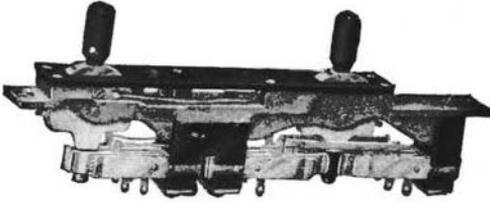
SINGLE MOUNTED TYPE

These push button type keys are ordinarily used for ringing, listening and supervisory circuits and may also be used for general purposes wherein a push button key is required. Consists of a brass shell and an insulated push button. The button of the key will be either locking or non-locking type as indicated in the following list.

Code No.	Key Lever	Dimensions (Inches)						
		A	B	C	D	E	F	*G
92A	Non-locking	3 3/32	3 1/8	1 1/32	1 1/16	3/32	3/32	1 1/4
92B	Locking							
92D	Locking							
92R	Non-locking							
188C	Non-locking	3 3/32	1/8	1/8	1 1/32	3/32	3/32	1 1/4
424A	Non-locking	3 5/32	3 1/8	1 1/32	1 1/16	3/32	3/32	1 1/4
424B	Locking							
424C	Locking							
424D	Non-locking							
424E	Locking							
464A	Non-locking	3 3/32	1/2	7/8	1 5/32	3/32	5/32	7/8
464B	Non-locking							

*Arranged for thickness of shelf as indicated.

KEYS
(CONTINUED)



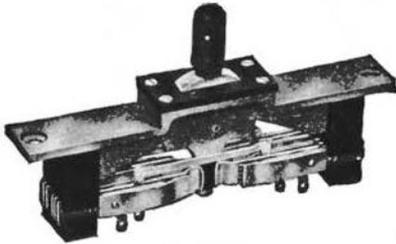
No. 102A



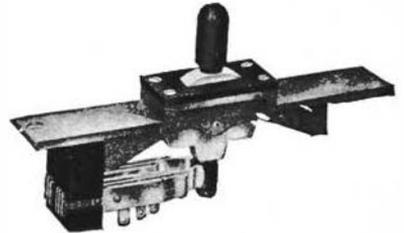
No. 121A

Lever Type Keys

Code No.	Description
102A	Combined listening and two-party ringing key, with indicator. Size of top $5\frac{1}{4} \times \frac{3}{4}$ inches. Listening key locking and makes two contacts when operated. Ringing keys, non-locking, each breaking two and making two contacts when operated.
110A	Combined listening and two-party ringing key with indicator. Size of top $5\frac{1}{4} \times \frac{3}{4}$ inches. Listening key has local contact. Listening key locking, and makes three contacts when operated. Ringing keys non-locking, each breaking two and making two contacts when operated.
121A	Single listening key. Size of top $5\frac{1}{4} \times \frac{3}{4}$ inches. Locking. Breaks two contacts and makes two when operated.
156A	Combined listening and two-party ringing key. Size of top $5\frac{1}{4} \times \frac{3}{4}$ inches. Listening key locking and makes three contacts when operated. Ringing keys non-locking, each breaking and making two contacts when operated.



No. 104A

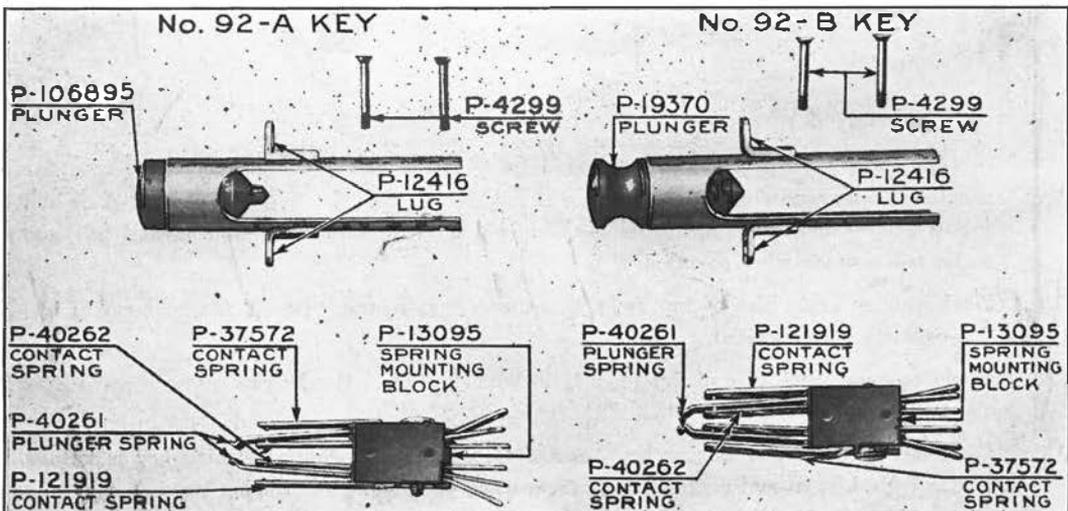
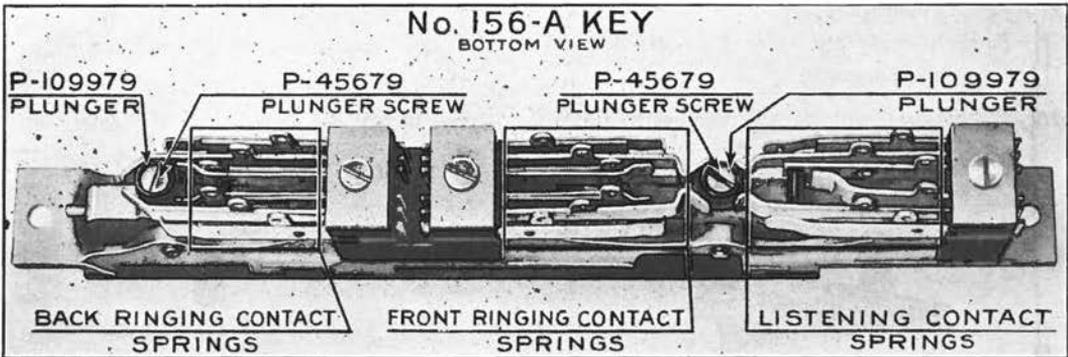
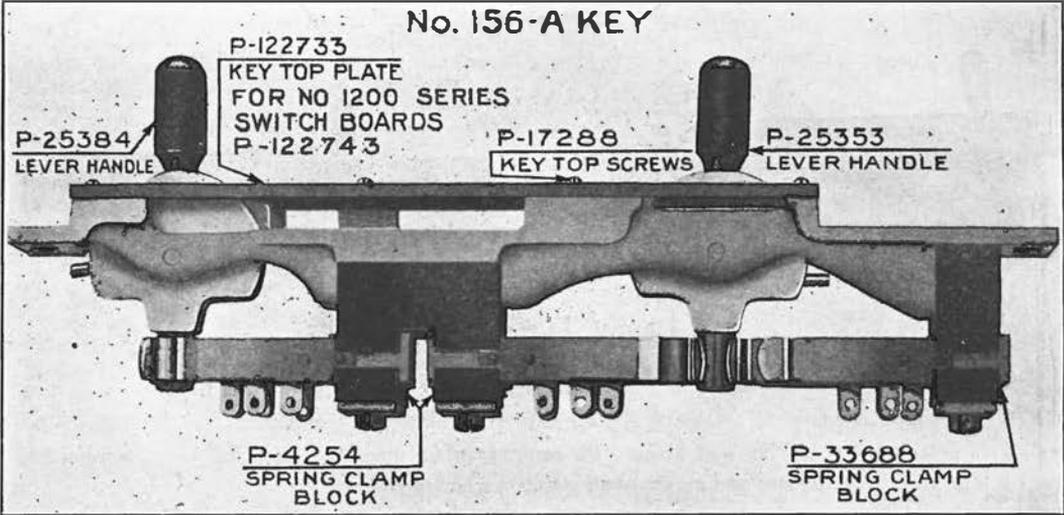


No. 115A

Lever Type Keys

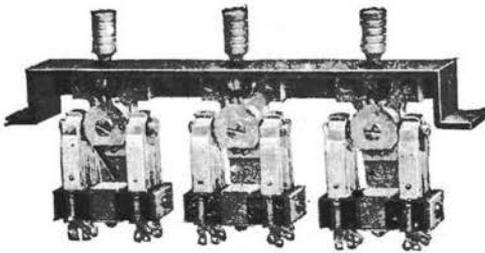
Code No.	Description
104A	Combined listening and ringing key. Size of top $1\frac{1}{2} \times \frac{3}{4}$ inches. Listening key is locking and makes two contacts when operated. The ringing key is non-locking and breaks two and makes two contacts when operated.
115A	Single ringing key. Size of top $1\frac{1}{2} \times \frac{3}{4}$ inches. Non-locking. Breaks two and makes two contacts when operated.
155A	Single listening key. Size of top $1\frac{1}{2} \times \frac{3}{4}$ inches. Locking. Breaks two contacts and makes two contacts when operated.
184A	Combined listening and ringing key. Size of top $1\frac{1}{2} \times \frac{3}{4}$ inches. Listening key is locking and breaks two and makes two contacts when operated. The ringing key is non-locking and breaks two and makes two contacts when operated.

KEY PARTS

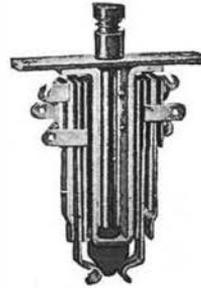


KEYS

(CONTINUED)



No. 251E



No. 375A



No. 378A

LEVER TYPE KEYS

- | Code No. | Description |
|----------|---|
| 251E | Combined listening and ringing key for use in connection with 3 x 7 cordless private branch exchange switchboards. Size of top $7\frac{5}{8} \times 1\frac{1}{8}$ inches. All listening keys locking, make three and break two contacts when operated. Ringing key non-locking makes two and breaks two contacts when operated. |
| 251F | Switching key for use in connection with 3 x 7 cordless private branch exchange switchboards. Size of top $7\frac{5}{8} \times 1\frac{1}{8}$ inches. All keys are locking in operated position and all make two and break two contacts when operated. |
| 251G | Same as No. 51F except for method of strapping. |

PUSH BUTTON TYPE KEYS

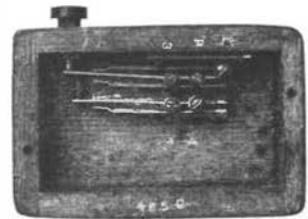
- | | |
|------|---|
| 375A | Push button type ringing key. Non-locking. Breaks two and makes two contacts when operated. |
|------|---|



No. 392A



No. 406A



No. 465C. Bottom View

PLUNGER TYPE KEYS

For Use With Key Levers

- | | |
|------|--|
| 377A | Plunger type key for use with key lever. Locking or non-locking according to key lever used. For use in No. 6000A key. Makes two contacts when operated. |
| 378A | Plunger type key for use with key lever. Locking or non-locking according to key lever used. Makes two and breaks two contacts when operated. |
| 392A | Plunger type key for use with key lever. Locking or non-locking according to key lever used. Makes four and breaks four contacts when operated. |

ROTATING PLUNGER TYPE KEYS

- | | |
|------|---|
| 272A | Rotating plunger type listening key. For $\frac{1}{4}$, $\frac{1}{8}$ or $1\frac{1}{4}$ inch shelf as specified. Locking. Breaks two and makes two contacts when operated. |
| 272C | Similar to No. 272A except that it breaks three and makes three contacts, when operated, instead of breaks two and makes two. |
| 272D | Similar to No. 272A except that it breaks four and makes four contacts, when operated, instead of breaks two and makes two. |
| 406A | Single mounted, brass, rotating plunger type switching key. Locking. For $\frac{1}{8}$ or $1\frac{1}{4}$ inch shelf as specified. Diameter of shell $\frac{1}{2}$ inch. Breaks one contact when operated. |

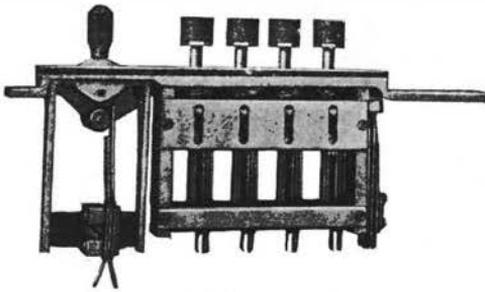
PUSH BUTTON TYPE KEYS MOUNTED

- | | |
|------|--|
| 465C | Push button type key mounted in an oak box. Size of box $4\frac{1}{2} \times 3\frac{1}{8} \times 1\frac{1}{2}$ inches. For use in transmitter circuits for way station operators to cut in transmitter. Non-locking. Makes two and breaks one contact when operated. |
| 465D | Push button type key mounted in an oak box. Size of box $4\frac{1}{2} \times 3\frac{1}{8} \times 1\frac{1}{2}$ inches. For use with No. 1317 type telephones which are not equipped with push buttons for central office selective signaling, but where this class of service is desired. Non-locking. Makes one and breaks one contact when operated. |

KEYS

(Continued)

NO. 510 TYPE



No. 510 Type Key

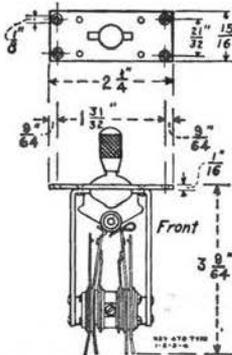
The No. 510 type keys are for use in Western Electric switchboards employing Harmonic Ringing Systems.

This type key is used in new equipment and in some cases for replacement purposes in existing equipment.

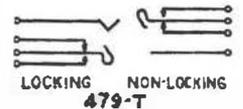
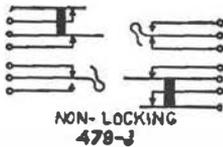
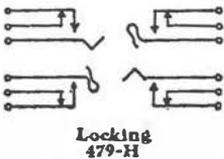
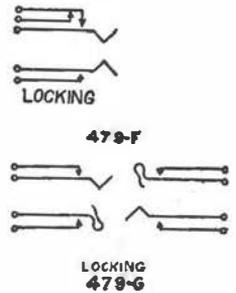
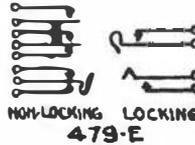
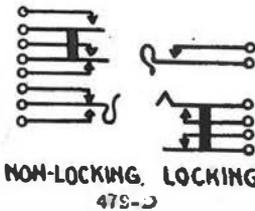
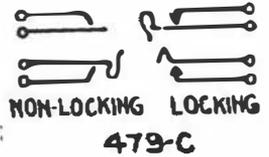
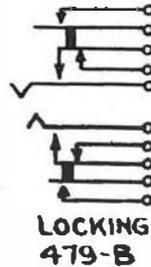
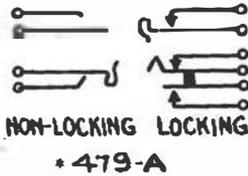
Further information as to the No. 510 type key will be supplied upon request.

Replaces No. 468 type key for new and additional equipments.

When ordering 468 type keys for replacement purposes the code number of the key now used should be given. This number is stamped on the frame of each key. Our factory will then either make shipment, or suggest a suitable 510 type key if advisable.



No. 479G also general design and dimensions of No. 479 type



*Contacts shown in diagram without arrowheads are arranged for ringing only.

NO. 479 TYPE

These lever type keys have black finished metal tops arranged for mounting on woodwork, and all except the No. 479B are supplied, unless otherwise specified, with a black lever handle. The No. 479B key is ordinarily equipped with a red handle.

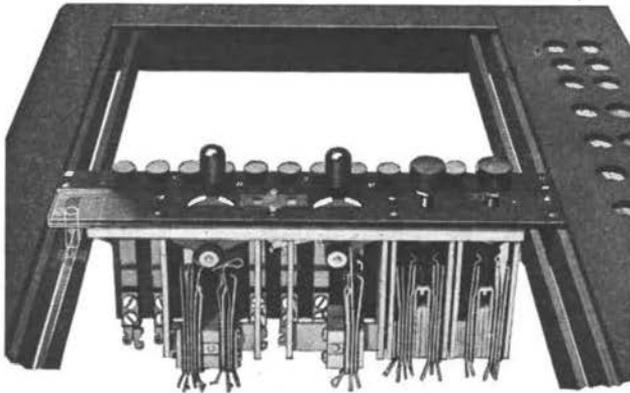
Four No. 4 oval head wood screws are furnished with each key for mounting.

The letters "A" and "B" appearing on the illustration of the No. 479G key indicate the position of the springs "A" and "B" as shown in the diagram of the No. 479G spring arrangement. The springs in the vertical column above "A" in the diagram are operated when the lever is thrown to the left and those above "B" when the lever is thrown to the right.

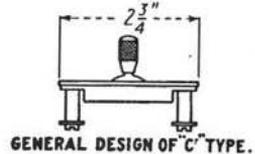
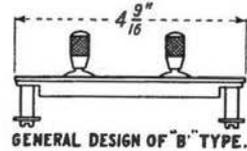
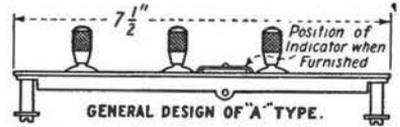
Code

No.	Position "A"	Contact	Position "B"
479A	2 make and 1 break (locking)		2 make (non-locking)
479B	4 make and 2 break (locking)		
479C	2 make (locking)		2 make (non-locking)
479D	2 make and 1 break (locking)		3 make and 2 break (non-locking)
479E	2 make (locking)		3 make and 2 break (non-locking)
479F			2 make and 1 break (locking)
479G	2 make (locking)		2 make (locking)
479H	2 make and 2 break (locking)		2 make and 2 break (locking)
479J	1 make and 3 break (non-locking)		1 make and 3 break (non-locking)
479K	2 make and 2 break (locking)		2 make and 2 break (locking)
479T	1 make and 1 break (non-locking)		1 make and 1 break (locking)

KEYS
(Continued)



A2 and A3 type keys in universal key shelf



UNIVERSAL TYPE KEYS

Universal type keys are arranged to mount in a Universal type key shelf, which, instead of being drilled and tapped for a definite location for each key, is provided with two mounting slots running lengthwise of the key shelf and registering with a mounting stud at each end of the key as shown in the illustration above.

In coding these Universal keys they have been divided into three types according to the length of the base; A type, 7 1/2 inches; B type, 4 9/16 inches; C type, 2 3/4 inches.

All of these types of keys are made in a variety of models mounting lever key units, and push button key units in varying numbers and combinations.

Key units are supplied mounted with or without indicators which show the last key operated. The units are manufactured in non-locking form and the lever units in both locking and non-locking arrangements.

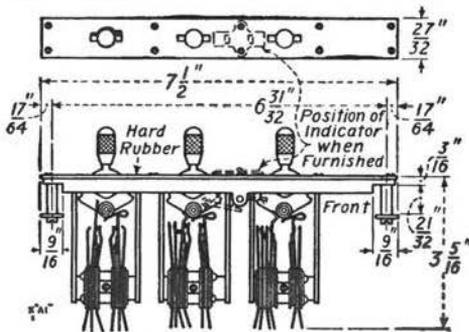
Universal type keys of the same length base will mount in any key shelf designed for that length of key and apparatus blanks can be supplied either to take the place of keys at non-equipped positions in the switchboard, or to fill the space remaining in the Universal key shelf after the required keys have been placed in it.

Several hundred forms of the Universal key are available, and it is, therefore, not practicable to list them all in this catalogue.

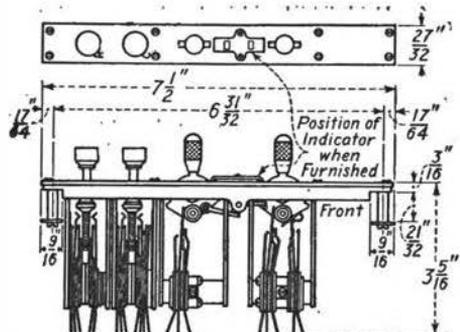
The list of Universal type keys given below is not complete or comprehensive and is not intended to be a guide in the selection of the actual keys required, but will serve for identification of Universal key types referred to in switchboard specifications or proposals.

Western Electric equipment using this type of key will be found to contain complete information for obtaining replacement, and in placing orders for this purpose, or for extension to the existing equipment, the customer should refer to the code number, which is stamped upon the keys already in service, or to the information given in the drawings accompanying the equipment.

The cuts following show four "A" type keys, two "B" type keys and one of the "C" type keys. It should be clearly understood that the illustrations and the information on Universal type keys is not complete and that keys are available in this type of construction to meet a wide range of service conditions and requirements.



General design and dimensions of "A1A" type



General design and dimensions of "A2A" type

"A1" Type Keys. Arranged for mounting in a universal type key shelf with "A" type keys and "A" type key spaces.

Equipped with one, two or three lever type key units as required.

Moving lever forward operates rear set of springs and vice versa.

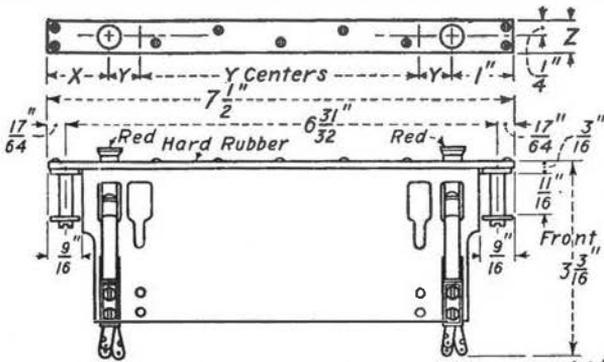
"A2" Type Keys. Arranged for mounting in a universal type key shelf with "A" type keys and "A" type key spaces.

Equipped with one or two lever type key units and one or two push button key units as required.

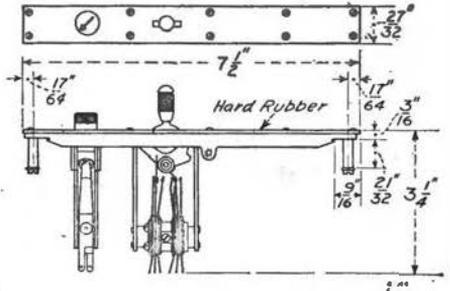
Moving lever forward operates rear set of springs and vice versa.

KEYS

(Continued)



General Design and Dimensions of A-3A Type



General Design and Dimensions of A-4B Type

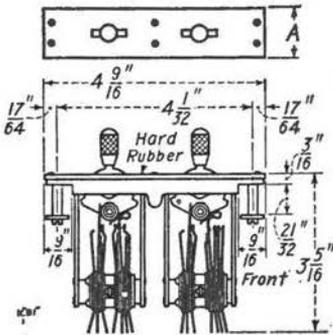
Universal Type Keys

“A-3” Type Keys. Call circuit keys arranged for mounting in a universal type key shelf with “A” type keys and “A” type key spaces.

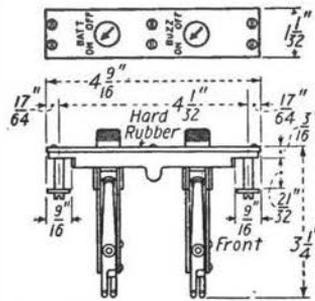
Furnished with red, unengraved, flat top buttons unless otherwise specified.
When specified will be furnished with cupped head red buttons.

“A-4” Type Keys. Keys arranged for mounting in a universal type key shelf with “A” type keys and “A” type key spaces.

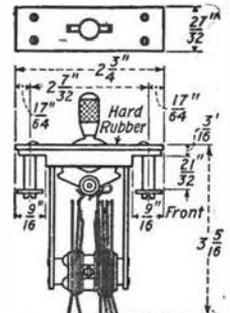
Equipped with lever type and rotating plunger type key units as indicated under the individual keys.
Moving lever forward operates rear set of springs and vice versa.
Springs of rear unit are operated by rotating plunger through 90 degrees.



General Design and Dimensions of B-1C Type



General Design and Dimensions of B-2A Type



General Design and Dimensions of C-1A Type

“B-1” Type Keys. Keys arranged for mounting in a universal type key shelf with “B” type keys and “B” type key spaces.

Equipped with one or two lever type key units as indicated under the individual keys.
Moving lever forward operates rear set of springs and vice versa.

“B-2” Type Keys. Keys arranged for mounting in a universal type key shelf with “B” type keys and “B” type key spaces.

Equipped with one or two rotating plunger type key units as indicated under the individual keys.

“C-1” Type Keys. Arranged for mounting in a universal type key shelf with “C” type keys and “C” type key spaces.

Moving lever forward operates rear set of springs and vice versa.

“C-2” Type Keys. Arranged for mounting in universal type key shelf with “C” type keys and “C” type key spaces.

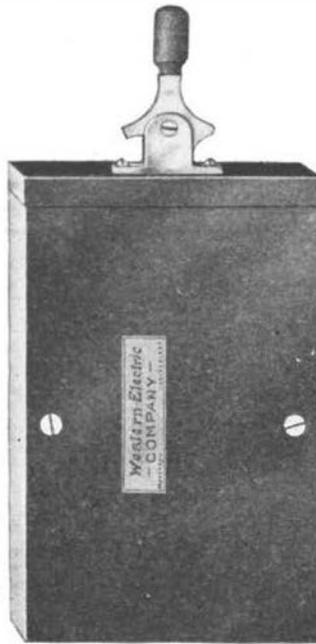
Equipped with one or two push buttons having color of buttons as required.

KEYS

(Continued)



No. 6000A



No. 6002A



No. 6000B

No. 6000 TYPE

Code No.	Description
6000A	Wooden box equipped with 1 No. 377A key and 1 No. 6A key lever. Size of box (including key lever) $4\frac{3}{4} \times 3\frac{5}{8} \times 1\frac{1}{8}$ inches. Locking. Makes two contacts when operated. For use in dispatcher's telephone circuits.
6000B	Wooden box (No. 334 key mounting) equipped with 1 No. 136B key. Size of box $6\frac{1}{4} \times 3\frac{7}{8} \times 2\frac{1}{8}$ inches. Locking in both positions. Makes two and breaks two contacts in both positions when operated. For use in railroad service for connecting a telephone to any one of three separate lines.

No. 6002 TYPE

6002A	Wooden box equipped with 1 No. 378A key and 1 No. 23A key lever. Ebonized finish. Intended for use as switching key to connect a telephone instrument on either one or both of two lines. Size of box $5\frac{1}{2} \times 3\frac{7}{8} \times 1\frac{5}{8}$ inches.
6002B	Wooden box equipped with 1 No. 378A key and 1 No. 6A key lever. Ebonized finish. Intended for use as a switching key to connect a telephone instrument on either one of two lines. Dimensions same as No. 6002A.
6002C	Wooden box equipped with 1 No. 375A key. Ebonized finish. Intended for use as a ringing key at sub-stations. Dimensions same as No. 6002A.
6002D	Wooden ebonized box equipped with 1 No. 393A key and 1 No. 6 key lever. Makes three and breaks three contacts (acts same as a 3 pole, double throw switch). The box is similar to that shown for the No. 6002A key except that its dimensions are $6\frac{1}{8} \times 3\frac{1}{2} \times 2\frac{1}{8}$.
6002E	Wooden, ebonized box equipped with 1 No. 136A key which is of the three position type and makes two and breaks two contacts when the lever is thrown to the left or to the right. The dimensions of the box are $6\frac{1}{8} \times 3\frac{1}{2} \times 2$ inches. The Key Lever is located in the center of the box face having dimensions of $2 \times 6\frac{1}{8}$ inches.
6003A	Wooden box equipped with a push button type key. Size of box $6\frac{1}{8} \times 3\frac{7}{8} \times 2\frac{1}{8}$ inches. Non-locking. Makes three and breaks two contacts when operated. For operating a No. 62A interrupter.

KEY LEVERS, MOUNTINGS AND SPACES

Key Levers

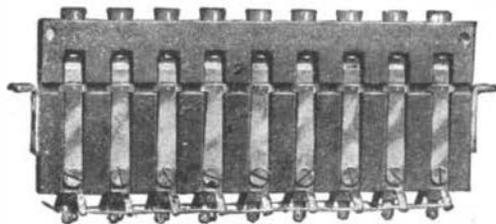


No. 6A

Code No.	Operated Position of Lever	Description
6A	Vertical	Used with lever type keys. Black handle, metal parts nickel plated. Locking.
6B	Vertical	Same as No. 6A, except real handle.
14A	Horizontal	Otherwise same as No. 6A.
23A	This is a double throw lever, locking in all positions and is used with lever type keys. When the lever is in the vertical position, all contacts are open; when the lever is thrown to the left the inner contacts are closed, and when the lever is thrown to the right the outer contacts are closed.	



No. 23A



Side View of No. 69A Keys Mounted in a Typical Key Mounting



No. 303 Key Mounting Equipped With No. 69A Keys

Key Mountings

The following are a few standard mountings for Nos. 69A and 242B order wire keys.

A complete line of mountings arranged for use with any of our standard keys are manufactured; further information will be supplied upon request.

Code No.	Number of Keys per Strip	Size of Top Inches	Keys Used With
233	10	7 5/8 x 1/2	69A
235	10	9 1/8 x 1/2	69A
303	8	6 7/8 x 1/2	69A
304	10	6 1/8 x 5/8	69A
312	12	6 5/8 x 5/8	69A & 242B
315	4	3 7/8 x 1/2	69A
323	10	6 1/8 x 1/2	69A
324	12	6 7/8 x 5/8	69A & 242B
341	12	6 1/4 x 1/2	69A

Key Spaces

These are intended for use in place of keys where the full equipment of keys for which the key shelf is arranged is not installed or to fill in space between two keys. Key spaces can be furnished which correspond to our standard keys in respect to the method and the size and finish of top.

The following list represents a few of the most commonly used key spaces.

Code No.	Size of Top Inches	A Corresponding Key	Code No.	Size of Top Inches	A Corresponding Key
102B	5 1/4 x 3/4	102A	104B	1 1/2 x 3/4	104A
102AH	5 1/4 x 1 1/8	...	251B	7 5/8 x 1 1/8	251E
102AJ	5 1/4 x 3/4	227A	479A	2 1/4 x 1 1/8	479 Type

LAMPS AND SOCKETS—SWITCHBOARD

Lamps



No. 2

The manufacture of switchboard lamps is a highly refined and specialized art. The Western Electric Company has been active in this field for many years and the problems involved have been studied continuously and extensively in its Research and Engineering Laboratories. Methods of manufacture and special treatments for filaments have been perfected which give the lamps long life, uniform quality and high illuminating power. A bright, dependable signal can only be obtained by the use of a lamp of the best quality. Western Electric lamps represent the latest development of the art and will give the highest class of service.

The No. 2 type switchboard lamps are $1\frac{3}{4}$ inches in length and .3075 inch (approximately $\frac{5}{16}$ inch) in diameter. The bulb is made from clear glass and is tipless.

Every lamp is tested for current consumption and for illuminating power.

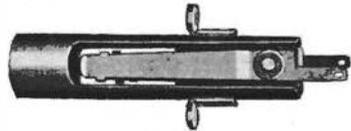
Code No.	Voltage	Current Consumption		Used with Lamp Sockets Number
		Minimum Amperes	Maximum Amperes	
2A	4	.17	.21	12,13,30,34
2B	4	.27	.31	12,13,30,34
2C	15	.09	.12	12,13,30,34
2E	20	.09	.12	12,13,30,34
2F	12	.097	.12	12,13,30,34
2G	24	.075	.115	12,13,30,34
2H	6	.27	.31	12,13,30,34
2J	24	.0225	.0375	12,13,30,34
2K	30	.09	.12	12,13,30,34
2L	10	.24	.26	12,13,30,34
2N	6	.12	.16	12,13,30,34
2P	8	.085	.10	12,13,30,34
2R	18	.09	.12	12,13,30,34
2T	35 to 37	.025	.0375 (35 V.)	12,13,30,34
2U	24	.035	.045	12,13,30,34
2W	18	.035	.045	12,13,30,34
2Y	48	.028	.036	12,13,30,34

The No. 3 lamps are now standard for use in the No. 16 type lamp sockets instead of the No. 4 lamps previously used. To permit of this, an adapter has been designed which may be inserted into the mounting through the lamp cap opening. The No. 2 type lamp together with a sufficient number of adapters should be ordered when replacements of No. 4 type lamps are to be made. In ordering specify:

Lamp Socket Adapter per D-12279



No. 13



No. 34

Lamp Sockets

Mounted Singly

These sockets are made of brass and are supplied with nickel silver springs, which are insulated with hard rubber. They mount individually and can, therefore, be ordered entirely separate from their mountings. The springs are insulated from the frame. The lamp mounts close to the lens of the lamp cap, giving the greatest possible amount of useful illumination.

Code No.	Used with Lamp No.	Used with Lamp Cap No.	Used with (Thickness of Shelf in Ins.)
13	2	2 & 72	$\frac{7}{8}$ inch
34	2	4	$\frac{7}{8}$, $1\frac{1}{8}$, $1\frac{1}{4}$, $1\frac{3}{8}$ inches.

Furnished for $\frac{7}{8}$ inch unless otherwise ordered

Mounted in Strips

These sockets are made of brass, and have nickel silver springs with hard rubber insulation. They are equipped in mountings containing 5, 10 or 20 sockets per strip and will not be supplied as a separate item, but must be ordered in connection with lamp socket mounting. (See description under Lamp Mounting.)

Code No.	Used with Lamp No.	Used with Lamp Cap No.	Suitable for Lamp Mounting No.
12	2 type	2 & 72	102, 117, 122, 123, 125, 136, 137, 144
30	2 type	8	102, 118, 123, 125, 122, 134

LAMP SOCKET MOUNTINGS

In ordering, specify the number of lamp sockets and the code number, together with the code number of the lamp socket mounting. The proper number of lamp sockets should be ordered to fully equip the mountings.

Lamp socket mountings when equipped with No. 12 lamp sockets may have numberings stamped on the face of the strip, if desired, but will be furnished unnumbered unless otherwise specified in the order.



No. 12 Lamp Socket with No. 102 Mounting



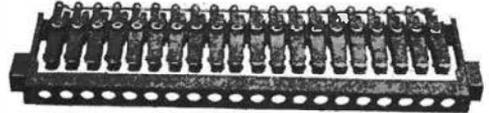
No. 12 Lamp Socket with No. 136 Mounting



No. 12 Lamp Socket with No. 137 Mounting



No. 30 Lamp Socket with No. 118 Mounting



No. 30 Lamp Socket with No. 102 Mounting

LAMP SOCKET MOUNTINGS
Not Arranged for Number Plates

Code No.	Arranged for Lamp S ckets Nos.	No. per Strip	Face Dimensions, Ins. Length	Width	Will mount with Jack Mountings Nos.	Type of Switchboard Used with
**102	12 and 30	20	9 1/8	1 1/8	118 and 120	No. 1
105	12 and 30	10	7 1/8	1 1/8	64 and 86	
118	30	20	7 1/8	1 1/8	113	No. 1
**123	12 and 30	20	10 1/2	1 1/8	115	No. 9
**125	12 and 30	10	10 1/2	1 1/8	116	
136	12	10	11 1/8	1 1/8	109 and 110	No.1962, No.10
*137	12	20	11 1/8	1 1/8	108 and 112	No.10
**138U	12	12	7 1/2	1 1/2		
*144	12	20	11 1/8	1 1/8	122 and 125	No. 1

*Nos. 137 and 144 are the same except that on the No. 137 the lamp sockets are mounted on 1/2 inch centers and on the No. 144 on 3/8 inch centers.

**The mounting is made of hard rubber when supplied with No. 12 Lamp Sockets and are of metal when used for No. 30 Lamp Socket.

***Mounts with "A3" keys.



No. 122 with No. 12 Lamp Socket



No. 134 with No. 12 Lamp Socket

LAMP SOCKET MOUNTINGS
Arranged for Number Plates

Code No.	Arranged for LampS ckets Nos.	No. per Strip	Face Dimensions, Ins. Length	Width	Arranged for Plates Nos.	Will mount with Jack Mount-ings Nos.	Type of Switchboard Used with
122	12	10	9 1/8	1 1/8	31A, 59B	117	No. 1
132	12	10	10 1/2	1 1/8	31A, 59B	116	No. 9
134	12	10	7 1/8	1 1/8	60D, 108A	18, 19	No. 1

Western Electric LAMP SOCKET CAPS

The lenses of Western Electric lamp socket caps are thick and substantial, being made from specially selected and treated glass. These lenses are held firmly in place in the cap cases by spinning the edges over the lenses. The cases are slotted to give a spring fit for the cap in a socket.

No. 2 and 72 Type—Used with Nos. 12 and 13 Lamp Sockets—Diameter $\frac{3}{4}$ Inch

	Code No.	Symbol	Color		Code No.	Symbol	Color
 No. 2C	2A	⊖	White opalescent		2AA	⊖	Red
	2B	⊙	White opalescent		2AB	⊖	White opalescent
	2C	⊕	White opalescent		2AC	⊙	Red opalescent
	2D	⊙	White opalescent		2AF	⊖	White opalescent
	2E	⊖	White opalescent		2AG	⊖	White opalescent
	2F	⊙	White opalescent		2AH	⊖	White opalescent
	2G	⊕	White opalescent		2AJ	⊖	White opalescent
	2H	○	Red opalescent		2AK	⊖	White opalescent
	2J	⊗	White opalescent		2AM	⊖	White opalescent
	2K	⊖	White opalescent		2AN	⊖	White opalescent
 No. 2J	2L	○	Green opalescent	2AP	⊗	White opalescent	
	2M	⊕	White opalescent	2AS	⊖	White opalescent	
	2N	⊙	Red opalescent	2AT	⊖	White opalescent	
	2P	⊙	Jeweled red	2AU	⊖	White opalescent	
	2R	⊙	Jeweled blue	2AW	⊕	White opalescent	
	2S	⊙	Jeweled green	2AY	○	White opalescent	
	2T	⊕	Red opalescent	2AZ	⊕	Red opalescent	
	2U	○	Amber opalescent	2BC	⊖	White opalescent	
	2W	○	Blue opalescent	2BD	⊙	White opalescent	
	2Y	⊙	Green opalescent	2BE	⊕	Green opalescent	

Note. The No. 72 type is numbered as follows:

Code No.	72A,	72B,	72C,	72D,	72E,	72F,	72G,	72H,	72J,	72K.
Symbol	●,	1,	2,	3,	4,	5,	6,	7,	8,	9.

No. 4 Type—Used with No. 4 Type Lamp Sockets—Overall Diameter $\frac{3}{4}$ Inch

Used in the No. 34 lamp socket for all such special cases as pilot signals, fire alarms, supervisor's signals, and for other classes of work in which the mounting of a large signal is desirable.



No. 4A

Code No.	Symbol	Color		Code No.	Symbol	Color
4A	○	White opalescent		4D	○	Red
4B	⊙	Jeweled red		4F	○	Green
4C	⊙	Jeweled green		4G	⊕	White opalescent



No. 8A

No. 8 Type—Used with No. 30 Lamp Socket—Overall Diameter $\frac{3}{4}$ Inch

Code No.	Symbol	Color		Code No.	Symbol	Color
8A	○	White opalescent		8K	⊙	White opalescent
8B	○	Clear		8L	○	Green opalescent
8D	○	Red opalescent		8R	⊕	White opalescent
8E	⊙	White opalescent		8T	⊖	White opalescent
8F	⊙	White opalescent		8U	⊖	White opalescent
8G	⊕	White opalescent		8W	⊙	Jeweled red
8H	⊖	White opalescent		8Y	⊙	Green opalescent
8J	⊕	White opalescent		8AA	⊖	Red
				8AB	⊕	Green opalescent
				8AC	⊙	Red opalescent
			8AD	⊖	White opalescent	
			8AE	⊗	White opalescent	
			8AF	⊖	White opalescent	
			8AG	⊙	White opalescent	
			8AH	⊖	White opalescent	

LINE POLES



No. 3 Line Pole



End Section with Spreaders Extended No. 3 Line Pole



Part of End Section with Spreaders Closed No. 3 Line Pole



No. 4 Line Pole



Part of End Section Showing Method of Clamping to Wire No. 4 Line Pole

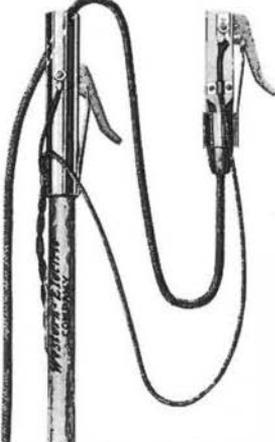
Line Poles

The line poles here listed are intended primarily for connecting portable telephones to open wire lines. They are made of hard wood and are in three sections, each approximately 6 feet in length. The joints are made of seamless brass tubing and are arranged so that the sections are securely locked together when the line pole is in use. The poles are so designed that the middle joint may be omitted if desired, thereby reducing the length of the line pole from 18 to 12 feet.

Contact with the line wires is made by means of a connecting clamp which consists of a metal hook equipped with a spring. When the hook engages the line wire the spring forces the wire into contact with the hook and at the same time scrapes the wire slightly so that a good contact is obtained.



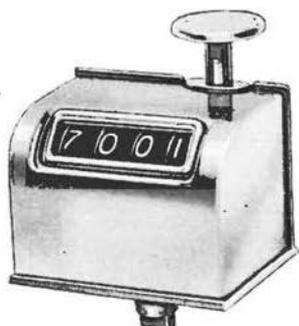
No. 5 Line Pole



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

Code No.	For Making Contact With	Cord	Description
3	2 metallic conductors.	100 feet of two conductor cord equipped with cord tips.	The top section is equipped with two arms hinged at the lower end. These are each equipped with a connecting clamp and are of such length that they will span wires spaced up to 2 feet horizontally.
4	1 metallic conductor (grounded line)	100 feet of single conductor cord equipped with cord tips.	The top section has one connecting clamp only.
5	2 metallic conductors.	100 feet of two conductor cord equipped with cord tips.	The top section is equipped with two connecting clamps. One of these is fixed to the pole and the other free but under control of the user by means of a long cord. This is intended for making connections between two line wires spaced up to 5½ feet, either horizontally or vertically.

MESSAGE REGISTERS AND COUNTERS



No. 10A



No. 12004



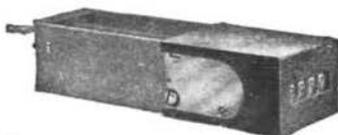
No. 12005

Message Register

Manually Operated

This mechanically operated, nickel-finished message register is primarily designed for making traffic peg counts. It is 1 1/2 x 1 1/4 inches at the base, and mounts in a socket which is flush in the top of the switchboard key shelf. The socket is also supplied mounted in a portable mahogany finished base (2 3/4 x 2 1/4 inches). The mechanism is strong and compact. The plunger being on the top of the case, is easily located by the operator and its action when depressed clearly indicates when the register has counted. The numbers appear in white on a black background and are easily read. The counter is of the cumulative type, registering up to 9,999 and then repeating, and it cannot be reset. This non-resetting feature increases the accuracy of readings through the elimination of errors in setting and also saves time in operating.

Code No.	Description	Code No.	Description
10A	Message register (counter only)	12005	Flush socket for permanent mounting
12004	Portable base for No. 10-A message register.		No. 10-A message register.



No. 5L

Message Registers

Electrically Operated

Electrically operated counters, primarily designed for use in connection with special central office circuits, and usually operated by means of a push button key mounted in the switchboard key shelf.

The Nos. 5H and 5P are designed for use in making peg counts, and the No. 5L is designed for association with an individual subscriber's line, and when so used in controlled by the switchboard operator to register the number of calls over that line.

The Nos. 5H and 5L may be arranged so as to give simultaneous peg count service and individual line call registering.

The message registers mount on steel mounting plates as listed under the heading of "mounting plates."

Code No.	Windings	Resistance	Operating Requirements	Non-Operating Requirements	No. of Terminals
5H	Single	.27	1.4 Ampere	1.25 Ampere	3
5L	Inner	37.5	*25.5 Volts	*23.9 Volts	2
	Outer	463			
*5P	Inductive	355	.070 Ampere	.060 Ampere	3
	Non-inductive	600			
	Combined	223			

*Note—With both windings in series.

**Note—Insulated from the mounting plate.

MOUNTING PLATES

The term "mounting plate" refers in general to a milled steel plate arranged for mounting relays, resistances, message registers or small retardation coils. Plates for mounting drops, signals and relays are known as "drop mountings," "signal mountings" and "relay mountings" respectively.

Whenever necessary the holes for terminals are equipped with hard rubber bushings to insulate the parts in circuit from the plate.

Certain mounting plates are equipped with dustproof covers for mounting relays which are not equipped with individual covers.

The code number of the apparatus for which the mounting plate is to be arranged must be specified in the order.

The following are a few of our standard mounting plates; other sizes are furnished to meet various conditions.

Mounting Plates

For Message Registers

Steel mounting plates with black finish.
5/8 in. thick and 1 1/4 in. wide.

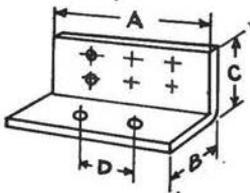
No. 671C—Mounting Plate

Code No.	Number per Strip	Mounting Centers Ins.	Length Ins.	Drilling
623B	20	1 5/8	33 3/4	Drilled for No. 5 message registers with two terminals.
623C	20	1 5/8	33 3/4	Drilled for No. 5 message registers with three terminals.
671B	10	1 5/8	19	Drilled for No. 5 message registers with three terminals.
671C	10	1 5/8	19	Drilled for No. 5 message registers with two terminals.
743A	20	1 5/8	35 5/8	Drilled for No. 5 message registers with two terminals. The 10th and 11th message registers are on 2 7/8 in. centers, all others on 1 5/8 in. centers.
743B	20	1 5/8	35 5/8	Drilled for No. 5 message register with three terminals.
628A	1	...	....	Drilled for any message register as specified.

Mounting Plates

For Resistances—Angle Type

All 1/8 Inch Thick—Black Finish Steel



Mounting Plate For Resistances—Angle Type

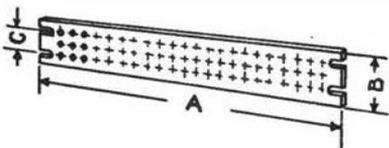
Code No.	No. of Resistances Mounted	Dimensions, Ins.			
		A	B	C	D
*701A	1	1 7/8	3/4	3/4	5/8
*682A	2	1 3/4	1 1/2	1 1/8	3/4
*629B	3	1 3/4	1 1/4	2 3/8	1 1/4
*629A	5	1 3/4	1 1/4	2 3/8	1 1/4
*690A	6	1 3/4	1 1/4	3 3/8	1 1/4
*629C	8	1 3/4	1 1/8	2 3/8	1 1/4

*Furnished with drilling for No. 19 type resistances, when so specified in ordering. No. 18 type resistances may also be mounted on these plates.

Mounting Plates

For Resistances—Relay Rack Type

All 1/8 Inch Thick—Black Finish Steel



Mounting Plate For Resistances—Relay Rack Type

Code No.	No. of Resistances Mounted	Dimensions, Ins.		
		A	B	C
601A	10	19	1 3/4	1 1/4
601C	40	19	1 3/4	1 1/4
601D	30	19	1 3/4	1 1/4
661B	15	8 3/4	1 3/4	1 1/4

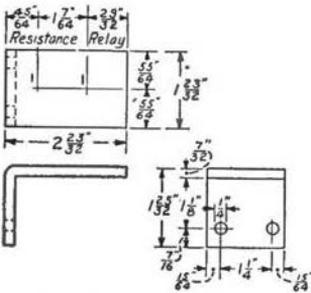
MOUNTING PLATES

(Continued)

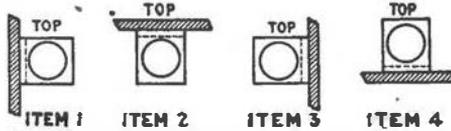
Mounting Plates

For Relays—Angle Type

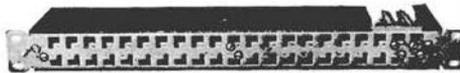
In ordering this angle type relay mounting plate, it is necessary to give the code number of the mounting plate, the code number of the relay to be mounted, and the item number of the drilling desired.



No. 628A Mounting Plate



Code No. Description
 628A Mounts one relay in any of four positions (give item number) can be supplied drilled for the No. 114, No. 118, No. 122, "A," "B" or "E" type relays as specified.



No. 737A Mounting Plate With 2 "A" Type Relays

Mounting Plates

For Relays—Punched Type

Galvanized Finished Metal Plates—Covers (Black Finish) 3 1/2 Inches Deep

Code No.	No. of Relay per Plate	Mounting Dimensions, Ins.—			Description
		Centers	Length	Width	
737A	20	3/4	19	1 3/4	Arranged for ten A-1 and ten A-2 relays mounted alternately or arranged for 20 of the "E" type relays which will mount on 3/4 in. centers. Provided with one battery and one ground clip. Mounts interchangeably with No. 600 type mounting plate.
737B	10	1 1/2	19	1 3/4	Arranged for ten "A" or "E" type relays. Mounts interchangeably with No. 600 type mounting plate.
745B	18	1	21 5/8	1 3/4	Arranged to mount "A" and "E" type relays. Mounts interchangeably with No. 606 and 607 type mounting plate.
745C	20	7/8	21 5/8		
750B	18	1	23		
750C	20	1	23	1 3/4	Arranged to mount "A" and "E" type relays, mounts interchangeably with No. 602 type mounting plate.



No. 600A Mounting Plate May Be Drilled for No. 118U Relays

Mounting Plates

For Relays

All 3/16 inch thick—black finished steel. Not equipped with covers unless so listed below. When ordering specify the code number of the relays to be mounted.

Code No.	No. of Relay per Plate	Mounting Dimensions, Ins.—			Description
		Centers	Length	Width	
600A	10	1 3/4	19	1 3/4	Drilled for Nos. 44, 59, 80, 87, 89, 105, 101K, 108, 117, 118, 122, 125, 149, 162, 172, 178 or "B" type relays.
600N	8	2 1/4	19	1 3/4	Nos. 87, 122, 125, 174 or 178J type relays.
600R	10	1 3/4	19	1 3/4	Equipped with wooden cleat upon which 10 No. 17A terminal punchings are mounted. Drilled for "B" type relays.
606A	10	1 3/4	21 5/8	1 3/4	Nos. 118, 122, 125, 149, 162 or 178 type relays.
606B	10	1 3/4	21 5/8	1 3/4	No. 189D type relays; has cover.
677A	15	1 5/8	27	1 3/4	No. 118 type relays.
677B	15	1 5/8	27	1 3/4	No. 114AT or No. 114AG relays; has cover.
734A	17	1 1/4	16 1/2	1 3/4	Nos. 189D, 189E, or 189K relays; has cover.
735A	20	1 1/4	21 5/8	1 3/4	No. 189 type; has cover.
748A	10	1 3/4	19	2 1/4	No. 190 or No. 196 type relays.

NUMBER PLATES



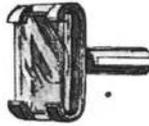
No. 1B



No. 5B



No. 13C



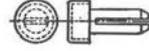
No. 30A



No. 60D



No. 108A



No. 124A



No. 128B

Number Plates

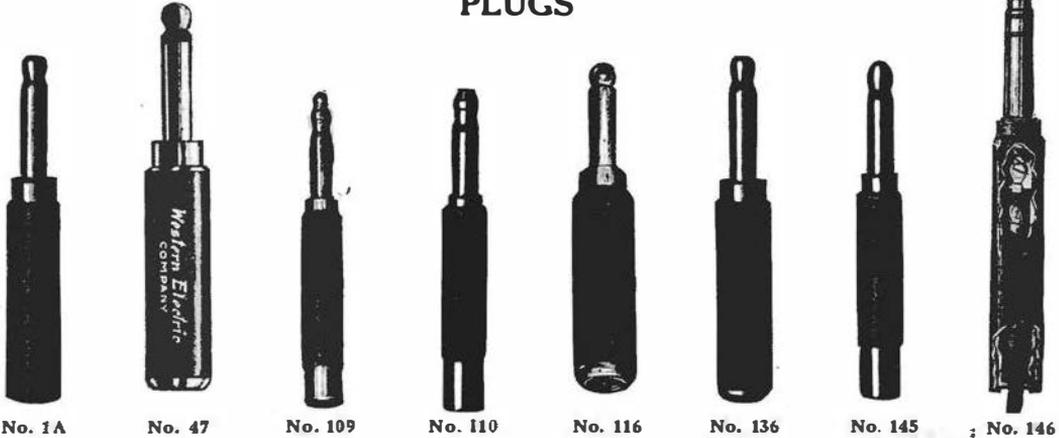
Code No.	Description	Size Ina.	Used in
*1B	White ivory with engraved black numbers; $\frac{1}{4}$ inch high.	$\frac{3}{8}$ diam.	Wooden stile casings and panel numbers.
*5B	Hard rubber, black face, with white engraved characters; $\frac{1}{4}$ inch high.	$\frac{1}{2} \times \frac{1}{4}$	110 jack mounting.
*12B	White ivory, black engraved characters; $\frac{1}{4}$ inch high.	$\frac{3}{8}$ diam.	Plug shelves and key shelves to designate plugs and keys.
*21B	Hard rubber, black face with white engraved characters; $\frac{1}{4}$ inch high.	$\frac{1}{2} \times \frac{1}{4}$	135 jack mounting.
*23A *23C	{ Aluminum plates with engraved black characters; $\frac{1}{4}$ inch high. Escutcheon pins furnished for mounting. ($\frac{1}{8}$ inch figures when specified.)	$\frac{1}{2}$ diam.	Flat iron stile casings.
*23D	Aluminum plate with engraved black characters; $9/12$ inch high. Machine screws furnished for mounting.		
**30A **31A	{ Metal holders with a celluloid cover; furnished with numbers printed on paper sheets of 0 to 511 inclusive, etc., as specified in order.	$\frac{3}{8} \times \frac{1}{4}$ $\frac{1}{4} \times \frac{1}{4}$	No. 19 jack mounting. { No. 2 and 17 jack mountings and Nos. 2C, 50A, 50B designation strips.
*32A	Celluloid face, white, with engraved black characters; $\frac{1}{4}$ inch.	$\frac{1}{4} \times \frac{1}{4}$	2 and 34 jack mountings.
59B	Hard rubber with nickel finish and white characters.	$\frac{1}{4} \times \frac{1}{4}$	2 and 34 jack mounting.
*60D	Hard rubber, black face with white numbers; $\frac{1}{4}$ inch high.	$\frac{3}{8} \times \frac{1}{4}$	19 jack mounting.
*102A	White celluloid face with black engraved characters; $\frac{1}{4}$ inch high.	$\frac{3}{8} \times \frac{1}{4}$	19 jack mounting.
*107B	Aluminum disc with a dull, satin finish and black characters; $\frac{1}{4}$ inch high. Furnished with escutcheon pins for mounting.	$\frac{1}{2}$ diam.	Used on stile casings.
**108A	{ Metal number plate arranged to hold a strip of printed figures, black finish. Numbers are furnished as printed sheets of 0 to 511 inclusive, etc.	$\frac{1}{2} \times \frac{1}{2}$	19 jack mountings.
**109A		$\frac{1}{2} \times \frac{1}{2}$	2 jack mountings.
124A	Brass, white celluloid cover.	$\frac{1}{4}$ diam.	Nos. 125 and 122 jack mounting as designation plugs to indicate different conditions of the line.
124B	Brass, red celluloid cover.	$\frac{1}{4}$ diam.	
124C	Brass, slate celluloid cover.	$\frac{1}{4}$ diam.	
124D	Brass, black celluloid cover.	$\frac{1}{4}$ diam.	
124E	Brass, yellow celluloid cover.	$\frac{1}{4}$ diam.	
124F	Brass, blue celluloid cover.	$\frac{1}{4}$ diam.	
124G	Brass, green celluloid cover.	$\frac{1}{4}$ diam.	
124H	Brass, light green celluloid cover.	$\frac{1}{4}$ diam.	
126A	Marked "Out of Service."		Used in No. 50 type coin collectors.
128B	Metal, black finish, papercard with celluloid covering.	$2\frac{1}{2} \times 1\frac{1}{4}$	{ Face of transmitters; furnished with celluloid strip and card for the exchange number.

*Engraved as specified in order.

**Numbers from 0 to 9727 inclusive are furnished on printed sheets, 512 numbers to a sheet. Sheets desired must be specified in order.

For number plates for machine switching telephone dials, see listing of Telephones for machine switching service.

PLUGS



Plugs

Code No.	No. of Conductors	May be used with Jack Nos.	Ordinarily Used with Cords Nos.	Used with combined Jack and Signal No.
1A	1	Any jack using No. 47 plug	512	
No. 1A goes in same jacks as Nos. 47 and 116. This plug is so designed that the outer shell is entirely insulated from the conductors. Used in the Nos. 385, 386 and 389 type jack boxes.				
47A	2	{ 99-200-201-203-208-224-146-147-149-151-154-155-156-159-168-169-173-175-176-177-215A-216A-223A-225A-226A-217A-218A-227A-281A }	493	2, 3, 6, 7, 8, 22, 23, 26, 27 types
No. 47A plug has a red shell.				
47B	2		493	
No. 47B plug is same as the No. 47A except that it has a black shell.				
109	3	92-229-128-134-143	447	
No. 109 is furnished with red shell unless otherwise specified; grey or black shell may be obtained when so ordered.				
110	3	{ 50-141-193-275-158-160-161-162-163-165-259-290B }	448	4, 11, 12, 24 and 31 types.
No. 110 is furnished with red shell unless otherwise specified.				
116	1	{ Same as for No. 47 plug.	510 511	No. 9 type
No. 116 uses a single conductor cord of same outside diameter as 2 or 3 conductor cords.				
136	2	99-152	369	
No. 136 has red fibre shell. Used in 1200 type switchboards.				
144	1	Same as for No. 47 plug	524	
No. 144 same as No. 116 except equipped with a bushing in the cord hole so that it will accommodate a small single conductor cord. Used in service observing.				
145	2	.....	Special 493	42C
146	2	186	509	

No. 146 has tip insulated. Through the insertion of the plug, the carbon protector blocks of the pole jack are connected across the line before the connection between set and line is made.

PLUGS
(Continued)



No. 148



No. 151



No. 153



No. 165

Plugs

Code No. 148	No. of Conductors 3	May be Used with Jack Nos. 77-78-190	Ordinarily Used with Cords Nos. 545
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No. 148 replaces No. 85 plug.

Code No. 150	No. of Conductors ..	May be Used with Jack Nos. Any jack used with No. 110 plug	Ordinarily Used with Cords Nos. No cord required.
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No. 150 is a dummy plug having the same profile and overall dimensions as the No. 110 plug; the tip, plug and sleeve are insulated from each other; equipped with fiber shell entirely insulating the handle. It is used for plugging out signals in lines which are in trouble.

Code No. 151	No. of Conductors ..	May be Used with Jack Nos. Any jack used with No. 47 plug	Ordinarily Used with Cords Nos. No cord required.
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No. 151 is a dummy plug having the same profile and overall dimensions as the No. 47 plug; it is designed for use in magneto switchboards for short-circuiting line which are in trouble.

Code No. 153A	No. of Conductors 2	May be Used with Jack Nos. See Note	Ordinarily Used with Cords Nos. No cord required
Code No. 153B	No. of Conductors 2	See Note	No cord required
Code No. 153C	No. of Conductors 2	See Note	No cord required

Plugs of the No. 153 type function with the same jacks as the No. 47 plugs. Each 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 1/10 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.

Code No. 165	No. of Conductors ..	May be Used with Jack Nos. See Note	Ordinarily Used with Cords Nos. No cord required
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No. 165 is a wooden dummy for use at test boards, etc., for opening jacks which use the Nos. 47, 110 or 116 plugs. The handle is $\frac{1}{4}$ inch diameter and $\frac{3}{8}$ inch long.

Code No. 219	No. of Conductors 2	May be Used with Jack No. 302	Ordinarily Used with Cords Nos. 772, 763
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The No. 219 plug is similar in profile as the No. 148 plug. Equipped with a black shell. May be used in connection with the No. 1002C head set.

PLUGS
(Continued)



No. 43



No. 133



No. 137



No. 141



No. 152

Twin Plugs

When an operator's head set 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.

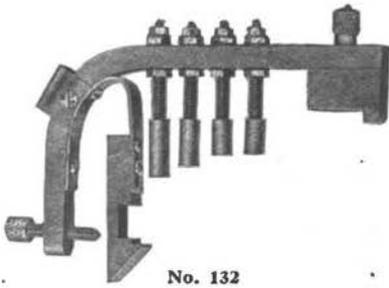
The standard plug for use with operator's head sets (the No. 137 plug) has been designed to include a self-adjusting feature which allows sufficient movement of each plug in the shell to take up any slight offsetting present in the jacks or which might otherwise be present in the plug itself. It will readily be seen that unless the center lines of both the jacks and plugs are parallel and exactly the same distance apart, excessive wear will result in both plug and jack if a non-flexible construction is used in the plug.

Twin plugs used mainly for testing are of the rigid type because of their comparative infrequent use and resulting small amount of wear. They are so marked that the operator may always insert them in the same position in the jacks and thus makes the proper connections with the testing circuit.

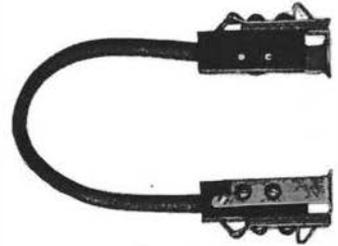
The No. 152 plug combines both features; its shell is marked and the flexible construction is used. By its use the most accurate testing connections may be made on circuits calling for 2 conductor plugs.

Code No.	No. of Conductors in Each Plug	Used with Jack No.	Plug Centers (Ins.)	Construction	Ordinarily Used with Cords No.	Notes
43	1	Any jack used with No. 116 plug and which mounts on $\frac{3}{8}$ inch centers.	$\frac{5}{8}$	Rigid	636 638	Used with portable composite set and at toll test boards.
133	3	Any jack used with No. 110 plug and which will mount on $\frac{1}{2}$ inch centers.	$\frac{1}{2}$	Rigid	448	Consists of two No. 110 plugs mounted on a rubber shell. Used in No. 10 Wire Chief's Desk.
137	2	Any jack used with No. 47 plug and which will mount on $\frac{5}{8}$ inch centers.	$\frac{5}{8}$	Flexible	87 555 568	The two plugs are insulated from each other. Used for operator's head telephone sets.
141A	2	Any jack used with No. 47 plug and which will mount on $\frac{5}{8}$ inch centers.	$\frac{5}{8}$	Rigid	694	Black fiber shell. The brass frame of the plug connects electrically the two plug sleeves; the tips are separately insulated.
141B	2		$\frac{5}{8}$	Rigid	694	Red fiber shell, otherwise same as the No. 141A.
141C	2		$\frac{5}{8}$	Rigid	520	Black fiber shell. The tip conductors are connected electrically as well as the plug sleeves.
152	2	Used with same jacks as No. 137 plug.	$\frac{5}{8}$	Flexible	558 568 87	Used in testing and service observation circuits. Same as No. 137 plug except that four ridges in its shell distinguish one side from the other, thus preventing improper insertion of plug in jacks.

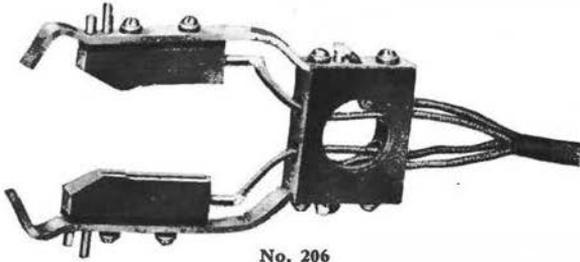
PLUGS
(Continued)



No. 132



No. 135



No. 206



No. 143

Test Plugs

Code No.	No. of Conductors	Ordinarily Used with Cords Nos.	Used with	Notes
132	4	556	Nos. 35, 36, 38 and 39 terminal strips.	Used for connecting service observing equipment to subscribers' line at the Intermediate Distributing Frame.
135	2	...	Nos. 67 and 73 heat coils and Nos. 4, 65, 73, 82, 84, 87, 89, 1168 and 1169 type protectors.	This plug is used at the protectors to reverse the polarity of a subscriber's line on which there is a ground on the ring side; the subscriber is given temporary service by battery feed over the tip side of the line.
143	2	517	Nos. 4, 65, 73, 82, 84, 87, 89, 1168 and 1169 type protectors.	Intended to be inserted in the protectors of the Main Distributing Frame in place of a heat coil for the purpose of introducing service observing equipment in series with the subscriber's line.
206	4	716	Nos. 73, 75, 1077, 1168, 1169, 1177, 1268 and 1269 type protectors.	Used for connections at the protectors of the Main Distributing Frame for testing line in or out of office.

Plug Seats

These red fiber plug seats are furnished complete with No. 4 round head wood screws, 1/2 inch long, for mounting.

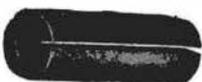


No. 13 Plug Seat

Code No.	Mount on Centers, Ins.	Used With Plugs Nos.
12	3/4	110
13	3/4	109
15	3/8	47
16	..	43-141
17	..	133

Plug Trouble Caps

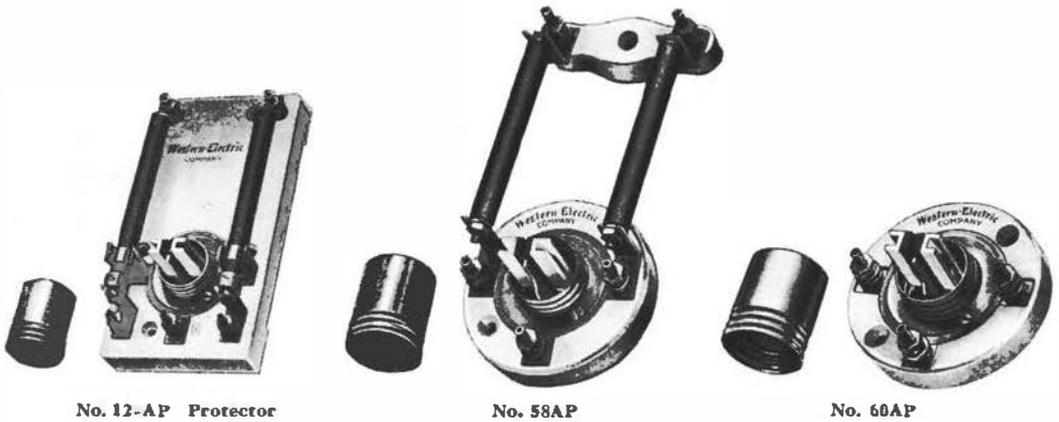
Split fibre tubes, 1 inch long, which will slip over plugs. They are used as temporary markers for cord circuits in which there is trouble.



No. 1A

Code No.	Color	Used with Plug Nos.	Code No.	Color	Used with Plug Nos.
1A	Black	109	2A	Black	47 and 110
1B	Red	109	2B	Red	47 and 110

PROTECTORS



Protectors

Protection against lightning and high voltage electric circuits is an important feature of telephone practice. The protector must be simple in construction so that the parts can be easily replaced when necessary, and reliable in operation in order that it may give the desired protection when needed. These requirements are fully met by Western Electric fuses, protector blocks and heat coils, when used in the mountings which have been designed for them. The fuses act at one and one-half times their rated current values and all fuses of the same code and capacity will give consistent results; the open space cut-outs protectors will discharge across their air-gaps at a definite voltage value because of the accurate manufacture of the blocks and separating micas; the heat coils ground the lines in which they are inserted upon a "sneak current" flow for a period of three and one-half minutes.

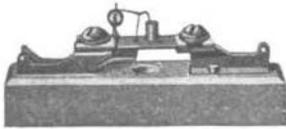
The wide application of carbon block cut-out (air gap) protectors throughout the telephone plant, makes particularly important the use of carbon blocks requiring a minimum of attention for renewal and cleaning, and with this fact in mind, the Nos. 26 and 27 protector blocks have been so designed as to reduce maintenance while, at the same time, affording the highest grade of protective service. These blocks are described and their operation explained in connection with their listing under "Protector Blocks" and are furnished as standard equipment in practically all subscribers' station protectors using carbon block protectors. Separate protectors and various arrangements of protectors for use in groups, are illustrated in the following pages. The mechanical designs have been tested by long service and proven to be correct in principle and dependable in operation.

Code No.	Protectors Consists of	Protects	
12AP	1 No. 25 protector mounting 2 No. 11D fuses (7 ampere) 2 No. 26 protector blocks 2 No. 27 protector blocks	Magneto telephone sets against high potential (lightning) abnormal and sneak currents	
*58AP	1 No. 29 protector mounting (instrument end) 1 No. 16 protector mounting (line end) 1 No. 48 protector mounting (asbestos pad) 2 No. 26 protector blocks 2 No. 27 protector blocks 2 No. 11C fuses		
58B	1 No. 29 protector mounting (instrument end) 1 No. 16 protector mounting (line end) 1 No. 48 protector mounting (asbestos pad) 2 No. 19 protector blocks 2 No. 20 protector blocks 2 No. 10 protector micas 2 No. 11C fuses		Magneto telephone sets against high potential (lightning) and abnormal currents
60AP	1 No. 49 protector mounting 2 No. 26 protector blocks 2 No. 27 protector blocks		

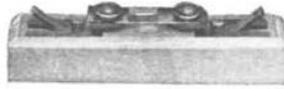
* A No. 60A fuse and No. 16 protector mounting may be used in connection with the No. 58AP protector as a sneak current arrester for protection of private branch exchange.

PROTECTORS

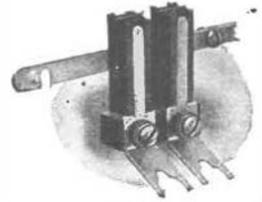
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No. 62C



No. 62D



No. 17B with Connector and Section of Ground Strip

Protectors

- | Code No. | Protector Consists of |
|----------|--|
| 62C | 1 No. 50B protector mounting (porcelain base 3½ x ¾ inches)
1 No. 35A fuse (1½ amperes; furnished with No. 35C, 2 ampere fuse or with No. 35F ½ ampere fuse, if so ordered) |
| 62D | 1 No. 22B protector mounting (porcelain base 3½ x ¾ inches)
1 No. 24A fuse (1½ amperes; furnished with No. 24C, 2 ampere fuse, if so ordered) |
| 76AP | 1 No. 29 protector mounting
2 No. 26 protector blocks
2 No. 27 protector blocks |
| 17B | 1 No. 15 protector mounting
2 No. 19 protector blocks
2 No. 20 protector blocks
2 No. 11 protector micas |

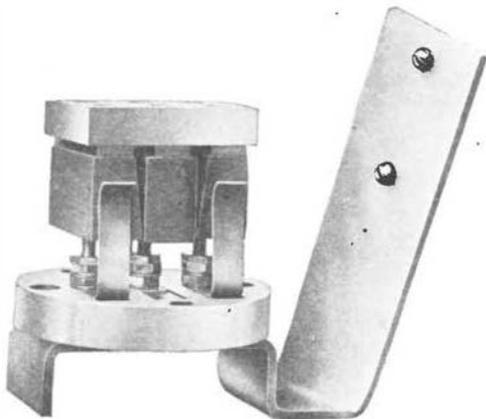
Note. For "Ground Strips," see listing elsewhere.

Protects Central battery switchboard circuits against abnormal currents.

Protects Central battery switchboard circuits against abnormal currents.

Against high potential (lightning); a two-wire protector (comprises part of the No. 58AP protector).

Used in No. 17 type cable terminals. Mounts on the No. 1075A protector



No. 86B Protector. Cover Removed



No. T-533B Protector

86B Consists of a porcelain base having two-line terminals and one ground terminal, three large carbon blocks (which are so placed as to form a high voltage protector) and a metal cover.

T 533B Non-arching metallic electrodes mounted in a sealed case suitable for mounting out of doors (a two-wire protector)

Telephone lines against high potential and abnormal currents

Against high potentials due to lightning, high potentials, crosses with light or power lines, and induced potentials caused by parallel lines. For use on lines mounted on poles carrying both telephone and power lines.

PROTECTORS

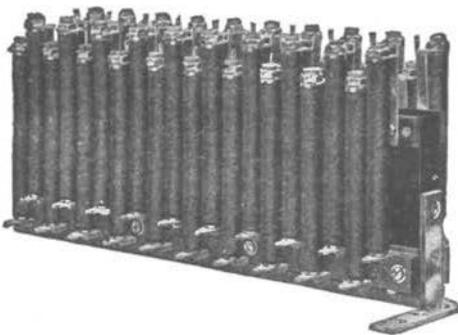
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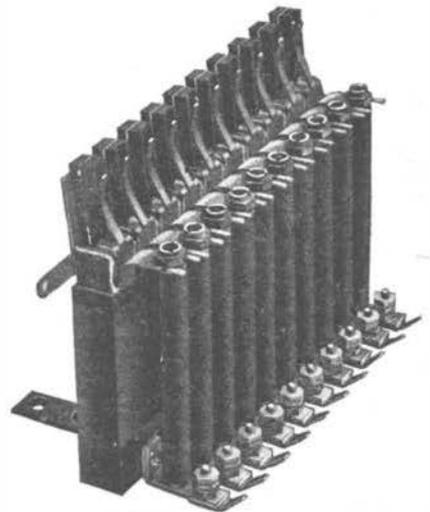
No. 144585 Vacuum Arrester

Metal Vacuum Tube Arresters

List No.	Consists of	Description	Use
144585	1 Porcelain base—List No. 144584 1 Vacuum arrester tube—List No. 140116	{ Base has 1 terminal for the ground connection, 1 terminal for the line and 1 terminal for connecting to instrument	{ Protection against high voltage (lightning)
148057	1 Porcelain base—List No. 148056 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 $\frac{1}{8}$ in. overall height	{ Used in No. 144585 vacuum tube arrester
148056	Base for mounting one vacuum arrester tube	{ Porcelain; two terminals 5 $\frac{3}{4}$ in. x 1 in. and 2 $\frac{1}{8}$ in. overall height	{ Used in No. 148057 vacuum tube arrester
140116	Vacuum arrester tube	{ Single pole. This tube must be mounted in vertical position	{ Used in No. 144585 and No. 148057 vacuum tube arrester



No. 77B



No. 1074-A Protector

Protectors

Mounted in Strips

Code No.	Equipped With	Protects
77B	1 No. 7A fuse	Against abnormal currents. Used in cable terminals.
1074A	1 No. 94A Protector mounting 1 No. 19 Protector block 1 No. 20 Protector block 1 No. 11 Protector mica	Against abnormal current and high potential (lightning). Replaces No. 61 type Protector.
1075A	1 No. 7A fuse 1 No. 75A Protector mounting 1 No. 75A fuse	Against abnormal currents. Used in cable terminals.

PROTECTORS—Continued

No. 1168 and No. 1169 Types

These protectors are for use in central battery and local battery exchanges. They provide protection against lightning and sneak currents.

The springs used are made of nickel silver, and where dependence is placed upon them for operating movements, they are accurately adjusted to give the necessary pressure. They employ no small, delicate or easily bent springs.

The heat coils associated with open-space protectors have springs for their support and operation which are entirely separate from those used in connection with the protector blocks. Variation in the thickness of the blocks, does not, therefore, interfere with the operation of the heat coils. The detailed operation of these heat coils is explained under "Heat Coils."

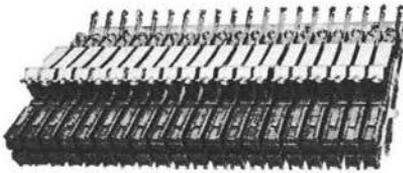
The ground connection, obtained through the operation of a heat coil, is made through a separate spring and is, therefore, reliable and of low resistance.

The protectors of the No. 1168 type are alike except that the No. 1168A is furnished only in lengths 20 per mounting, while the No. 1168B is supplied only in strips of 23 protectors. Each protector provides for one pair of wires. The terminals are so arranged that the line wires may be connected directly at one side of the protector and jumpers, extending to a switchboard cable terminal block, connected to the terminals on the other side of the mounting. These units are used on Type "A" main distributing frames.

The No. 1169 type is similar to the No. 1168, except that the terminals are arranged for connecting the switchboard cable wires directly to one side, jumpers being used from the other side of the protector to an outside line terminal block.

The No. 1169 is furnished only in units of twenty per strip; and are used on type "B" main distributing frames.

Both the No. 1168 and No. 1169 type Protectors may be mounted on walls or partitions by means of the No. 736A Mounting Plate. Where required, one or more of these mounting plates should be ordered as indicated under "Protector Mounting Plates."



20 No. 1169A

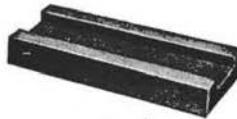
Code No.	Consists of
1168A	1 No. 68A Protector Mounting 2 No. 1 Protector Blocks 2 No. 2 Protector Blocks 2 No. 3 Protector Micas 2 No. 73A Heat Coils
1168B	1 No. 68B Protector Mounting 2 No. 1 Protector Blocks 2 No. 2 Protector Blocks 2 No. 3 Protector Micas 2 No. 73A Heat Coils
1169A	1 No. 69A Protector Mounting 2 No. 1 Protector Blocks 2 No. 2 Protector Blocks 2 No. 3 Protector Micas 2 No. 73A Heat Coils

No. 1268 and 1269 Types

These protectors are identical in construction with the corresponding No. 1168 and No. 1169 type protectors respectively, but differ in that they are equipped with No. 26 and No. 27 protector blocks instead of the No. 1 and No. 2 protector blocks and the No. 3 protector mica. No protector mica is needed when the No. 26 and No. 27 protector blocks are used. They should be specified when the new design of Protector Block is desired.



No. 1



No. 2

Protector Blocks

Nos. 1, 2 and 5 Types

Code No.	Description	Protector Micas	Used With Protectors
1	Plain carbon block with fuse metal.....	No. 3 and No. 12	Nos. 1168 and 1169 types
2	Grooved carbon block without fuse metal....	No. 3 and No. 12	Nos. 1168 and 1169 types
5	Grooved carbon block with fuse metal.....	No. 3 and No. 12	Nos. 1168 and 1169 types

No. 9 Type

The No. 9 Protector Block is a paraffined wood dummy which is used in place of the No. 1 and No. 2 Protector Blocks when the open-space cut-out is to be made non-operative.

Code No.	Description
9	Paraffined wood dummy

PROTECTOR BLOCKS AND MICAS

Protector Blocks

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 break-down 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.



No. 19



No. 20

Code No.

Description

Used With Protectors

- 19 Plain copper block with two pins.....
- 20 Grooved copper block with two bushings.....
- 25 Plain copper block with two pins and fuse metal....

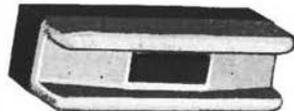
- 60B and 80A
- 60B and 80A
- Used in place of No. 19 protector block when fuse metal is desired



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 constant 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
27	Porcelain frame with carbon insert.....	Nos. 12AP, 58AP, 60AP, 76AP, 1079AP, 1268A and 1269A
30	Porcelain frame with carbon insert.....	83A protector mounting

The new blocks are interchangeable with the old combinations of No. 1 protector block, No. 2 protector blocks and No. 3 protector mica in all subscribers' set protector mountings and are therefore available for improving protective equipment already in service, during the normal replacements. This practice will result in fewer visits of the trouble man to subscribers' station. In central office, a saving in labor will be effected through a material reduction in the time required for cleaning and maintenance. These facts have been fully verified by the use of Nos. 26 and 27 protector blocks in actual service. All orders for replacements of Nos. 1 and 2 blocks and No. 3 micas in subscribers' telephone station protectors should specify the Nos. 26 and 27 protector blocks; no separator (protector mica) is needed with the new design of block.

Protector Micas



No. 3 Protector Mica

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.



No. 10 Protector Mica

PROTECTOR MOUNTINGS



No. 48
Protector Mounting



No. 82
Protector Mounting



No. 83A Protector Mounting

Protector Mountings

- | Code No. | Description |
|----------|--|
| 16 | Part of No. 58AP protector, also used as part of mounting for No. 60A fuse, consists of porcelain base equipped with clips for holding fuses. |
| 48 | An asbestos pad $8 \times 4\frac{1}{2}$ inches for use with the No. 58 type protectors. This pad is included in the complete No. 58AP and No. 58B protectors, but may be ordered separately as the No. 48 protector mounting when so required. |
| 29B | For use in mounting protective apparatus of the No. 58, 74, 76 or 79 type protectors. Consists of porcelain base equipped with clips for holding protector blocks, protector mica and fuses. |
| 82A | This protector mounting consists of a cast iron galvanized case approximately $11\frac{1}{2} \times 4\frac{3}{4} \times 4\frac{5}{8}$ inches over all with hinged cover and a wooden backboard. It is used for mounting the No. 58 protector at telephone stations located out of doors. |
| 83A | Designed to protect drop wires between the overhead lines and the subscribers telephone set from lightning. This protector mounting consists of an iron box approximately $8\frac{3}{4} \times 3\frac{1}{2} \times 2\frac{1}{2}$ inches deep with a hinged cover having a No. 84A protector mounted within it. Arranged to mount 10 pairs of No. 26 and 30 protector blocks on No. 19 and 20 blocks with No. 11 mica. This protector mounting provides for the protection of 5 pairs of wires. The box mounts directly underneath the crossarms on the poles. Two mounting lugs are provided for this purpose. |

Protector Mounting Plate

The No. 736A mounting plate is used with the Nos. 1168 and 1169 type protectors when they are to be mounted on flat surfaces such as walls and partitions. It consists of a supporting bar $\frac{1}{4} \times 1\frac{1}{2}$ inches equipped with angle brackets adapted to fasten to cross strips on the wall, etc., and can be supplied in lengths suitable for use with protectors for from 20 to 243 lines. These mounting plates progress in capacity by 20 lines each. When ordering give the code number of the mounting plate and the number of protectors to be mounted per plate.

Code No.	Capacity	Code No.	Capacity
736A	20 or 23 protectors	736A	60 or 63 protectors
736A	40 or 43 protectors	736A	80 or 83 protectors

Larger plates will be supplied upon application.

PUSH BUTTONS

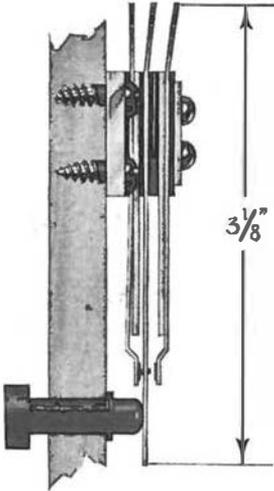
Push Buttons

These push buttons are suitable for general telephone use, but are primarily intended for use in magneto telephones for "central office selective signalling" service. Other uses will be suggested by the descriptive matter in this catalog under "Definition of Terms."

The springs are of nickel silver and are backed up with brass stop springs. The ends of the springs are notched and tinned in order to permit wires being readily soldered to them. The button is made of hard rubber.

Note. The No. 465 type keys consist of push buttons mounted in small wooden boxes suitable for use in connection with telephone apparatus.

See also push buttons listed under keys.

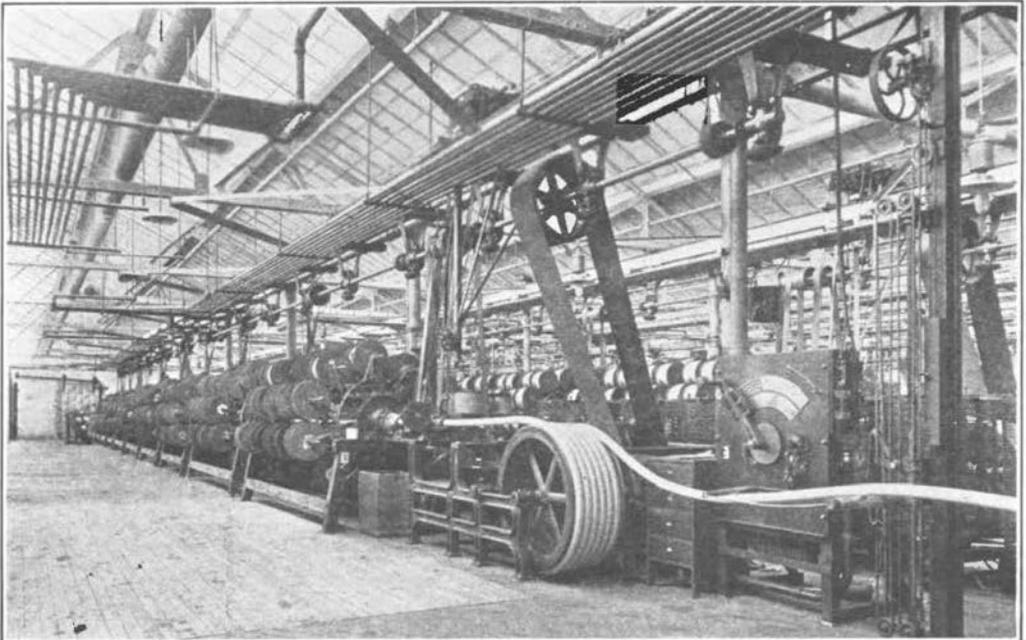


No. 1006A Push Button

Code No.	Spring Combination	Buttons Finished For Woodwork Thickness As Follows:	Principal Use
1002A	Five springs arranged for one break two make contacts..	$\frac{3}{32}$, $\frac{1}{2}$ or $\frac{3}{16}$ inch as specified.	Used in magneto telephones for central office selective signalling.
1004A	Six springs arranged for two break-make contacts*.....	$\frac{1}{2}$ in.	Used in magneto telephones for "signalling central secretly."
1006A	Three springs arranged for one break-make contact.....	$\frac{3}{32}$, $\frac{1}{2}$ or $\frac{3}{16}$ inch as specified**	Used in magneto telephones for "central office selective signalling."

*The No. 1004A is in effect two No. 1006A push buttons.

**A button for $\frac{3}{32}$ inch wood will be furnished in cases when orders do not specify the thickness of the woodwork with which the push button is desired for use.



Cable Stranding Machine, Hawthorne Works

RECEIVERS

Western Electric Receivers are as near perfection as scientific research has been able to make them.

General

The No. 143AW Receiver is the same as the No. 144AW, except that it has a composition case and ear piece. These composition parts will give entire satisfaction under ordinary conditions, but where rough handling is apt to be encountered, the use of the No. 144AW Receiver is recommended. The No. 144AW Receiver is also recommended where high humidity is encountered, for example, in mine service.

The Nos. 143AW and 144AW Receivers are used on telephones and desk stands for standard central battery and local battery service. These receivers weigh 13 oz. and will operate any of our Nos. 140 and 143 type switch hooks and the switch hooks of our standard desk stands. The No. 171W (magnetless) receiver, in view of its light weight (5½ oz.), is suitable only for use with the No. 143M switch hook and No. 1020AH desk stand.

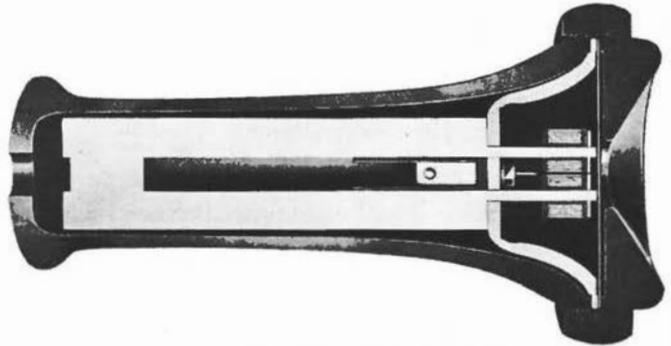
Nos. 143AW, 144AW and 171W receivers are equipped with binding posts that will take either pin type or flat type cord tips.

The "P" numbers of the parts, of certain of these receivers are included in the following table so that replacing parts may be ordered if desired.

No cords are included with these receivers and must, therefore be ordered as separate items.



143AW, 144AW, 171W Equipped with Cord



Section of 143AW or 144AW Receiver

RECEIVERS FOR STANDARD CENTRAL BATTERY AND LOCAL BATTERY SERVICE

For Wall Telephones and Desk Stands

Code No.	Type	Shell Material Composition	Ear Piece Material Composition	Resistance (Ohms)	General
143AW	Standard Hand Type	P-93518	P-93519	75	Same as No. 144AW except that the shell and ear pieces are made of composition instead of hard rubber. Terminals arranged for clamping Nos. 29 or 82 cord tips.
144AW	Standard Hand Type	Hard Rubber P-94533	Hard Rubber P-93520	75	Same as No. 143AW except that shell and ear pieces are made of high grade hard rubber instead of composition.
146AW	Watch case type —not equipped with hanger	Hard Rubber P-99403	Hard Rubber P-94545	650	Intended principally for use in multiple with the regular receiver furnished on a desk stand or telephone. Equipped with a cut-in switch. Will fit the No. 1A receiver holder which is designed for use on desk stands. Intended for use under the following conditions: Where receiving difficulty is encountered on long distance connections. Where telephone is installed in a very noisy location. Where the telephone user has defective hearing.



146AW

RECEIVER FOR SERIES CENTRAL BATTERY SERVICE

171W	"Magnetless" or direct current type	Composition P-92613	Composition P-91614	40	Bi-polar receiver for aeries central battery service. This receiver is not provided with a permanent magnet. The weight of this receiver is 5¼ ounces whereas the 143AW and 144AW receivers weigh 13 ounces.
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Western Electric

RECEIVERS

(CONTINUED)



No. 528BW



No. 131W



509-W (1002-C Head Set)

RECEIVERS—FOR USE ON HAND SETS—FOR CENTRAL BATTERY AND LOCAL BATTERY SERVICE

Code No.	Type	Shell Material	Ear Piece Material	Resistance Ohms	Notes
131W	Hand Set	Brass, nickel plate	Hard rubber P-81496	70	For use in connect on with No. 1001 type hand sets. Designed to withstand rough handling. Ear piece clamped to shell by a brass ring nut. Small bi-polar receiver for use on No. 1002 type hand sets.
141W	Hand Set	Brass, nickel plate	Composition P-88295	70	

RECEIVERS FOR USE ON LINEMEN'S TEST SETS

515W	Operators' type. Less head band	Brass, black finish	Hard rubber	45	Arranged so that cord tips may be entirely concealed. Same as No. 189W train dispatching receiver except that head band is omitted.
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RECEIVERS—OPERATORS' TYPE

528BW	Operators Standard	Brass, black Finish	Hard rubber P-98919	80	High efficiency receiver equipped with a No. 3A head band.
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RECEIVERS—HEAD SET

509W	Head Set	Brass, Nickel plate	Hard Rubber P-99768	1100	High efficiency receiver used on No. 1002C head set.
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RECEIVER PARTS

(For Piece Part Numbers of Shells and Ear Pieces, See Receivers)

DIAPHRAGMS

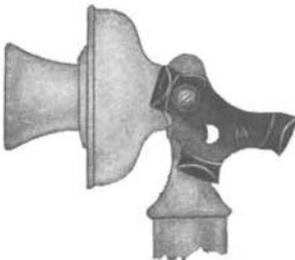
Part No.	Name	Receiver Used On	Part No.	Name	Receiver Used On
P-95114	Diaphragm	171W, 141W, 144AW-143AW	P-91525	Diaphragm	131W
P-95225	Diaphragm	146AW-515W	P-98387	Diaphragm	528BW, 509W

HEAD BANDS

Code No.	Name	Receiver Used On
3A	Head Band	528BW, 509W
1B	Head Band	1002C and 528BW

RECEIVER HOLDER

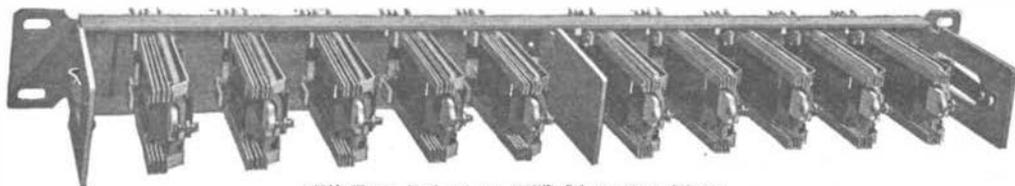
No. 1 Type



No. 1A Receiver Holder

1A This is designed for use on No. 1020 type desk stands for holding a No. 146AW Receiver, in cases where this receiver is connected in multiple with the regular desk stand receiver. It is designed so that the receiver may be easily removed but is normally held so firmly that it will not be dislodged accidentally or rattle. This receiver holder is so arranged that it can be mounted by means of the screw which holds the transmitter in place. It has a black finish.

RELAYS



"E" Type Relays on 737B Mounting Plate

Relay Types

The relay is an essential and important piece of telephone equipment and the correct design of this class of apparatus, not only materially affects the quality of service rendered by the entire telephone plant, but also the expense incurred in securing that service. The increasing use of central battery equipments necessitate relays suitable for operation on direct, pulsating, and alternating current in circuits not only calling for a wide variety of spring arrangements and combinations, but also for slow acting as well as fast acting types. Relays of high impedance and those of low impedance have very definite fields of application and polarized relays are necessary for accomplishing certain results. To meet these varying conditions, the Western Electric Company has developed a number of relay types; each type being supplied with the character of windings and arrangement of contacts to meet the requirements of the circuits in which it is to be placed. It is impracticable to catalog them all here, the main types only being described. Further details will be supplied upon request.

Flat Type Relays

The expense of installation, operation and maintenance are reduced to a minimum by the use of standardized forms of apparatus. After careful analysis of the circuit conditions under which relays are most commonly used, the "Flat Type Relay" form of construction has been evolved which lends itself readily to a great variety of slight changes through winding modifications and contact arrangements, producing a relay ideally suited to a multiplicity of applications and requirements. The advantages of Flat Type Relays are briefly indicated below.

1. Efficiency of Operation. Each relay requires the minimum amount of current consistent with the conditions under which it operates. These conditions cover the contact pressures necessary both during operation and in its non-operative position, the speed or time of operation and the requirements as to high or low impedance which its position in the circuit makes necessary. High efficiency is attained through a careful choice of materials and the correct proportioning of the parts.

2. Permanent and Easy Adjustments. All Flat Type Relays have their spring contacts and armature air gaps at the front end of the relay where they are clearly visible while being adjusted when in place on their mountings. The adjustments are permanent over long periods of service, being maintained under widely varied conditions of heat, cold and humidity.

3. Insulation of Contact Springs. "Phenol Fibre" is used for spring insulation. This material in addition to having the high dielectric strength of hard rubber has the advantage of not being affected by heat, moisture or deterioration like rubber.

4. Self Cleaning Contacts. All contacts are so mounted that their surfaces are in a vertical plane, allowing dust to fall out of, rather than settle on, the contacts. Maintenance is reduced by this construction and difficulties due to poor contacts avoided.

5. Armature Suspension. A flat, reed type spring is used for armature suspension in all Flat Type Relays. This feature of design secures a continuous and unvarying magnetic path between the armature and the core. By the selection of suitable springs, extremely sensitive relays are obtained with this type of construction.

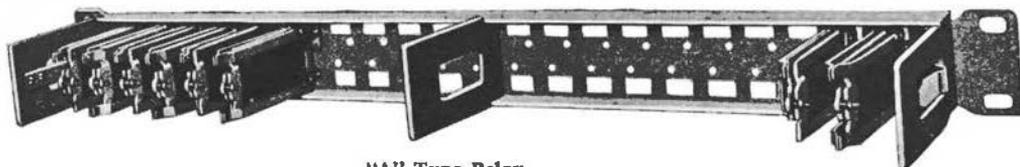
6. Durability of Parts. All steel parts are galvanized. The special alloy steels used are not only the best material, electrically, for the parts in which they are utilized, but are mechanically strong materials from which small parts having great strength may be made. The spool heads are of Phenol Fibre and the windings are highly insulated. All windings will carry continuously without injury, currents greater than required for operation.

7. Small Size and Ease of Mountings. Compact in design, these relays are light in weight and occupy a small amount of space. Their terminals are all at one end and conveniently arranged for making soldered connections. Mounting plates for placing groups of relays under common dust-proof covers and also mounting plates for use when individual cross-talk proof covers are required on each relay, are listed elsewhere as all flat type relays are insulated from their mountings and are fastened in place by means of two screws; their stability and ruggedness when mounted reduces maintenance costs.

RELAYS

Flat Type Relays—Continued

The "A," "B," "E," "H," and "G" type relays are all of the Flat Type form of construction and can be supplied to meet a great variety of circuit conditions.



"A" Type Relay

"A" Type Relays

The "A-1" and "A-2" relays are used together as a line and cut-off relay group. The above illustration shows a No. 737-A Mounting Plate with four of the total of ten line and cut-off groups in place. These mounting plates may be placed upon $1\frac{1}{4}$ inch vertical centers and are each equipped with a dust-proof metal cover. The small amount of space occupied and the ease of inspection and adjustment is clearly shown.



"E" Type Relay

"E" Type Relays (General Use)

The "E" type relay has been designed for heavy duty, general purpose use. The fact that each relay may have two sets of contact springs which may be duplicated or may differ in contact arrangement, makes it possible in many cases to use one of these relays where two or more of another style would be required. They may be mounted in groups under a common dust-proof cover on $\frac{3}{4}$ or 1 inch horizontal centers, the spacing depending upon the number of contact springs with which they are equipped. They may also be obtained with individual dust-proof covers and when so equipped will mount on $1\frac{1}{4}$ inch horizontal centers. Relay Mounting Plates for "E" type relays may be placed on $1\frac{1}{4}$ inch vertical centers.

"H" Type Relays

The relays of the "H" type are similar to the "E" relays, but have higher impedance due to the laminated construction of their cores. They are each equipped with a cross-talk proof cover and will mount on $1\frac{1}{4}$ inch horizontal and $1\frac{1}{4}$ inch vertical centers.

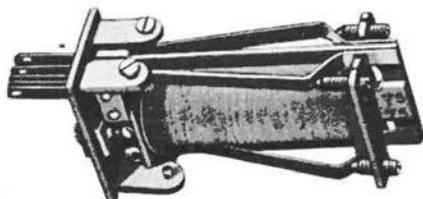
"B" Type Relays

"B" type relays are provided with a micrometer screw adjustment feature which permits of extremely accurate adjustments being made. They are used as supervising relays in switchboard cord circuits and in other places where a sensitive, highly efficient and reliable relay is required. When used as a series supervisory relay, the transmission loss is very low.

These relays have superior "flashing" ability and will operate in a line having as high as 1000 ohms resistance.

"B" type relays are provided with individual covers, each having a removable cap which may be placed in position without affecting the adjustment of the relay. The individual covers are dust proof and cross-talk proof on all "B" type supervisory relays. For purposes in which the cross-talk shielding is not required, dust-proof covers are supplied. These relays may be mounted on $1\frac{1}{4}$ inch horizontal and $1\frac{1}{4}$ inch vertical centers.

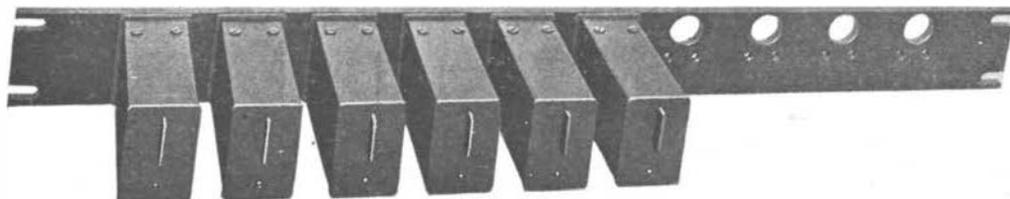
The use of a supervisory relay of the "B" type secures the operating advantages which are obtained through sensitive adjustment, low transmission loss, and reduced maintenance.



"B" Type Relay With Cover Removed

"G" Type Relays

The "G" type relays are provided with micrometer screw adjustment and are otherwise similar to the "B" type relays, but are of higher impedance due to the use of a laminated core. Each relay is equipped with a cross-talk proof shell with removable cap and will mount on $1\frac{1}{4}$ inch horizontal and $1\frac{1}{4}$ inch vertical centers.



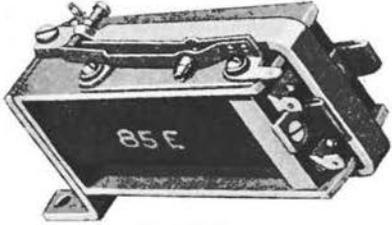
"B" Type Relays on No. 600A Mounting Plate

RELAYS

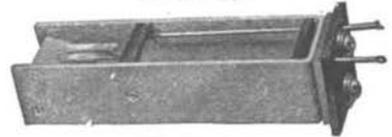
(Continued)



No. 44 Type



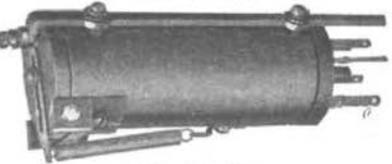
No. 85 Type



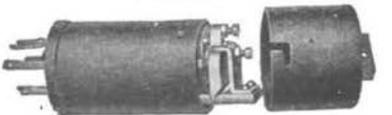
No. 87 Type



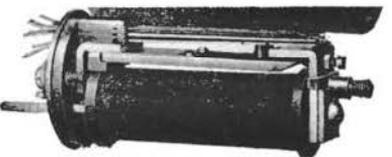
No. 89 Type



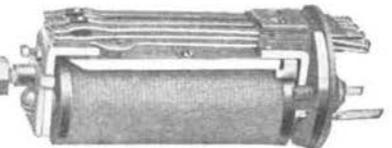
No. 114 Type



No. 118 Type



No. 122 Type



No. 125 Type



No. 189 Type

No. 44 Type Relay

The No. 44 type relays are provided with a line coil and a restoring coil. They have the characteristics of a drop. When the line coil is energized, the front armature is released and falls forward, closing a local contact. When the restoring coil is energized, the front armature is returned to the vertical position. Each relay is provided with a cross-talk proof shell.

No. 85 Type Relay

The No. 85 type relays are slow acting and are designed to operate on either alternating or direct current. They are used in the No. 1533 and No. 6054 type telephones in four party selective ringing systems employing superimposed ringing current. An angle bracket for mounting it in a vertical position is provided on certain types.

No. 87 Type Relay

No. 87 type relays close a local circuit only while the line is being rung upon. They have flexible contact springs and heavy armatures of sluggish action so that the local circuit remains closed as long as there is ringing current on the line and are used in trunk circuits between central offices. They are equipped with cross-talk proof covers. One contact is made when the relay is operated. One form of this type of relay has an independent breaking contact.

No. 89 Type Relay

No. 89 type relays have an operating coil and a locking coil. They are designed to respond to ringing current and to close a circuit through an armature contact and locking coil so that the relay remains in the operated position after ringing has ceased. They are used for toll line signaling and in toll cord supervisory circuits and have cross-talk proof covers. One contact is made when the relay is operated.

No. 114 Type Relay

Relays of the No. 114 type operate on direct current and have one or two operating windings. They are provided with cross-talk proof shells. One contact is made and one broken when the relay is operated.

No. 118 Type Relay

No. 118 types are sensitive relays for operating on direct current for general use where a single contact is to be made. Several forms of this relay have, in addition, a back contact. They have cross-talk proof covers. The "B" type relay is recommended for those uses formerly calling for the No. 118 type relays.

No. 122 Type Relay

Relays of the No. 122 type are operated by direct current and most commonly used where it is desired to break two and then make two contacts when the relay is energized, and they are also supplied with various other spring arrangements. They have dust-proof covers. The "E" type relay is now used in almost all cases where this type was formerly employed.

No. 125 Type Relay

No. 125 type relays are operated by direct current. The form of this relay in most general use is designed to break three and then make three contacts, or to make three and then break three contacts when the relay is energized. Other contact arrangements may, however, be obtained in this type of relay. They are provided with dust-proof covers. The "E" type relays are now used in almost all cases where the No. 125 type was formerly employed.

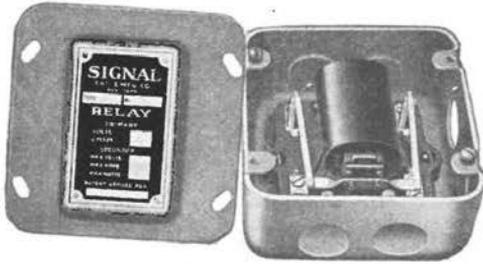
No. 189 Type Relay

The No. 189 types are small relays operating on direct current and making one contact when operated. They were formerly used as line relays and in other cases where a small compact relay was required. For the classes of service for which the No. 189 type relays were designed, the "A" type relays are now recommended.

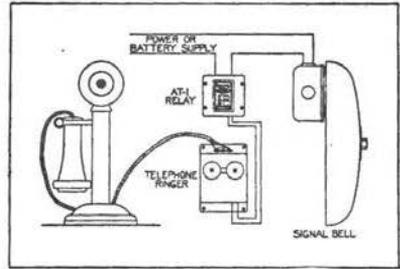
RELAYS

(Continued)

FOR SIGNALLING PURPOSES



Signal Relay



Schematic Wiring Diagram

“Signal” Telephone Extension Relays

Telephone ringing current has not enough energy to operate a more powerful signal but it may be used to operate a relay and this relay, in turn, close a circuit of greater energy, from which the signal may be operated. Signals may be sounded intermittently according to a code in the same manner as with the customary telephone ringer. The Signal Telephone Extension Relay may be used on standard telephone ringing current (alternating) either to replace the existing telephone ringer or, by adding a 2 microfarad condenser (on central battery lines), as an extension to it.

The relay will make and break circuits up to 250 volts A.C. or D.C. Its maximum power capacity is 12 watts and its maximum current capacity is 8 amperes. Under proper line and operating conditions it may be used on lines equipped with either 1000, 1600 or 2500 ohm ringers.

Stamped steel housing, furnished with knockouts (on all sides) for 1/2 inch conduit. Weatherproof housing when specified.

Code		Dimensions	Weight
Type AT-1	4 3/4 x 4 3/4 x 3 ins.....		Net 3 lbs. 9 oz. Shipping approx. 4 lbs.

“Signal” A.C. and D.C. Relays

The Relays covered here are furnished to operate from standard voltages 12 to 250 A.C. and 6 to 250 D.C.

Carrying Capacity—Maximum ratings—

Power Relays—600 watts, 10 amperes, 250 volts.

Heavy Duty Relays—1000 watts, 15 amperes, 250 volts.

Relays can be furnished either single circuit or double circuit. A single circuit relay controls one circuit and has two sets of contacts in series affording a double break. Double circuit relay controls two circuits and has one set of contacts in each circuit affording a single break.

A Front Contact Relay closes one or two circuits when energized.

A Back Contact Relay closes one or two circuits when deenergized.

A Front and Back Contact Relay is a combination of the two preceding relays.

“Signal” A.C. and D.C. Relays means the best in design and construction. Laminated silicon steel magnetic structure. Phosphor bronze contact arms. Self-supporting, form wound impregnated moisture-proof coil. Wiping self-cleaning contacts. Moulded insulating base of approved material. All parts secured to base with brass inserts.

Standard Housing. Stamp steel outlet box, 1/2 inch knockouts on all four sides, dimensions 4 3/4 inches square, 3 1/4 inches high.

Weatherproof Housing. (When specified.) Cast iron, enamel finish. State whether for open wiring or 1/2 inch conduit. Connections top, bottom or both. Dimensions 8 1/2 x 6 x 4 inches high.

Relay Sets. Consisting of telephone extension relays type AT-1 and A.C. and D.C. relays furnished upon application.

Approved by Board of Fire Underwriters—Factory Mutual Laboratories.

Weights: Net 3 1/2 lbs. Shipping, 8 1/2 lbs.

Heavy Duty Relays. Standard Front Contact Relay equipped with main copper to copper contacts and an auxiliary copper to carbon contact. The auxiliary contacts make before and break after the main contact which eliminates arcing or burning of the latter.

Type	Description	Type	Description
AF-1	A.C. Front Contact Relay.	DF-1	D.C. Front Contact Relay.
AB-1	A.C. Back Contact Relay.	DB-1	D.C. Back Contact Relay.
AFB-1	A.C. Front and Back Contact Relay.	DFB-1	D.C. Front and Back Contact Relay.
AFH-1	A.C. Heavy Duty Front Contact Relay.	DFH-1	D.C. Heavy Duty Front Contact Relay.

Above relays also furnished in double circuits when specified.

Western Electric

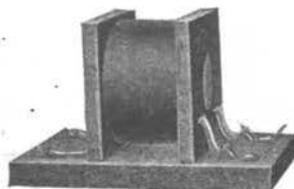
REPEATING COILS



No. 20A



No. 25E

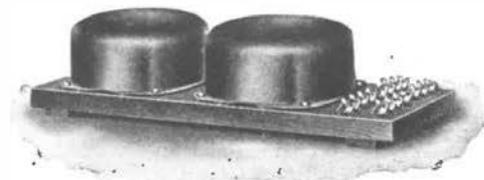


No. 30A

Repeating Coils

The Nos. 20A and 30A have a cloth covering. With these exceptions the coils listed below are enclosed in iron cross-talk proof shells. The No. 25E is provided with a hard rubber base. All others are mounted on wooden bases.

Code No.	Resistance Ohms (each coil)	Size of Base Inches	Use
0A	1 primary winding, 277. 1 secondary winding, 40. 1 tertiary winding, non-inductive, 360.	5 $\frac{1}{8}$ x 1 $\frac{1}{4}$	Operator's telephone circuit, No. 1 switch board for busy test.
25E	1 primary winding, 42. 1 secondary winding, 42.	3 $\frac{7}{8}$ x 4 $\frac{7}{8}$	Street railway telephone sets Nos. 1278 and 1302 types.
30A	1 primary winding, 385. 1 secondary winding, .01.	5 $\frac{1}{2}$ x 5 $\frac{1}{2}$	Tone test circuit.



No. 25A



No. 26A

No. 25 TYPE

These have two coils mounted on one base and are for use on standard repeating coil racks. Size of base is 10 $\frac{3}{4}$ inches by 4 inches.

The windings of the Nos. 25C and 25G are the same as those of the Nos. 25A and 25S respectively, except that they are brought out to terminals on both ends of the base.

25A	{ 2 primary windings, 21 each.	Cord circuits and incoming trunk circuits on central battery switchboards.
25C	{ 2 secondary windings, 21 each.	
25S	{ 2 primary windings, 21 each.	48 volt battery long distance and incoming toll trunks, central battery switchboards.
25G	{ 2 secondary windings, 21 each. 2 non-inductive windings, 40 each.	

No. 26 TYPE

These have one coil per base, and are for use on standard repeating coil racks. Size of base is 10 $\frac{3}{4}$ x 4 inches.

The windings of the No. 26C are the same as those of the No. 26A, except that they are brought out to terminals on both ends of the base.

26A	{ 2 primary windings, 21 each.	Cord circuits and incoming trunk circuits of central battery switchboards.
26C	{ 2 secondary windings, 21 each.	
26H	{ 2 primary windings, 21 each.	48 volt battery long distance and incoming trunks, central battery switchboards.
	{ 2 secondary windings, 21 each. 2 non-inductive windings, 40 each.	

No. 27 Type

These have a single coil on a base 6 x 4 inches (Similar to the No. 77-A) and are used where one coil and a short base is desired.

27A	{ 2 primary windings, 21 each.	Cord circuits and incoming trunk circuits on central battery switchboards.
	{ 2 secondary windings, 21 each.	
27D	{ 2 primary windings, 21 each.	48 volt battery long distance and incoming toll trunks on central battery switchboards.
	{ 2 secondary windings, 21 each. 2 non-inductive windings, 40 each.	

No. 42 Type

Diameter of shell, 1 $\frac{5}{8}$ inches; overall length, No. 42A, 2 $\frac{1}{4}$ inches; No. 42B, 4 $\frac{1}{8}$ inches.

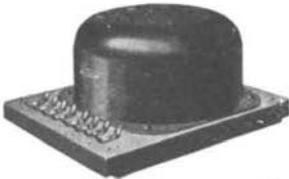
42A	4 windings, 35, 53, 72 and 90.	Magneto cord circuits to prevent ringing through.
42B	4 windings, 22, 34, 45 and 57.	Magneto cord circuits to prevent ringing through.

REPEATING COILS

(CONTINUED)



No. 76A



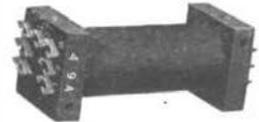
No. 56A



No. 50A



No. 77A



No. 49A

No. 76A

Has two coils mounted on one base and is for use on standard repeating coil racks. Size of base is 10 3/4 x 4 inches.

Code No.	Resistance Ohms (Each Coil)	Use
76A	2 primary windings, 21 each 2 secondary windings, 21 each	Phantom and simplex circuits

No. 77A TYPE

Has a single coil on a base 6 x 4 inches and is used where a single coil mounted on a short base is desired.

77A	2 primary windings, 21 each. 2 secondary windings, 21 each.	Phantom and simplex circuits. Same coil as in No. 46A.
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No. 49 TYPE

Approximate overall dimensions, length, 3 3/8 inches; width, 1 1/8 inches; height, 1 1/8 inches.

49A	1 primary winding of 1.65 ohms. 1 secondary winding of 31 ohms.	Used in howler circuit of No. 12 local test desk and trouble positions of local switchboards. Has a graduated secondary coil.
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No. 50 TYPE

Approximate overall dimensions, height, 20 inches; width, 9 1/2 inches; length, 11 1/2 inches. This coil is insulated to withstand 25,000 A.C. volts for a period of one minute. It is potted in a cast iron case with two porcelain castings provided for bringing out the ends of each winding.

50A	Outer winding of 31 ohms. Inner windings of 37 ohms.	Used in telephone systems operated in connection with high voltage transmission lines.
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No. 54 TYPE

Two coils mounted on a wooden base. Similar to the No. 76A repeating coil. Size of base, length, 10 3/4 inches; width, 4 inches.

54B	4 windings of 6 ohms each. 2 heavy primary and 2 secondary windings.	Used in "non-ring thru" magneto cord circuits.
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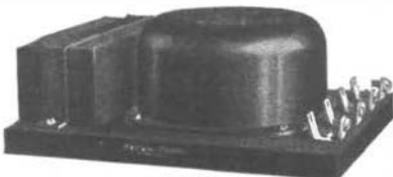
No. 56 TYPE

Approximate overall dimensions, 11 inches x 8 3/8 inches x 5 1/8 inches.

56A	Two inner windings of .85 ohms. One outer winding of 22.5 ohms.	Used in circuits designed for obtaining ringing current from central office storage batteries.
56B	Two inner windings of 2.35 ohms. One outer winding of 27.7 ohms.	

REPEATING COIL GROUPS

Code No.	Description
1A	Consists of a No. 44A repeating coil and a No. 21L (two microfarad) condenser mounted on a wooden base 6 3/4 x 5 1/8 inches. The repeating coil has three inductive windings—two of 21 ohms each and one of 42 ohms. Used in cord circuits of No. 1800 type switchboards.



No. 1A

RESISTANCES

No. 1 Type



No. 1

These resistances are small, compact units having one winding on a brass core and are assembled with fiber heads. A brass shell protects the winding from injury. They are mounted by means of a round head machine screw passing through the core. The overall dimensions are: diameter $\frac{1}{4}$ of an inch, length $1\frac{1}{2}$ inches. A mounting screw is furnished with the resistance.

Code No.	Resistance Ohms						
1A	400	1B	2600	1H	200	1R	260
1AH	11.4	1C	500	1J	20	1T	350
1AJ	11.6	1D	50	1K	30	1U	4.5
1AK	12.4	1E	300	1L	100	1W	12000
1AL	11.0	1F	1000	1N	700	1Y	1200
1AN	120	1G	3000	1P	5	1AT	1600

†Non-inductive.



No. 18 Type

Resistances of the No. 18 type have a micanite core upon which a single winding is placed. The winding is protected by a covering of sheet mica. The ends of the winding are soldered to tinned terminal posts which are also used for mounting the unit. Each terminal post is provided with two fiber washers and a hexagonal nut.

The overall dimensions are: length, $4\frac{1}{4}$ inches, width, $1\frac{1}{4}$ inches, thickness, $\frac{1}{2}$ inch. The resistance values do not vary more than plus or minus 5 per cent. from those rated in the table below. In some cases, as noted, the resistance is held to even closer limits. Each resistance will dissipate six watts continuously without injury from heating.

The mounting plates listed elsewhere under the heading of "Mounting Plates," provide for assembling these resistances in compact groups and when so mounted the terminals are conveniently located for making soldered connections.

Code No.	Resistance Ohms	Code No.	Resistance Ohms	Code No.	Resistance Ohms	Code No.	Resistance Ohms
18A	37	18AT	1600	18BM	1000	18G	200
18,1A	95	18AU	380	18BN	340	18H	210
18AB	45	18AW	40	18BR	60	18J	30
18AC	500	18AY	2.4	18BS	90	18K	80
18AD	240	18B	40	18BT	200	18L	170
18AE	600	18BA	2000	18BU	300	18M	53
18AF	300	18BB	2	18BW	100	18N	180
18AG	226	18BC	470	18BY	605	18P	130
18AH	320	18BD	580	18C	83	18Q	110
18AJ	400	18BE	20	18CB	955	18R	10
18AK	60	18BF	284	18CF	610	18S	20
18AL	4	18BG	400	18CH	1.2	18T	50
18AM	250	18BH	1000	18CJ	5	18U	100
18AN	850	18BJ	1200	18CT	14.81	18W	133
18AP	500	18BK	1300	18D	120	18Y	90
18AR	380	18BL	750	18E	140	18Z	67
18AS	350	18CY	1585	18F	150	18DA	1510

†Resistance value does not vary more than plus or minus 1 per cent.
 *Resistance value does not vary more than plus or minus 3 per cent.



No. 19 Type

These resistances are similar in construction to the No. 18 Type and may be mounted on $\frac{1}{4}$ inch horizontal centers and $1\frac{1}{2}$ inch vertical centers. They differ from the No. 18 Type in that two windings are provided and the end of each winding soldered to a center terminal. The two outside terminals are used as mounting posts. The resistance values do not vary more than plus or minus 5 per cent. from those rated below and in some cases, as noted, the variation is held to closer limits.

Code No.	Resistance Ohms	Code No.	Resistance Ohms	Code No.	Resistance Ohms	Code No.	Resistance Ohms
19A	37 and 37	19AW	2.5 and 2.5	19BS	400 and 20	19CN	100 and 200
19AA	15 and 90	19B	40 and 40	19BT	10 and 540	19D	83 and 83
19AB	210 and 120	19BA	900 and 900	19BU	132 and 158	19E	30 and 30
19AC	60 and 83	19BB	2300 and 300	19BV	380 and 750	19F	40 and 60
19AD	150 and 150	19BC	300 and 50	19BY	220 and 1075	19G	40 and 100
19AF	140 and 140	19BD	380 and 100	19C	40 and 83	19H	40 and 120
19AG	120 and 160	19BE	90 and 30	19CA	185 and 770	19J	10 and 40
19AH	240 and 240	19BF	600 and 1600	19CB	125 and 345	19K	100 and 100
19AJ	200 and 200	19BG	200 and 400	19CD	1095 and 125	19L	60 and 60
19AK	70 and 70	19BH	100 and 500	19CE	125 and 510	19M	20 and 20
19AL	40 and 68	19BJ	350 and 350	19CF	284 and 284	19N	5 and 8
19AM	50 and 50	19BK	500 and 40	19CG	270 and 270	19P	20 and 130
19AN	250 and 260	19BL	1 and 1	19CH	100 and 125	19S	60 and 90
19AP	180 and 180	19BM	1000 and 1000	19CJ	250 and 750	19T	25 and 25
19AR	60 and 260	19BN	20 and 185	19CK	50 and 65	19W	10 and 10
19AS	170 and 170	19BP	375 and 270	19CL	125 and 895	19Y	15 and 15
19AU	60 and 170	19BR	205 and 225	19CM	60 and 1235		

†Note. Resistance value does not vary more than plus or minus 1 per cent. from rated value.

RESISTANCES

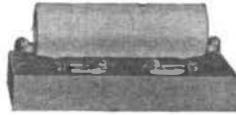
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No. 34A Resistance



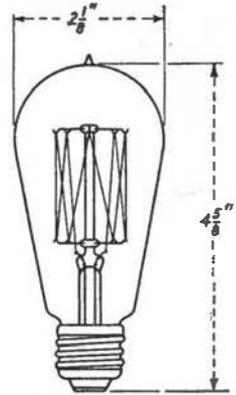
No. 5



No. 31A Resistance



No. 38 Type



No. 6 Type

No. 5 Type

Resistances of the No. 5 type have a single winding on a wooden spool. A threaded stud with a hexagonal nut is supplied for mounting. The overall dimensions are: diameter $1\frac{1}{2}$ inches and length, 3 inches.

Code No.	Resistance Ohms						
5G	10000	5K	750	5R	40	5AG	200
5J	600	5M	2500	5AC	2000	5AJ	15000

No. 31 Type

31-A—A steel tube enamelled resistance is mounted on a maple base 4 inches in length and 2 inches wide. The overall height is $1\frac{3}{4}$ inches. Two screw terminals are provided. 1200 Ohms resistance.

No. 34 Type

Variable resistance windings of this type are brought out at several points and a screw terminal provided for connecting at each point. The core is of brass with a fiber head. The insulation will stand 500 volts A.C. between the winding and the core. A No. 10 round head iron wood screw 3 inches long is furnished for mounting.

Approximate dimensions: diameter, $2\frac{1}{8}$ inches, length overall, $2\frac{3}{8}$ inches.

Approximate resistance in steps (ohms)	Terminal No.	34A	34B	34C	Code No.			
		1	200	100	4	34E	34F	34G	34H
	2	400	200	8	1000	2000	2900	320
	3	800	400	16	800	3200	2500	160
	4	1600	800	32	500	3400	2200	80
	5	3200	1600	64	800	3200	1700	40
	6	4600	....	500	1500	2600	1300	20
	7	6400	....	1000	2300	1900	900	10
	8	12800	....	1500	3200	1400	700	...
Approximate total resistance (ohms) . . . . .	....	30000	....	3100	10100	17700	12200	630

No. 38 Type

These resistances consist of a single carbon filament winding placed in a spiral groove on a cylindrical lavite core. Each end is fitted with a brass cap which serves both as a mounting lug and as a terminal. The lavite spool is covered, after winding, with insulating and moisture-proofing compound. The overall dimensions are: length, 3 inches; diameter, $\frac{1}{8}$ inch.

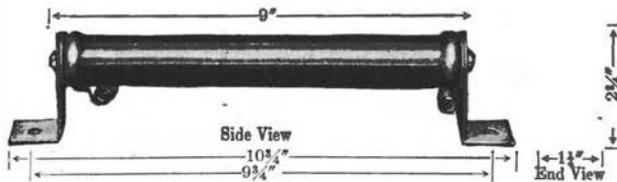
Code No.	Resistance Ohms	Code No.	Resistance Ohms
38A	48000	38D	50000
38B	12000	38E	20000
38C	15000		

No. 6 Type Resistance Lamp

The No. 6 type resistance lamps have Tungsten filaments. They are intended for use in ringing and battery supply leads for protective purposes.

Code No.	Watts	Rated Voltage	Amperes—Current at Listed Voltages								
			125 V.	120 V.	110 V.	72 V.	70 V.	30 V.	24 V.	20 V.	10 V.
6A	10	125	.09	...	...	.06	...	...	.03	...	...
6B	15	125	.13	...	...	.10	...	...	.05	...	...
6C	25	125	.22	...	...	.16	...	...	.09	...	...
6D	25	100	...	...	.22	...	.18	...	.09	...	...
6E	25	30	...	...	...	...	...	.68	...	.53	.35
6F	60	115	...	.53	...	...	...	.38	...	.18	...

RESISTOR UNITS—VITROHM



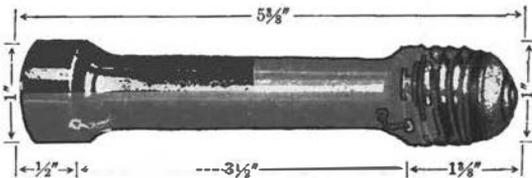
Size DM. Use No. 10 Drill for Mounting Holes

Vitrohm (Vitreous Enameled) Resistor Units

The "DM" size Vitrohm (Vitreous Enameled) Resistor Unit is equipped with brackets suitable for wall or switchboard mounting. Where banks of permanent resistances are required this affords a convenient method of mounting. Individual units arranged in this manner are used for charging small storage batteries, for reducing voltage on pilot lamps or on small motors when these are run on higher than rated voltage.

CAPACITY: 200 WATTS FOR CONTINUOUS DUTY. 500 WATTS FOR 20 SECONDS DUTY

List No.	Ohms (Approx.)	Max. Amp.	Volts at Max. Amp.	List No.	Ohms (Approx.)	Max. Amp.	Volts at Max. Amp.	List No.	Ohms (Approx.)	Max. Amp.	Volts at Max. Amp.
DM-2000	2000	.32	640	DM-62	62	1.80	111	DM-2.5	2.5	8.9	22.2
DM-1500	1500	.36	540	DM-45	45	2.19	99	DM-1.7	1.7	10.8	18.4
DM-1000	1000	.45	450	DM-31	31	2.54	78	DM-1.2	1.2	12.9	15.5
DM-700	700	.53	371	DM-22	22	3	66	DM-.9	.9	14.9	13.4
DM-600	500	.63	315	DM-15	15	3.65	54.7	DM-.6	.6	18.3	11
DM-350	350	.76	2	DM-10	10	4.47	44.7	DM-.4	.4	22.4	9
DM-250	250	.89	222	DM-7	7	5.3	37.1	DM-.3	.3	25.8	7.7
DM-175	175	1.07	187	DM-5	5	6.3	31.5	DM-.2	.2	31.6	6.
DM-125	125	1.27	158	DM-3.5	3.5	7.6	26.6	DM-.15	.15	36.5	5.
DM-90	90	1.49	134								



Size EB



Vitrohm Ferrule Type

This Vitrohm (Vitreous Enameled) Resistor Unit is equipped with a standard Edison screw base, and is supplied ready for use in all standard Edison sockets. It may be supplied in any resistance from 0.2 ohms to 1000 ohms. The sizes listed are carried in stock at the factory and any other values up to about 2000 ohms may be supplied at short notice.

CAPACITY: 60 WATTS FOR CONTINUOUS DUTY, 210 WATTS FOR 20 SECONDS DUTY

List No.	Ohms (Approx.)	Max. Amp.	Volts at Max. Amp.	List No.	Ohms (Approx.)	Max. Amp.	Volts at Max. Amp.	List No.	Ohms (Approx.)	Max. Amp.	Volts at Max. Amp.
EB-1000	1000	.24	240	EB-62	62	.98	61	EB-3.5	3.5	4.1	14.3
EB-700	700	.28	203	EB-45	45	1.15	52	EB-2.5	2.5	4.9	12.2
EB-500	500	.35	175	EB-31	31	1.39	43	EB-1.7	1.7	5.9	10
*EB-440	440	.37	163	EB-22	22	1.65	36	EB-1.2	1.2	7.1	8.5
EB-350	350	.41	143	EB-15	15	2	30	EB-.9	.9	8.1	7.3
EB-250	250	.49	122	EB-12.5	12.5	2.2	27.5	EB-.6	.6	10	6
*EB-220	220	.52	114	EB-10	10	2.4	24	EB-.4	.4	12.3	4.9
EB-175	175	.59	103	EB-7	7	2.9	20.3	EB-.3	.3	14.1	4.2
EB-125	125	.69	86	EB-5	5	3.5	17.5	EB-.2	.2	17.3	3.5
EB-90	90	.81	73								

* The EB-440 is the resistance equivalent of the 8 candle power, 110 volt carbon lamp. The EB-220 is the equivalent of the 16 candle power, 110 volt carbon lamp.

VITROHM (VITREOUS ENAMELED) RESISTOR UNITS

These Ferrule Type units are made in various current carrying capacities and with a large number of resistance values. They mount in standard fuse clips. Information will be furnished upon request.

RETARDATION COILS



No. 5AA



No. 5AF



No. 8C, M, U



No. 8B, K, L, N, P, S

No. 5 TYPE

Code No.	No. of Windings	Resistance (Ohms)	Use	Size of Base Inches
5AA	2	74 (each)	In standard composite sets	11 x 8 5/8
5AD	2	25 (each)	Nos. 51A, 52A and 53A selector apparatus cases . .	9 x 9
5AF	4	330 (total)	In phantoming magneto subscribers' circuits . . .	3 7/8 x 3 7/8

No. 8 TYPE

8B	2	85 (each)	No. 8C unmounted	} Battery	9 1/8 x 1 3/4
8C	2	85 (each)	Mounted . . . . .			10 3/4 x 2
8K	2	35 (each)	Unmounted	} Supply	9 1/8 x 1 3/4
8L	2	175 (each)	Unmounted . . . . .			of P.B.X.	9 1/8 x 1 3/4
8M	2	165 (each)	Mounted	} Cord	10 3/4 x 2
8N	2	85 (each)	8B with mounting lugs . . . . .			} Circuits	9 1/8 x 1 3/4
8P	2	175 (each)	8L with mounting lugs	9 1/8 x 1 3/4	
8S	2	175 (each)	Holding coil in No. 380 Sub Set	9 1/8 x 1 3/4	
8U	2	85 (each)	P.B.X. No. 505B switchboard	10 3/4 x 2	



No. 12G



Nos. 12A, 12F, 12L and 12S

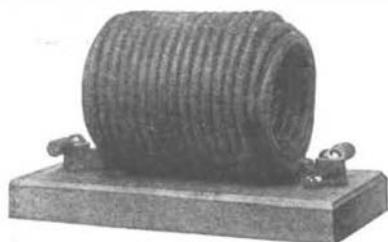


No. 12M

No. 12 TYPE

Code No.	No. of Windings	Resistance (Ohms)	Use	Size of Base Inches
12A	1	165	} Operator's telephone circuit in Nos. 1, 9 and 10 switchboards and Nos. 101 and 102 private exchanges	6 x 1 3/4
12F	1	140		
12G	1	2.3	} Nos. 1312A and 6023A telephone sets. Has a movable core for varying impedance	3 1/4 x 1 x 1 3/4 high
12H	1		
12J	1	} Operator's telephone circuit No. 4 P. B. X.	6 x 1 3/4
12K	1		
12L	1	400	} Operator's telephone circuit in No. 550 P. B. X.	6 x 1 3/4
12M	1	2.3		
12S	1	100	Operator's telephone circuit in No. 550 P. B. X.	6 x 1 3/4

RETARDATION COILS
(Continued)



No. 31B Type



No. 44 Type



Nos. 46M, N, P, T, W and Y



No. 48A Retardation Coil

No. 31 TYPE

These coils are for use with lightning arresters in the protection of machines connected to overhead DC. or A.C. power circuits. They are mounted on a temporary wooden base as shown for shipment.

Code No.	Capacity Amperes	Size of base, In.	Code No.	Capacity Amperes	Size of Base, In.
31B	25	9 x 4	31H	150	19 x 8
31D	50	10½ x 5	31K	200	23 x 8
31F	100	15 x 6½	31L	325	28 x 9

No. 44 TYPE

Code No.	No. of Windings	Resistance (Ohms)	Use	Size of Base, In.
44B	2 on each coil	203 each winding	Toll cord circuits. Have two separate toroidal type coils on a common wooden base, each enclosed in a cross-talk proof shell	10¾ x 4
44D	2 on each coil	83 each winding		
44F	4 on each coil	330 each coil—4 windings in series	A phantom circuit retardation coil.....	11¾ x 4½

No. 46 TYPE

These coils have two mounting screw holes on 1½ inch centers and are front connected. The overall length is 3½ inches and the diameter of the shell 1 inch.

Code No.	No. of Windings	Resistance (Ohms)	Use	Code No.	No. of Windings	Resistance (Ohms)	Use	
46A	1	600	For general use in switch-board circuits	46L	1	400	For general use in switch-board circuits	
46B	1	150		46M	2	125 (each)		
46C	1	200		46N	2	100 (each)		
46D	1	250		46P	2	500 (each)		
46E	1	300		46R	1	1500		
46F	1	500		46S	1	40		
46G	1	750		46T	2	33 (each)		
46H	1	350		46W	2	200 (each)		
46J	1	900		46Y	2	1000 (each)		
46K	1	1000		46AA	2	20 (each)		In P.B.X. long line circuits.

No. 48 AND 49 TYPES

Code No.	No. of Windings	Resistance (Ohms)	Use	Size of Base, In.
48A	2 in series	100 (total)	Grounded composite circuits.....	6 x 4
49A	2 inner	37 each	Intended to remove electrostatic and electromagnetic charges from telephone lines. (Similar to No. 48A type)	
	2 outer	46 each		

RETARDATION COILS

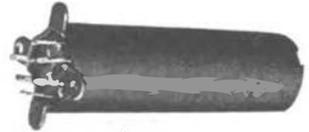
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No. 51C



No. 47



No. 54



No. 60 Type

No. 47 TYPE

These coils are arranged for back connections. The coil shell is 3 5/8 inches long and 1 inch in diameter. The terminals are 1/8 of an inch long.

Code No.	No. of Windings	Resistance (Ohms)	Use	Code No.	No. of Windings	Resistance (Ohms)	Use
47A	1	600	Differs from the No. 46 type only in that they are arranged to mount on mounting plates.	47K	1	1000	Differs from the No. 46 type only in that they are arranged to mount on mounting plates.
47B	1	150		47L	1	400	
47C	1	200		47M	2	125 (each)	
47D	1	250		47N	2	100 (each)	
47E	1	300		47P	2	500 (each)	
47F	1	500		47R	1	1500	
47G	1	750		47S	1	40	
47H	1	350		47Y	2	1000 (each)	

NO. 51 TYPE

Code No.	No. of Winding	Resistance (Ohms)	Use
51A	1	520	No. 295AK desk set box and Nos. 1293AD, AE, AK, AL; 1317W, AD, AE and AW telephones....
51B	1	520		No. 1336F telephones. Same as No. 51A, except is moistureproofed.....
51C	2 in parallel	55.5	Inter-phones.....
51E	2 in parallel	55.5	Inter-phones. Consists of a No. 51C mounted on a base.....
51F	1	45	Nos. 101A, B; 102A, B, C and D selector sets....

No. 54 TYPE

Arranged for back connecting. The shell is 4 5/8 inches long and 1 1/2 inches diameter. The two mounting holes are on 1 3/8-inch centers.

54A	3	1300 (inner) 85 (outer front) 85 (outer rear)	Combined battery feed and holding coil for No. 550 P.B.X. switchboards.
54B	2	400 (inner) 40 (outer)	Operator's telephone set in No. 550 P.B.X. switchboards.
54C	1	200	In No. 4 P.B.X. switchboards.
54D	2	85 (each)	In No. 505B cordless P.B.X. switchboard as a battery feed coil.

No. 60 TYPE

60A	2	.21 .35	Intended for use with the Nos. 84F and 84G interrupters to limit the noise in the battery due to the operation of the interrupter.....
60B	2	5.3 9.3	

10 1/2 x 3 1/4

RINGERS



Illustrating General Design of No. 6 and 8 Type Ringer

Western Electric Company ringers are wound with black enamel wire of Western Electric manufacture and are designed to give maximum ringing efficiency and at the same time offer high impedance to voice currents.

The gong posts are designed for engaging slotted gongs thereby assuring permanent gong adjustment.

Ringers (except harmonic ringers) are divided into two classes, namely: lock-nut adjustment and screw adjustment. In the screw adjustment type the position of the armature is adjusted with regard to the pole pieces, by means of a screw driver; and the position of the gongs is adjusted by means of an eccentric screw. These ringers are used in practically all the magneto telephones.

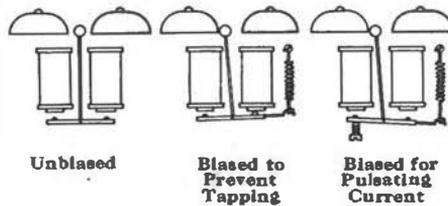
In the lock-nut type of adjustment a small wrench (for example: the No. 129 tool) is used to alter the position of the armature with regard to the pole pieces and the eccentric screw form of gong adjustment is not employed. Ringers employing the lock-nut method of adjustment are used on central battery telephones.

All ringers employing the single screw form of adjustment are provided with screw terminals, whereas those employing the lock-nut adjustment have soldering terminals.

The ringers that are equipped with a biasing spring and armature stop screw or screws are intended primarily for use on pulsating (P.C.) or superimposed current (SC). However, such ringers are frequently operated on alternating current (A.C.); particularly in central battery systems.

Ringers equipped with a bias spring but without armature stop screws are intended for use on alternating current where it is desired to render the ringer less sensitive so that it will not tap, due to inductive disturbances, also to prevent operation on pulsating current. (See description of Center Checking Telephones.)

Ringers which are not equipped with biasing springs are suitable for use only on alternating current.



LOCK-NUT TYPE OF ARMATURE AIR GAP ADJUSTMENT

Code No.	Type of Armature Air Gap Adjustment	Resistance (Ohms)	Biasing Feature	Current Adjusted For	Gong Posts		Code No. and Finish	Gauge Diameter Ins.
					Length	WoodWork Thickness		
6AG	Lock-nut	*1400	Spring and screw	P.C.	1 1/8	3/8	29A black	2 1/2
6FG	Lock-nut	1600	Spring	A.C.	1 3/8	3/8	29A black	2 1/2
8AG	Lock-nut	*1400	Spring and screw	P.C.	1 3/8	3/8	29A black	2 1/2

*Note. The Nos. 6A and 8A ringers were formerly wound to 1000 ohms resistance instead of 1400 ohms. The 1000 ohm and 1400 ohm ringers have the same impedance and may be used interchangeably in service.

3000 Ohm Non-Inductive Supplementing Winding

42AG	Lock-nut	*1000 and 3000	Spring and screw	P.C. or S.C.	1 1/8	3/8	29A black	2 1/2
52AG	Lock-nut	*1000 and 3000	Spring and screw	P.C. or S.C.	1 3/8	1/4	29A black	2 1/2

*One spool of the No. 42 and 52 type ringers has a 3000 ohm supplementary non-inductive winding over the regular winding. The two windings are connected in series and the junction brought out to an extra terminal on the spool head for use in connection with an extension bell. These are the equivalent of using a 3000 ohm non-inductive resistance coil in series with a 1000 ohm, Nos. 6 or 8 type ringer.

RINGERS

(Continued)



No. 38 Type



No. 51 Type



No. 53 Type

Ringers

The No. 47 type ringer is the same as the No. 38 type except a biasing spring is added.
 The No. 50 type ringer is the same as the No. 51 type except that a biasing spring is added.
 The No. 49 type ringer is the same as the No. 51 type except that a biasing attachment and stop screws are added.
 The No. 55 type ringer is the same as the No. 53 except that a biasing spring is added.
 The No. 54 type ringer is the same as the No. 53 type except that a biasing spring and stop screws are added.

Screw Type Armature Air Gap Adjustment—3 Inch Gong.

Code Nos.	Type of Armature Air Gap Adjustment	Resistance (Ohms.)	Biasing Feature	Current Adjusted for	Gong Posts		Gongs	
					Length, Ina.	Woodwork Thickness Ina.	Code No. and Finish	Diameter Ina.
38AG	Single Screw	1000	None	AC	1 1/4	5/8	26A Black	3
38BG	Single Screw	250	None	AC	1 1/4	5/8	26A Black	3
38FG	Single Screw	1600	None	AC	1 1/4	5/8	26A Black	3
45BG	Single Screw	2500	None	AC	1 1/4	5/8	20 Black	3

Designed to resist the action of moisture and fumes. Used in mine telephones.

47AG	Single Screw	1000	Spring	AC	1 1/4	5/8	26A Black	3
47BG	Single Screw	2500	Spring	AC	1 1/4	5/8	26A Black	3
47FG:	Single Screw	1600	Spring	AC	1 1/4	5/8	26A Black	3

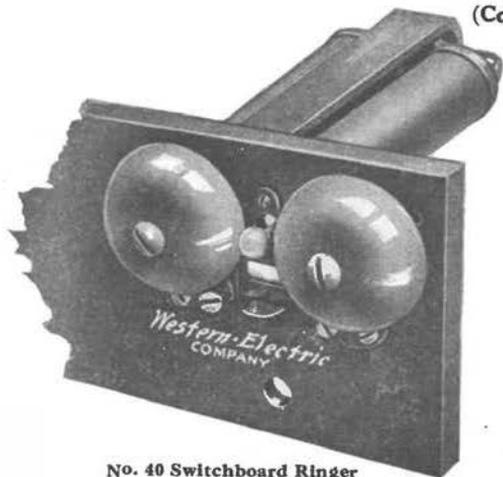
Screw Type Armature Air Gap Adjustment—2 1/2 Inch Gong.

**51AG	Single Screw	1000	None	AC	1 1/4	5/8	29A Black	2 1/2
**51BG	Single Screw	2500	None	AC	1 1/4	5/8	29A Black	2 1/2
**51FG	Single Screw	1600	None	AC	1 1/4	5/8	29A Black	2 1/2
**51JG	Single Screw	50	None	AC	1 1/4	5/8	29A Black	2 1/2
53AG	Single Screw	1 00	None	AC	1 1/4	5/8	29A Black	2 1/2
53BG	Single Screw	2500	None	AC	1 1/4	5/8	29A Black	2 1/2
53FG	Single Screw	1 00	None	AC	1 1/4	5/8	29A Black	2 1/2
**50BG	Single Screw	2500	Spring	AC	1 1/4	5/8	29A Black	2 1/2
55AG	Single Screw	1000	Spring	AC	1 1/4	5/8	29A Black	2 1/2
55BG	Single Screw	2500	Spring	AC	1 1/4	5/8	29A Black	2 1/2
55FG	Single Screw	1 00	Spring	AC	1 1/4	5/8	29A Black	2 1/2
**49BG	Single Screw	2500	Spring & screw	PC	1 1/4	5/8	29A Black	2 1/2
54BG	Single Screw	2500	Spring & screw	PC	1 1/4	5/8	29A Black	2 1/2

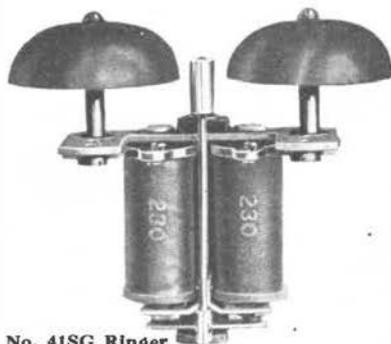
**The Nos. 49, 50 and 51 type ringers have bent gong posts which permit of their use in woodwork drilled for ringers having three inch gongs; for example drilled for the No. 38 type ringer.

RINGERS

(Continued)



No. 40 Switchboard Ringer



No. 41SG Ringer

Ringers

Harmonic Ringers

Code No.	Armature Air Gas Adjustment	Resistance (ohms.)	Biasing Feature	Current Adjusted For	Length, Ins.	Woodwork Thickness, Ins.	Gong Code No. and Finish	Diameter, Ins.
41RG	None	.....	None	16 3/4 cycles	1 1/4	5/8	29A Black	2 1/2
41SG	None	.....	None	33 1/2 cycles	1 1/4	5/8	29A Black	2 1/2
41TG	None	.....	None	50 cycles	1 1/4	5/8	29A Black	2 1/2
41UG	None	.....	None	66 3/4 cycles	1 1/4	5/8	29A Black	2 1/2
41WG	None	.....	None	20 cycles	1 1/4	5/8	29A Black	2 1/2

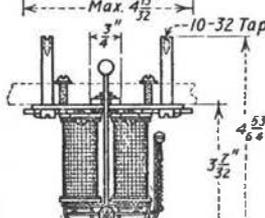
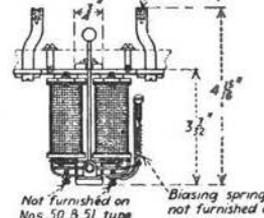
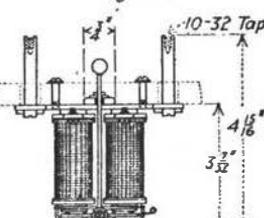
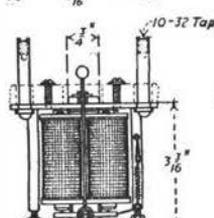
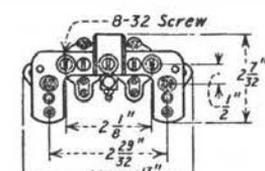
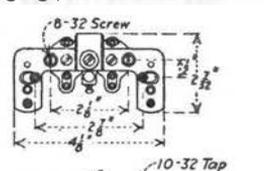
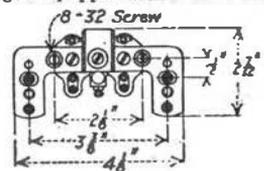
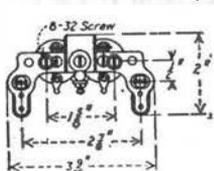
Switchboard Ringers

40AG	Single Screw	1000	None	AC	1 1/4	See Description	22 Type Nickel Plate	1 1/4
40BG	Single Screw	2500	None	AC	1 1/4	See Description		1 1/4
40FG	Single Screw	1600	None	AC	1 1/4	See Description		1 1/4

No. 40 type ringers are designed for use in magneto switchboards and when equipped with No. 1A ringer indicators, serve the purpose of a visual signal, as well as an audible one. Electrically the same as the No. 38 type ringer. Gongs are adjusted from the front of the switchboard. Designed for mounting on a metal mounting plate.

In all cases the length of the gong post is measured from the top of the heel iron to the surface on which the gong rests. This surface is 1/4 inch lower than the lugs which project through the slot in the gong.

For information on ringers equipped with 6 and 8 inch gongs, see extension bells.

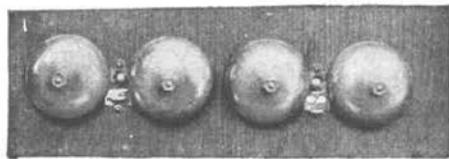


Nos. 6 and 8 Type Ringer also No. 42 and 52 Type

Nos. 38 and 45 Type Ringer Also General Dimensions of No. 47 Type (with Biasing Spring)

Nos. 49, 50 and 51 Type Ringers

No. 55 Type Ringers also General Dimensions of No. 53 and 54 types



No. 1A Ringer Indicators

RINGER INDICATORS

No. 1 Type

Code No. 1A—A manually restored indicator, consisting of a metal frame with a slide which is arranged to engage the copper rod or a ringer.

When the ringer operates the slide is released thus exposing a white surface on the frame.

This indicator is used in connection with switchboards equipped with ringer and in other places where it is desirable to have a means of determining which ringer of a group of ringers operated.

RINGERS

(Continued)

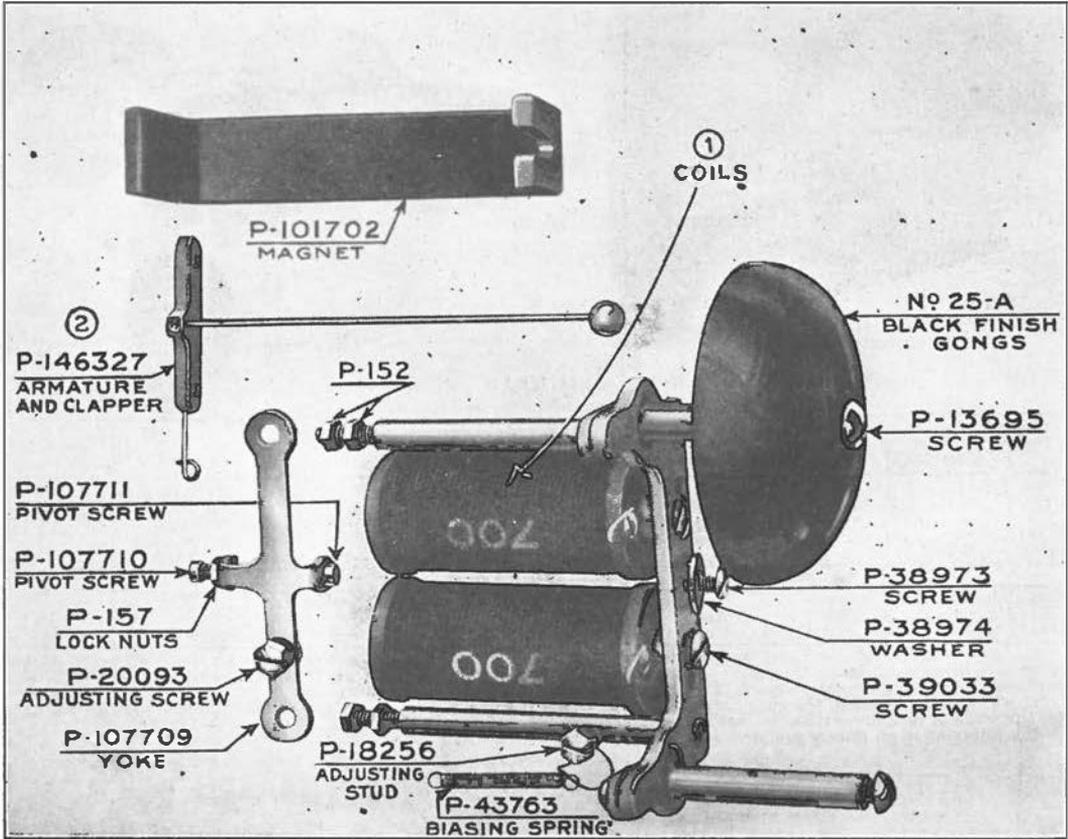


Fig. 1

Repair Parts of Ringers

Repair parts for the Nos. 6, 8, 42 and 52 type ringers are the same as shown in Fig. 1 with the following exceptions.

Ringer and Part Nos.

	6AG	6FG	8AG	42AG	52AG
Coils (See 1 Fig. 1)	P-143018 (700 ohms)	P-127016 (800 ohms)	P-143018 (700 ohms)	P127418 (500 ohms) P-133720 (500-3000 ohms)	P-127418 (500 ohms) P-133720 (500-3000 ohms)
Armature and Clapper Assembly (See 2 Fig. 1)	P-110884	P-110884	P-110884	P-146329	P-146328

RINGERS

(Continued)

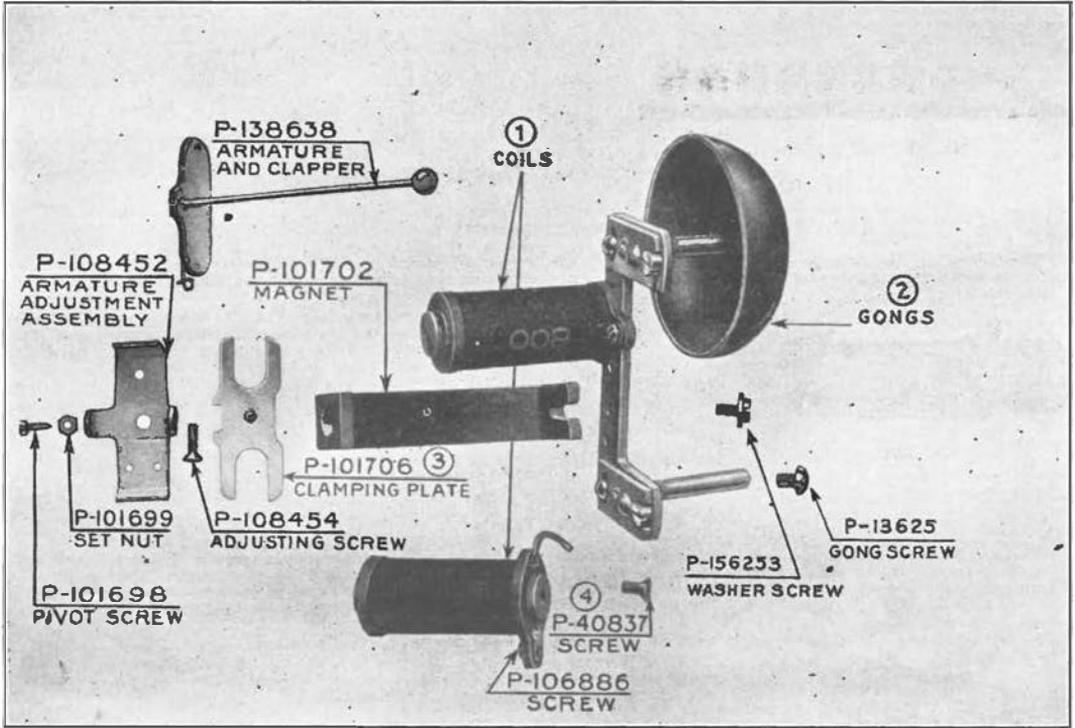


Fig. 2

Repair Parts of Ringers

Repair parts for the Nos. 38, 47, 50, 51, 53 and 55 type ringers are the same as shown in Fig. 2 with the following exceptions:

Ringer and Part Nos.

Description

Coils (Each) (See 1 Fig. 2)	38AG	P-133726 (600 ohms ea.)	38BG	P-133727 (1250 ohms)
	47AG		47BG	
51AG	49BG			
53AG	50BG			
55AG	51BG			
38FG	P-133729 (800 ohms)	53BG	51 JB } P-127280 (25 ohms)	
47FG		54BG		
51FG		55BG		
53FG				

Gongs (see 2 Fig. 2) for various type ringers are listed with the code numbers.

Clamping Plate (see 3 Fig. 2) for No. 49BG ringer is P-145419.

Coil Mounting Screw (see 4 Fig 2).

38 Type	P-40837	47, 49 Types	P-38973
51 Type		50, 54 Types	
53 Type		55 Type	

SIGNALS

No. 4 Type

The No. 4 type signal has two coils. When operated, an aluminum signal is lifted into a visible position, it being covered by the mounting when unoperated. The aluminum signal target is supplied numbered in black as per order but will be supplied unnumbered unless otherwise specified. The No. 4A and No. 4E have a local contact which is closed when the signal is operated. The No. 4J is not provided with a local contact; the armature of the No. 4J is provided with a counterweight to balance the target.

This type is used principally as a line signal in private branch exchanges employing magnetic signals and operating on a central battery basis.



No. 4E, No. 2 Mounting

Code No.	Total Resistance (Ohms)	Used with Signal Mountings No.	Mounting Centers
4A	98	2, 3, 94A	1 3/8
4E	500		1 3/8
4J	400		1 3/8

No. 32 Type

The face of the No. 32 type signal is entirely black in the unoperated position. When operated, a target is lifted into position so as to register white in the slots in the signal face, thus giving visible indication of operation. These signals have no local contacts.

The Nos. 32B and 32C have a single winding; the No. 32A has two windings, one inner inductive winding of 50 ohms and an outer non-inductive winding of 100 ohms. The resistance value given in the table below is for both windings in parallel.



No. 32A

Code No.	Resistance (Ohms)	Mounting Centers
32A	33	1 1/4
32B	50	1 1/4
32C	525	1 1/4

No. 34 Type

The No. 34 type signal has one coil with a single winding. When operated, an aluminum target is displayed as shown in the illustration. In the unoperated position, the opening in the signal face is not filled by the target. The signals will be furnished unnumbered unless otherwise specified, but, if so ordered, they will be supplied with black numbers on the aluminum target. When so desired, No. 129 type number plates may be used with these signals and the number on the target omitted.

Each No. 34 type signal has a single local contact which is closed in the operated position.

These signals are used as line signals in the No. 9 switchboard and in the trunk circuits of the old No. 105 Magneto Switchboard. They will mount on 1 3/4 inch horizontal and 1 1/2 inch vertical centers.



No. 34A shown in the operated position

Code No.	Resistance (Ohms)	Used with Signal Mounting No.
34A	86	34, 60, 61, 62, 96, 97
34B	300	
34C	900	
34D	525	

No. 41 Type

The No. 41 type signal is similar in general construction to the No. 34 type. The coil has two parallel windings; the resistance given below is the value of each individual winding. These signals will mount on 1 1/4 inch horizontal and 1 1/2 inch vertical centers. Numbered in black on the aluminum target when so specified in order but otherwise furnished unnumbered.

Each No. 41 type signal is provided with a cross-talk proof shell.

This type signal has a local contact, both sides of which are brought out to terminals. The No. 41A signal has this contact normally open; the No. 41B is arranged so that the contact is closed when the signal is in the unoperated position.

These signals are used in the cord circuits of the No. 9 switchboard.

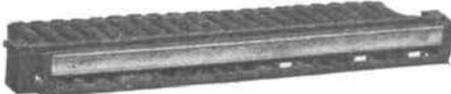
Code No.	Resistance (Ohms)	Used with Signal Mountings No.	Code No.	Resistance (Ohms)	Used with Signal Mountings No.
41A	30 (each)	60	41B	100 (each)	60

No. 42 Type

The No. 42 type signal has one coil with a single winding. There are no local contacts. The illustration shows all but three of the signals in the No. 79 mounting in their unoperated position. The aluminum target is lifted into place when the signal is operated as shown in the cut. A designation strip on the mounting is used for numbering the signals.

The mounting centers are: horizontal 1 1/4 inch, vertical 3/4 inch.

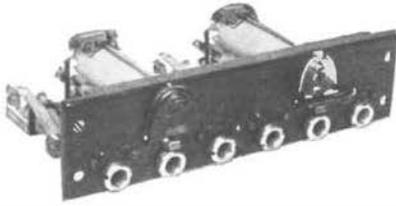
The No. 42 type is used as a busy signal with multiple toll line jacks; they mount in the same centers as the jacks.



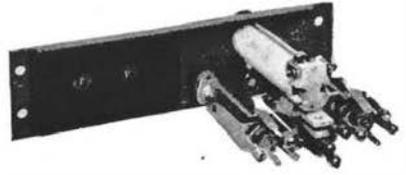
No. 42A Signal on No. 79 Mounting

Code No.	Resistance (Ohms)	Used with Signal Mountings No.
42A	100	75, 77, 78, 79, 82, 83, 105

SIGNAL GROUPS AND MOUNTINGS



No. 5B Signal Group



No. 6B Rear View

Signal Groups

These signal groups are used at switchboards for receiving signals from and making connections to a through toll line. The apparatus involved is, in each case, described under separate headings elsewhere in this catalogue. The groups are furnished without numbered plates unless otherwise specified.

Code No.	Consists of	Overall Dimensions Ins.	Used In	Code No.	Consists of	Overall Dimensions Ins.	Used In
1B	1 No. 102B Signal mounting 1 No. 3D combined jack and signal. 2 No. 199 jacks	2 1/4 x 2 1/4	No. 1800 type switchboard	4B	1 No. 103B signal mounting 2 No. 3D combined jack and signal. 4 No. 199 jacks	6 3/4 x 1 1/4	No. 1200 type switchboard
2B	1 No. 91B signal mounting 1 No. 23D combined jack and signal. 2 No. 199 jacks	2 1/4 x 2 1/4	No. 1800 type switchboard	5B	1 No. 104B signal mounting 2 No. 23D combined jack and signal. 4 No. 199 jacks	6 3/4 x 1 1/4	Nos. 1200 and 1800 type switchboards
3B	1 No. 103B signal mounting 1 No. 3D combined jack and signal. 2 No. 199 jacks	6 3/4 x 1 1/4	No. 1200 type switchboard	6B	1 No. 104B signal mounting 1 No. 23D combined jack and signal. 2 No. 199 jacks	6 3/4 x 1 1/4	Nos. 1200 and 1800 type switchboards



No. 62 Signal Mounting

Signal Mountings

The following mountings are those commonly used with the various classes of signals as listed. They are metal mountings with black finish faces.

Code No.	For Signals	No. of Signals per Strip	Size of Plate, Ins.	Code No.	For Signals	No. of Signals per Strip	Size of Plates, Ins.
2	4 type	10	16 x 1 1/2	79	42 type	20	9 1/2 x 1 1/2
3	4 type	15	22 x 1 1/2	82	42 type	10	11 1/2 x 1 1/2
34	34 type	20	24 1/2 x 1 1/2	83	42 type	20	11 1/2 x 1 1/2
60	34, 41 type	15	24 1/2 x 1 1/2	94A	4 type	5	7 1/2 x 1 1/2
61	34 type	20	24 1/2 x 1 1/2	95A	(Mounts 3 No. 56 drops and 7 No. 4 type signals)		13 1/2 x 1 1/2
62	34 type	12	21 x 1 1/2	96	34 type	15	21 x 1 1/2
*75	42 type	20	10 1/2 x 1 1/2	97	34 type	15	21 1/2 x 1 1/2
*77	42 type	10	9 1/2 x 1 1/2	100	42 type	5	5 1/2 x 1 1/2
*78	42 type	10	7 1/2 x 1 1/2	*105	42 type	20	9 1/2 x 1 1/2

*Note. Upper part of face equipped with designation strip.

For Combined Jacks and Signals

80B	2, 3, 6, 7, 8, 9, 12	1	1 1/4 x 2 1/4	89C	24, 31	5	6 3/4 x 1 1/4
80C	4, 6, 11	1	1 1/4 x 2 1/4	89D	23, 52, 55	5	6 3/4 x 1 1/4
81E	2, 3, 6, 7, 8, 9, 12	5	6 1/2 x 1 1/2	92B	22, 23, 26, 27	1	1 1/4 x 2 1/4
81F	4, 5, 11	6	6 1/2 x 1 1/2	92C	24, 31	1	1 1/4 x 2 1/4
88B	2, 8, 6, 7, 8, 9, 12	10	11 1/4 x 1 1/2	92E	29D	1	1 1/4 x 2 1/4
88C	4, 6, 11	10	11 1/4 x 1 1/2	101B	22, 23, 26, 27	10	11 1/4 x 1 1/2
89B	22, 23, 26, 27	6	6 1/2 x 1 1/2	101C	24, 31	10	11 1/4 x 1 1/2

For Supervisory Signals

80D	10, 13	1	1 1/4 x 2 1/4	90B	30, 33	3 on right end of plate	6 3/4 x 1 1/4
81D	10, 13	5	6 1/2 x 1 1/2	90C	30, 33	5	6 3/4 x 1 1/4
88D	10, 13	10	11 1/4 x 1 1/2	93A	30, 33	1	1 1/4 x 2 1/4
90A	30, 33	2 on left end of plate	6 3/4 x 1 1/4	99A	34C	10	11 1/4 x 1 1/4

SIGNAL PLUGS AND SUPERVISORY SIGNALS



Nos. 1, 2, 3 and 4 Type Signal Plug

Signal Plugs

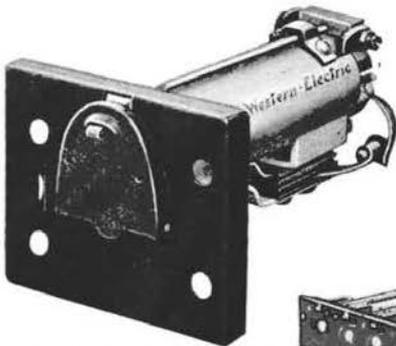
Nos. 5 and 6 Type Signal Plug

The Nos. 1, 2, 3 and 4 types are metal plugs which are inserted in a jack to designate a change of number, line temporarily disconnected, line arranged for calling only, or similar purposes. Heads are covered with opaque celluloid paint. The white heads of the Nos. 1A and 3A may be written upon.

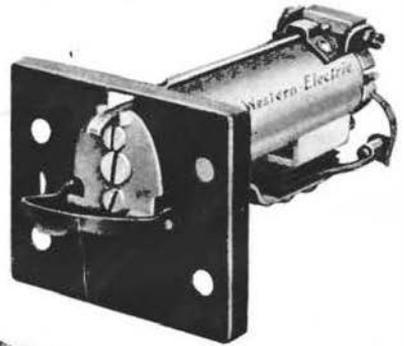
Code No.	Color of Head	Dimensions, Inches Diameter of Head	Overall Length	Code No.	Color of Head	Dimensions, Inches Diameter of Head	Overall Length
For No. 49 and No. 193 Jacks							
1A	White	27/64	} 35/64	2E	Yellow	} 23/64	} 35/64
2B	Red	23/64		2F	Blue		
2C	Slate	23/64		2G	Dark Green		
2D	Black	23/64		2H	Light Green		
For No. 92 Jacks							
3A	White	23/64	} 33/64	4E	Yellow	} †	} 33/64
4B	Red	†		4F	Blue		
4C	Slate	†		4G	Dark Green		
4D	Black	†		4H	Light Green		

The 5 and 6 type signal plugs are used as line markers for indicating lines in trouble, spare jacks, etc. The metal shank is slotted in two directions and the head has a white celluloid face which may be written upon. The sides of the plug head are colored as indicated in the table.

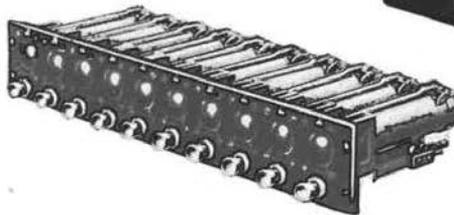
Code No.	Color of Face	Color of Side Head	Length of Side Head	Overall Length	Diameter Inches
For No. 49 and No. 193 Jacks					
5A	White	Red	1 1/2	1 1/2	†
5B	White	White	1 1/2	1 1/2	†
5C	White	Blue	1 1/2	1 1/2	†
For No. 92 Jacks					
6A	White	Red	1 1/2	1 1/2	†
6B	White	White	1 1/2	1 1/2	†
6C	White	Blue	1 1/2	1 1/2	†



No. 30C Supervisory Signal Shutter Restored



No. 30C Supervisory Signal Shutter Operated

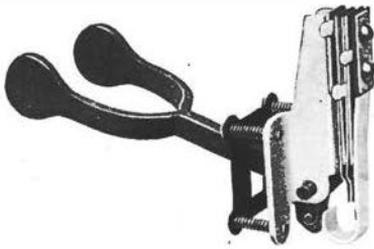


No. 10C Supervisory Signals on No. 89D Mounting

Supervisory Signals

Code No.	Approximate Resistance Ohms	Description	Mountings No.
10C	240	A magneto supervisory signal similar to the No. 22 type combined jack and signal, except that the jack springs are omitted and a push button for restoring the signal ball is added	80D, 81D and 89D
30C	350	A manually restored shutter type magneto supervisory signal, to be used in connection with the No. 22 type combined jack and signal or as a line signal	90A, B, C and 93A
33A	265 (inner) 290 (outer)	A manually restored shutter type magneto supervisory signal with two windings. To be used in connection with the No. 22 type combined type jack and signal	90A, B, C and 93A
34C	330	A manually restored, electrically operated shutter type magneto supervisory signal, to be used in connection with No. 22 type combined jack and signal or as a line signal	99A

SWITCH HOOKS



No. 143Y



No. 143Y Switch Lever and Escutcheon Removed

No. 140 and 143 Types

The Nos. 140 and 143 type switch hooks are simple, compact and self-contained. The switch hook lever is made of brass and is designed to withstand rough usage. The bracket is made of steel and is extremely rigid. The springs are of nickel silver and are backed up with brass stop springs. The adjustment is positive and permanent. The contacts are of ample size and in proper alignment. The movement of the lever is limited by stops making it impossible for the springs to be damaged, no matter how hard the receiver is "slammed" on the hook. The switch lever pivots on a fulcrum pin (P-158130) which is normally locked in position by means of a retaining spring (which forms a part of the pin). This pin may be readily removed with the fingers, when desired.

The No. 140 type switch hooks, here listed, are intended for use in metal telephones (Nos. 1533 and 1553 types) and, therefore, no escutcheons are provided.

The No. 143 type switch hooks mount by means of four machine screws which pass through clearance holes in the escutcheon and thread into tapped holes in the switch hook bracket. Screws of suitable length for mounting in 1/2 inch wood work are furnished unless otherwise specified.

The soldering terminals project to one side of the switch hook bracket in some cases and to the opposite side in others. The position of the terminals is indicated by the words "Right" and "Left" in the following table—"Right" meaning that the terminals project to the right, looking at the switch bracket from the switch hook lever side. The soldering terminals are so substantial that there is no danger of their breaking off.

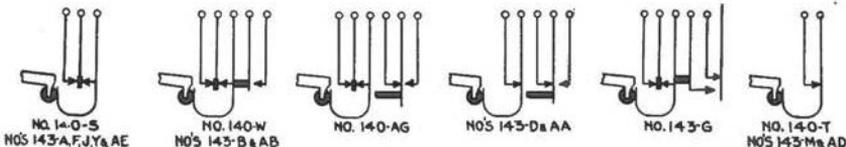
All iron and steel parts have an electro-galvanized finish to thoroughly protect them against rusting.

Mechanical contact is made between the lever and the tension spring through a hard rubber roller to minimize friction. All current carrying parts are insulated from the bracket.

Except for the Nos. 140T and 143AE these switch hooks are designed for use with standard hand receivers (Nos. 143AW and 144AW.)

Code No.	Terminal Projection	Finish	Use
140S	Left	Black	Nos. 1533 and 1553 type telephones.....
140T	Left	Nickel plate	No. 1533 type—Designed to operate with a light weight receiver (171W) for series central battery service.....
140W	Left	Black	Nos. 1533 and 1553 type telephone.....
140AG	Left	Black	No. 1553 type telephones.....
143A	Right	Nickel plate	Formerly the general standard. Same as No. 143Y except finish. No. 143Y recommended.
143B	Right	Nickel plate	Same as No. 143AB except finish.
143D	Right	Nickel plate	Same as No. 143AA except finish.
143F	Left	Nickel plate	Same as No. 143A except terminal projection.
143G	Right	Nickel plate	Used in telephone systems where it is necessary to momentarily ground the line when the receiver is removed from the hook.
143J	Left	Black	No. 1336 type mine telephones—treated to resist action of moisture and fumes.
143M	Right	Black	Series central battery telephones—Designed to operate with a light weight receiver (No. 171W).
143Y	Right	Black	General standard—Same as No. 143A except finish.
143AA	Right	Black	Same as No. 143D except finish.
143AB	Right	Black	Same as No. 143B except finish.
143AD	Right	Nickel plate	Nos. 1324 and 1325 type telephones—Has offset lever.
143AE	Right	Black	Equipped with special lever for use with head band receiver only.

No escutcheon furnished with these.



SWITCH HOOKS AND SWITCHBOARD WIRE**No. 141A Switch Hook****(For Suspending Hand Sets)**Code
No.

Use and Description

141A

A nickel plated brass hook having a wood screw thread at one end and provided with a stop escutcheon. Overall length, $2\frac{1}{8}$ inches. Intended for use with No. 1002 and No. 1003 type hand sets.

**No. 141A Switch Hook****No. 144A Switch Hook****"Dummy" Switch Hook**Code
No.

144A

A cast brass nickel plated auxiliary hook designed so that it may readily be secured to the No. 1020 type telephone arms.

Switch Hook PartsDrawing No.
of Part

Description

P-123498

Nickel plated switch lever as used on the No. 143A switch hook.

P-123514

Black finished switch lever as used on the No. 140S switch hook.

P-158139

Fulcrum pin for No. 143 type switch hooks and for No. 140 type switch hooks having steel brackets. This pin may be used in place of the fulcrum screw formerly used.

P-139256

Black finished switch lever as used on the No. 143AE switch hook (For head band receiver.)

P-139797

Round head nickel plated machine screws $\frac{3}{8}$ inches long for mounting No. 143 type switch hooks.

Switchboard Wire

Beeswaxed double silk and single cotton insulated tinned copper wire is generally used in making local forms for switchboard equipments. This wire is manufactured using various colors in the insulation to facilitate tracing connections.

Single conductor is furnished with red, red-blue, red-brown, etc.

Twisted pair is furnished black and black-white, blue and blue-white, brown and brown-white, etc.

Triple conductors are furnished red, white and blue; green, white and green-white, etc.

This wire comes in No. 19, No. 20, No. 22 and No. 24 B. and S. gauge for single, paired or triple conductor.

Cross-connecting or Distributing Frame Wire**Jumper Wire**

This wire, usually known as jumper wire, is made in single, twisted pair and triple conductor.

Western Electric cross-connecting wire is made in No. 20 and No. 22 B. & S. gauge tinned copper wire, insulated with black enamel and three servings of tussah floss. The exterior is covered with a flame-proof braid.

The No. 20 wire is colored as follows: Single, brown, twisted pair, brown and black, and triple, brown, black and red.

The No. 22 wire is colored as follows: Single, white, twisted pair: white and black; triple, white, black and red.

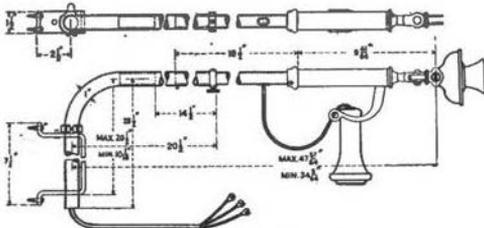
TELEPHONE ARMS

Telephone arms are preferred to desk stands by some telephone users as they save space and eliminate the possibility of overturning desk articles and disarranging papers, etc.

Where a desk telephone has to be used by two or more persons seated at opposite sides of a desk or table the use of a telephone arm is of great convenience and in some cases almost indispensable. Where desk stands are apt to be subjected to particularly rough handling, the cost of maintaining desk telephones can be lessened by the use of transmitter arms, but, this is of course true only when the telephone arm employed is of such design as to require very little maintenance.

Because of its extreme simplicity of construction, the No. 1020 type telephone arm is recommended wherever a non-collapsible rotating type of arm is required.

The No. 1048 type telephone arm is a very convenient type, since it is collapsible and can also be rotated in a horizontal plane. The highest grade of materials and construction are employed to assure that the arm will not sag materially even after extensive service.

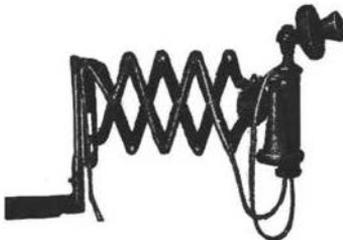


No. 1020-CC Telephone Arm

No. 1020 Type

This telephone arm has a black rust-proof finish—trimmings nickel plated. Electrically the No. 1020CC telephone arm is the equivalent of the No. 1020AL desk stand and may, therefore, be used in place of this desk stand.

Code No.	Trans.	Rec.	Cords			Switch Combinations	Service
			Rec.	Trans.	Tel.		
1020CC	*323BW	143AW	{ No. 549 2 ft. 6 ins. long	{ Nos. 547 and 582 12 ins. long	{ No. 550 8 ft. long	Two make contacts	{ Std. local or central battery



No. 1048AA

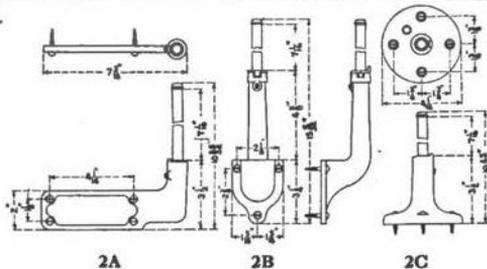


No. 1048AB

No. 1048 Type

These telephone arms have a black finish, trimmings nickel plated. Length, closed 9 3/4 inches; extended, 24 1/2 inches. Electrically these telephones arms are the equivalent of the No. 1020AL desk stand and may, therefore, be used in place of this desk stand.

Code No.	Trans.	Rec.	Tel. Arm Brkt	Cords			Switch Combinations	Suitable for Mounting On	Service
				Rec.	Trans.	Tel.			
1048AA 1048AB 1048AC	*323BW	143AW	{ 2A 2B 2C	{ No. 549 2 ft. 6 ins. long	{ Nos. 547 and 548 9 3/4 ins. long	{ No. 550 5 ft 6 ins.	Two make contacts	{ Either side of a roll top desk Wall or side of a flat top desk Top of a flat top desk	Standard local or central battery service



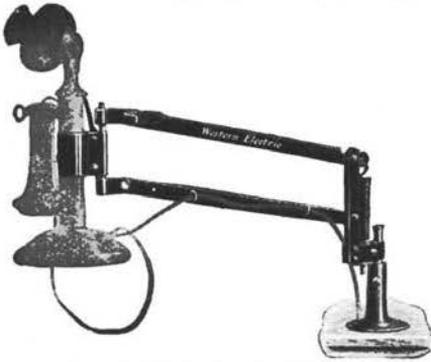
Telephone Arm Brackets

These telephone arm brackets form a part of the No. 1048 Type Telephone Arms and No. 147 Type Telephone Brackets.

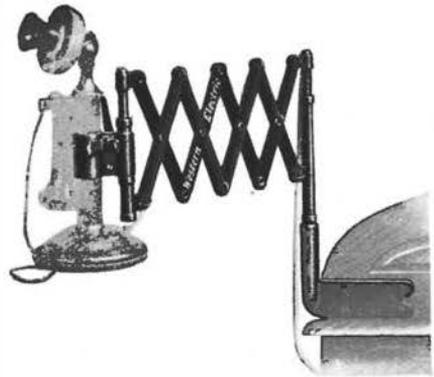
Code No.	Suitable for Mounting On
2A	Either side of a roll top desk.
2B	Wall or side of a flat top desk.
2C	Top of a flat top desk.

*No. 323W transmitter (nickel finish) will be furnished until the stock is exhausted.

TELEPHONE BRACKETS



Type "EZ" Equipped with No. 83 Mounting and "B" Clamp



Type "S" Bracket Equipped with No. 1 Mounting and No. 20 Clamp

"EZ" Telephone Brackets Type

The "EZ" Telephone Bracket permits of a desk stand being instantly adjusted to a height convenient to the user. In addition to this the arm is pivoted on its mounting and may therefore be rotated in a horizontal plane. (24-in. radius.)

An "EZ" Telephone Bracket consists of:

- 1 Arm
- 1 Mounting as specified in the order

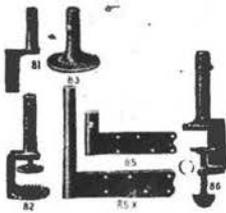
In placing orders for this apparatus be sure and specify the mounting and clamp that is wanted.

"EZ" Type Telephone Bracket equipped with Nos. 81-83-85-85X or 88 mounting and any style clamp are standard complete equipment.

"EZ" Type Telephone Bracket equipped with Nos. 82 or 86 mounting are furnished at extra charge.

1 Clamp as specified in the order.

MOUNTINGS FOR "EZ" TELEPHONE BRACKETS



"EZ" Type Mountings

- | | |
|----------|--|
| Code No. | Use |
| 81 | Used on wall or side of flat top desks.* |
| 83 | Used on top of flat desk. |
| 85 | Used on either side of flat or roll top desk. |
| 85X | Used on either side of flat or roll top desk.* |
| 86 | Clamps on edge of flat top desk.* |
| 94 | Used on wall or partition. |

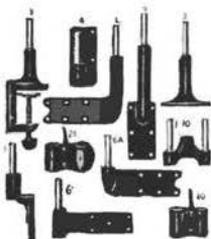
CLAMPS FOR "EZ" TELEPHONE BRACKETS

- | | |
|-------------|--|
| Code Letter | Use |
| A | This clamp fits desk telephones with convex shaped stem.* |
| B | This clamp fits desk telephones with cylindrical stem such as No. 1020 type desk stands. |
| C | This clamp fits desk telephones with tapering stem.* |
- *Not stocked. Furnished on order.

"S" Type Telephone Brackets

This bracket is of the "folding gate" type, and is arranged so as to revolve on its base. Furnished in 24 and 36 inch lengths. The desk stand swivels on the front rod. The bracket will be furnished with any of the mountings described below and with either of the clamps listed.

When ordering specify the letter of the clamp and mounting that is wanted in addition to the code number of the telephone bracket.



Type "S" Mountings

Code No.	Length of Bracket Extended, Ins.	Approximate Shpg. Wt., Lbs.
S-8	24	5
S-14	36	6 1/2

Complete equipment consists of bracket, one mounting, one receiver hook, one telephone clamp, one set of eyelets for holding cord, but does not include desk stand.

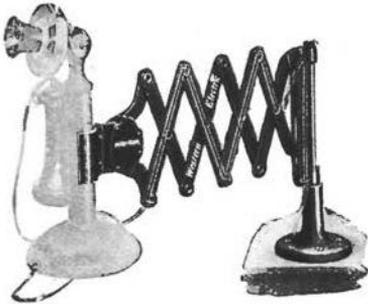
MOUNTINGS FOR "S" TYPE TELEPHONE BRACKETS

- | | | | |
|----------|---|----------|---|
| Code No. | Use | Code No. | Use |
| 1 | For use on side of flat or roll top desk. | 6 | For use on side of roll top desk.* |
| 2 | For use on top of flat top desk. | 6A | For use on side of flat or roll top desk.* |
| 3 | Clamps on edge of flat top desk.* | 7 | For use on side of flat top desk.* |
| 4 | For use on wall or partition. | 10 | Attachment fits any mounting and holds two brackets.* |
| 5 | For use on side of flat top desk.* | | |

CLAMPS FOR "S" TYPE TELEPHONE BRACKETS

- | | |
|----------|---|
| Code No. | Use |
| 20 | This clamp fits telephones with a cylindrical stem such as the No. 1020 type. |
| 21 | This clamp fits telephones with convex shaped stems |
- *Not stocked. Furnished on order only.

TELEPHONE BRACKETS AND TERMINAL PUNCHINGS



No. 147AC

Telephone Brackets

The advantages incident to the use of a No. 1048 type telephone arm, may also be obtained to a large extent by the using of a Western Electric No. 147 type telephone bracket in connection with a No. 1020 type desk stand. The structural features of these brackets are the same as those of the No. 1048 type telephone arm. These brackets have a black finish with nickel plated trimmings.

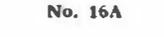
A screw driver is the only tool required for securing the clamp of the telephone bracket to the desk stand.

No. 147 Type

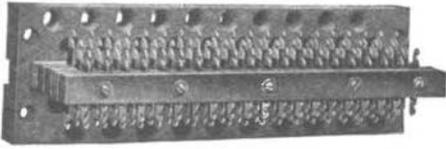
Code No.	Telephone Arm Bracket	Method of Mounting	Length Closed (Inches)	Length Extended (Inches)
147AA	2A	Either side of roll top desk.	8¼	24
147AB	2B	Wall or side of flat top desk.	8¼	24
147AC	2C	Top of flat top desk.	8¼	24
147CA	2A	Either side of roll top desk.	10	36
147CB	2B	Wall or side of flat top desk.	10	36
147CC	2C	Top of flat top desk.	10	36

The desk stand is not included in the price of the telephone bracket and must be ordered as a separate item.

Terminal Punchings

Code No.	Material	Use
 No. 3	Nickel Silver.	On fuse posts and fuse blocks.
 No. 6	Brass, tinned ends.	For the ground side of ringing leads.
 No. 8	Brass, tinned ends.	On double sided connecting racks.
 No. 9	Brass, tinned ends.	On No. 10 switchboards.
 No. 13A	Brass, dip tin finish.	On double sided connecting racks.
 No. 14	Brass, dip tin finish.	Similar to No. 13A except ½ in. shorter.
 No. 15A	Brass, one end tinned.	For screw connection on one end.
 No. 16A	Brass, tinned ends.	On one sided connecting racks.
 No. 17A	Brass, tinned ends.	On repeating coils and retardation coils.
 No. 21A	Brass, tinned ends.	On induction coils and telephone sets.
 No. 3	Brass, dip tin finish.	On repeating coils, induction coils and retardation coils.

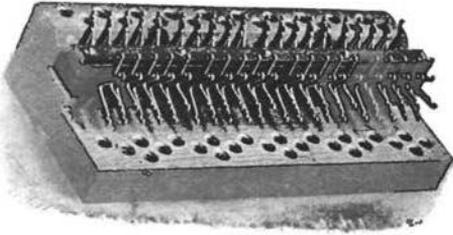
Western Electric
TERMINAL STRIPS



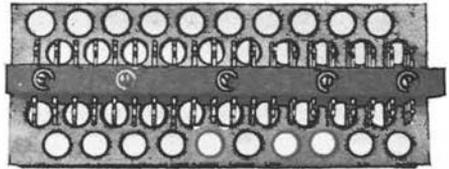
No. 35



No. 53



No. 65



No. 100A and 101A

Terminal Strips

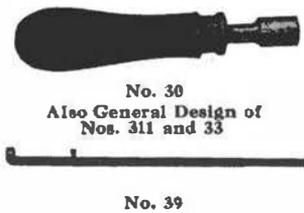
The No. 53 and 69 terminal strips are composed of a 3 ply laminated maple wooden base having holes into which the terminal punchings are driven.

All other models have a solid maple base upon which are assembled hard rubber insulating strips which hold the terminal punchings in place. The base is drilled to act as a fanning strip for wires and the holes are chamfered to prevent injury of the insulation. These terminal strips are furnished unnumbered unless otherwise specified. The Nos. 100 and 101 types are provided with a clamping strip which is wide enough to permit of four characters being used for each stack of terminals. The Nos. 100 and 101 types are arranged to mount on a 1/2 inch by 1/2 inch bar by means of two 1 1/4 inch No. 10-32 round head iron machine screws, which are furnished with the terminal strips.

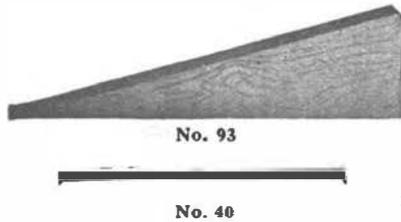
Code No.	Number of Terminals per Row	Number of Rows of Terminals	Length of Strips in Ins.	Width	Height Overall	Used With
35	20	3	7 1/2	2 1/2	2 1/2	Intermediate Distributing Frame
36	20	4	7 1/2	2 1/2	2 1/2	Intermediate Distributing Frame
37	20	5	7 1/2	2 1/2	3 1/4	Intermediate Distributing Frame
38	20	3	6 1/2	2 1/2	2 1/2	Intermediate Distributing Frame
39	20	4	6 1/2	2 1/2	2 1/2	Intermediate Distributing Frame
40	20	5	6 1/2	2 1/2	3 1/4	Intermediate Distributing Frame
41	20	6	6 1/2	2 1/2	3 3/8	Intermediate Distributing Frame
51	20	6	7 1/2	2 1/2	3 5/8	Intermediate Distributing Frame
70	20	7	7 1/2	2 1/2	4	Intermediate Distributing Frame
65	40	1	7 1/2	3 5/8	2 1/8	Main Distributing Frame
53	20	2	10	1 1/2	2	No. 9 Switchboard
69	20	3	10	1 1/2	2	No. 9 Switchboard
100A	20	3	6 1/2	2 1/2	2 1/2	Switchboards
100B	20	4	6 1/2	2 1/2	3 1/2	Switchboards
100C	20	5	6 1/2	2 1/2	3 3/4	Switchboards
100D	20	6	6 1/2	2 1/2	4 1/2	Switchboards
100E	20	7	6 1/2	2 1/2	4 1/2	Switchboards
100F	20	8	6 1/2	2 1/2	4 1/2	Switchboards
100G	20	9	6 1/2	2 1/2	5 1/2	Switchboards
100H	20	10	6 1/2	2 1/2	5 1/2	Switchboards
100J	20	11	6 1/2	2 1/2	5 1/2	Switchboards
101A	20	3	7 1/2	2 1/2	2 1/2	Switchboards
101B	20	4	7 1/2	2 1/2	3 1/2	Switchboards
101C	20	5	7 1/2	2 1/2	3 3/4	Switchboards
101D	20	6	7 1/2	2 1/2	4 1/2	Switchboards
101E	20	7	7 1/2	2 1/2	4 1/2	Switchboards
101F	20	8	7 1/2	2 1/2	4 1/2	Switchboards

*Three way.

TOOLS



No. 30
Also General Design of
Nos. 311 and 33



No. 93

No. 40

Code No.

CABLE AND CABLE TERMINAL TOOLS

- 311 Socket wrench for use on $\frac{3}{8}$ in. hexagonal nuts on Cable heads.
- 93 Multiple cable lifter.
- 216A Combination double end screw driver and double end socket (taking hexagonal nuts, $\frac{3}{8}$ in. and $\frac{1}{4}$ in. across flats) for use in placing fuses in cable terminals and connecting wires to fuses and binding posts. The socket wrench may be extended beyond the screw driver ends and locked in position or may be released to turn freely over the screw driver shank.

DISTRIBUTING FRAME TOOLS

- 33 Socket wrench for use on $\frac{1}{2}$ in. hexagonal nuts on distributing frames.

DROP TOOLS

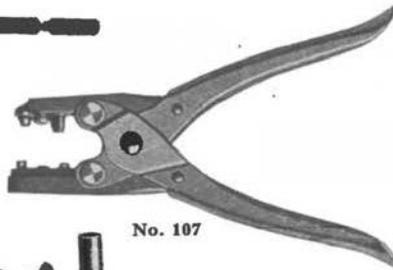
- 39 Shutter support adjuster, used on drops.
- 40 Double screw driver for use on drops. One end bent at angle of 90 degrees.



Nos. 64 and 103



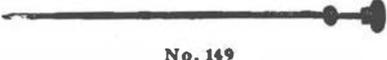
No. 113



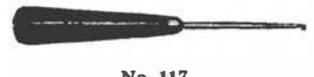
No. 107



No. 86



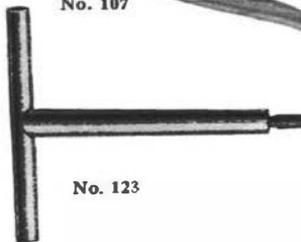
No. 149



No. 117



No. 124



No. 123



No. 118

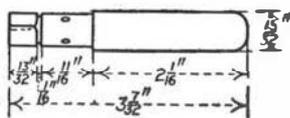
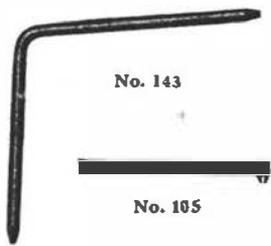
Code No.

JACK TOOLS

- 64 Wrench and screw driver for adjusting Nos. 4, 6, 7, 10, 11, and 15 jack fasteners.
- 86 Jack cleaner with $\frac{1}{8}$ in. wide blade.
- 103 Wrench and screw driver, similar to No. 64 except arranged for adjusting No. 16 jack fastener.
- 107 Pliers for use in removing and replacing sleeves when repairing No. 92 jacks.
- 113 A steel holder with a removable steel blade having a screw driver edge at one end. Approximate diameters; holder $3\frac{1}{2}$ inches long; blade $\frac{1}{2}$ inch long; overall length $4\frac{1}{8}$ inches. Intended for use in removing the underlining of jack mountings.
- 117 Adjusting tip and ring springs of No. 92 jacks. Used with No. 118 tool for adjusting abnormally bent ring springs.
- 118 With No. 117 tool for adjusting abnormally bent ring springs of No. 92 jacks.
- 123 Jack sleeve remover. For use in removing sleeve from a worn No. 49 jack without interfering with other jacks in strip and without removing the strip from the switchboard. Used in connection with No. 124.
- 124 For use in replacement of No. 49 jack sleeves. Has a socket adapted to fit over soldering terminal of jack sleeve used in connection with No. 123 tool.
- 149 Spring tweezers for use in holding wires to jack terminals while soldering.

Western Electric

TOOLS
(Continued)



No. 143

No. 105

No. 116

No. 85

No. 87

KEY TOOLS

- | | |
|----------|---|
| Code No. | Use |
| 105 | Adjusting springs on No. 453 type keys. |
| 143 | For use in adjusting the springs of horizontal type keys. |

LAMPS AND LAMP CAP TOOLS

- 85 Extracting No. 4 type lamps.
- 87 Extracting No. 8 type lamp caps.
- 116 Removing No. 2 type lamps.
- 146 This tool is used in removing No. 2 type lamp cap, type 59, 60 and similar type number plates from switchboards. It consists of pincer or forceps for gripping the number plate on which is riveted a hook that is pivoted at its fastening and can be opened out when necessary for prying loose such number plates as have become stuck in the jack mounting.
- 319 For removing lamp caps and number plates. Similar to the No. 58 tool.



No. 132



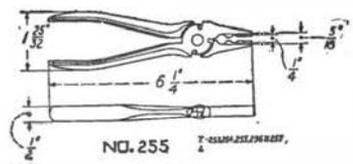
No. 200



No. 213



Nos. 201 and 202



No. 255

PLUG TOOLS

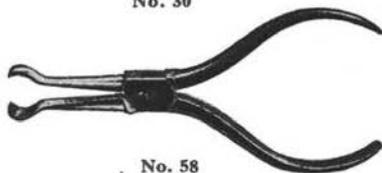
- | | |
|----------|--|
| Code No. | Use |
| KS-2348 | Combination tool for inserting and extracting shell and connecting screws of plugs. (Replacing No. 109). |
| 132 | Consists of a six-foot flexible shaft arranged at one end to connect to the motor shaft of a plug polishing machine (or any other motor having a 1/2 inch diameter straight shaft) and provided at the other end with a die sinkers handle with non-revolving front for holding various tools. The shaft, holder, and coupling together with the tightening pin are mounted in a neat wooden box 20 inches long, 14 3/8 inches wide by 2 inches high, and space is provided for a No. 133, 134 and 135 tool. The complete outfit is used for cleaning heat coil washers and protector springs. |
| 200 | Tool for use with Nos. 201 or 202 tools for removing Nos. 109 plugs or 110 plugs from or attaching them to repaired cords. Consists of a black finished cast iron frame fitted with a spindle, handle and clamping arrangement whereby the Nos. 201 or 202 tools may be attached thereto. A wrench is furnished with this tool to facilitate removal of the Nos. 201 or 202 tools. |
| 201 | Consists of a chuck arranged to grip the shank of a No. 109 plug and attaches to the No. 200 tool. |
| 202 | Same as the No. 201 except arranged to accommodate the No. 110 plug. |
| 213 | Socket wrench for use in adjusting nuts of Nos. 103 and 137 plugs and consists of a hardened steel socket attached to a wood handle. |
| 255 | A grooved pliers for use in conjunction with Nos. 200, 201 and 202 tools for attaching plugs to repaired cords. |

TOOLS

(Continued)



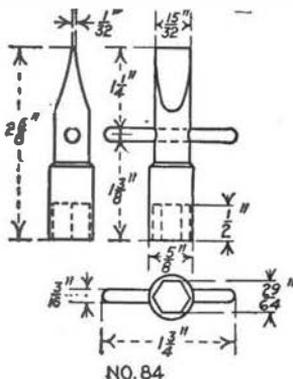
No. 30



No. 58



No. 133



NO. 84



No. 134



No. 135

PROTECTOR TOOLS

These Include Fuse, Heat Coils, Etc.

- | Code No. | Use |
|----------|---|
| 30 | Socket wrench for use on $\frac{1}{16}$ in. hexagonal nuts on No. 7 type protector fuses. |
| 58 | Pliers for use in handling heat coils of protectors. |
| 84 | Wrench and screw driver for No. 7 type fuses. Fits $\frac{1}{16}$ hexagonal nuts. |
| 133 | Wire bristle brush in a brass holder for use with No. 132 tool for cleaning protector springs. |
| 134 | Wire bristle brush with wooden center for use with No. 135 tool for cleaning heat coil washers. |
| 135 | Steel coupling for mounting the No. 134 tool on a $\frac{1}{2}$ inch motor shaft. |



No. 35



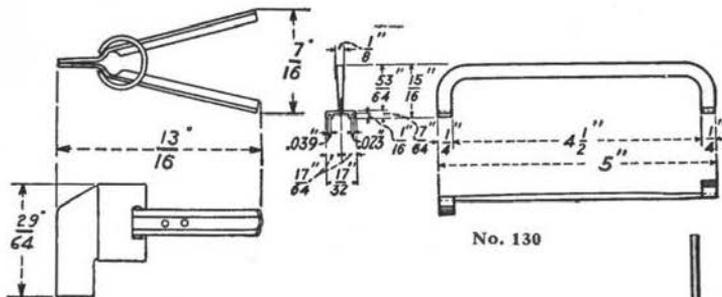
No. 45



No. 50



No. 91

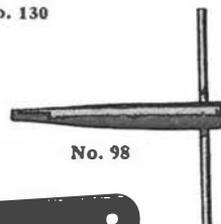


No. 252

No. 130



No. 136



No. 98



No. 99

RELAY TOOLS

- | Code No. | Use |
|----------|---|
| 35 | Screw driver with blade $\frac{1}{16}$ in. wide used with relays. |
| 45 | Socket wrench for $\frac{1}{16}$ in. hexagonal armature adjusting nuts of relays. |
| 46 | Removing $\frac{5}{16}$ in. hexagonal cap nuts from relays of No. 122 type. |
| 48 | Wrench and screw driver for adjusting armature contacts of relays. Will fit $\frac{1}{4}$ in. hexagonal nuts. |
| 50 | Relay spring adjustment. |
| 72 | Wrench and screw driver for adjusting armature contact screws. Same as No. 48 except arranged for $\frac{1}{16}$ in. and $\frac{3}{32}$ in. hexagonal nuts. |
| 91 | Removing cover of No. 89 type relay. |
| 98 | For use in adjusting and bending the springs of No. 177 type relays. |
| 99 | Gauge for adjusting air gap between armature and pole piece of No. 177 relays. |
| 130 | For use in adjusting the middle bank of springs on the No. 125 type relays. |
| 136 | For use in opening relay contacts. Inserted between the adjusting nut and the armature of flat type cut-off relays preparatory to a cut-over from an old to a new exchange. |
| 147 | Screw driver for adjusting contact screws of relays same as the screw driver part of No. 72 tool. |

TOOLS**RELAY TOOLS (Continued)**

- | Code No. | Use |
|----------|--|
| 220 | Socket wrench for $\frac{1}{8}$ in. hexagon nut, arranged to fit over the screw driven shank of the No. 35 tool. |
| 221- | Consists of a combination of the Nos. 35, 219 and 220 tools. |
| 231 | Intended for use in adjusting stud nuts of A, E or similar type relay (similar to one-half of a No. 43 tool.) |
| 252 | An offset contact clip for making connections with relay springs under operating conditions. |
| 259 | A single piece, bar shaped, vanadium steel, tool approximately $5\frac{1}{2}$ inches long. From the side of one end extend two beveled tipped jaws. These tips are so proportioned that they can be inserted between the springs of the "A" and "E" type relays thus permitting of adjusting them to the proper tension. |
| 265 | Designed for cleaning and burnishing the contact points of relays. Consists of the No. 266 tool mounted in a small brass chuck which is provided with a hard rubber handle, also includes a cap similar to a fountain pen cap for covering the chuck of the No. 266 tool when not in use. Overall length of tool with the cap in place is $3\frac{1}{4}$ inches and the diameter $\frac{1}{8}$ inches. |
| 266 | Part of the No. 265 tool for cleaning and burnishing the contact points of relays. |

RESISTANCE COIL TOOLS

- | | |
|-----|---|
| 276 | Socket wrench for adjusting mounting nuts of Nos. 18 or 19 type resistances. (Similar in design to No. 94 tool.) |
| 277 | Open end off-set wrench intended for use on mounting nuts of Nos. 18 or 19 type resistances when wired in position. |



No. 96



No. 129

RINGER TOOLS

- | | |
|-----|---|
| 96 | Double screw driver for ringers. |
| 129 | Double wrench for adjusting armature pivot screw nuts and adjusting posts of ringers. |

SWITCHBOARD CORD TOOLS

- | | |
|--------------------------|--|
| 312
313
314
315 | } A set of tools for use in repairing the No. 447 and No. 448 switchboard cords. |
|--------------------------|--|

TOOLS

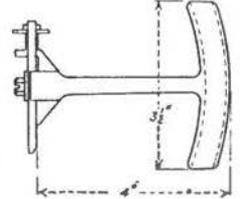
(Continued)



No. 61



No. 70



No. 71



No. 63



No. 110

TELEPHONE SET TOOLS

- | Code No. | Use |
|----------|--|
| 61 | Socket wrench for use on $\frac{3}{8}$ in. hexagonal nuts on binding posts of telephone sets. |
| 63 | Triple wrench for use on nuts of binding posts of receivers and transmitters. |
| 70 | Double socket wrench for use on $\frac{3}{8}$ in. and $\frac{1}{2}$ in. hexagonal nuts on receivers, transmitters and telephone set binding posts. |
| 110 | Double socket wrench for No. 20 type desk stands and No. 48 type telephone arms. Fits $\frac{1}{4}$ and $\frac{3}{8}$ inch hexagonal nuts. |

WIRE TOOL

- 71 Wire skinner for use in removing the insulation from braided rubber covered wire. Has adjustable blades arranged to receive wire of different gauges.



No. 43 and 74



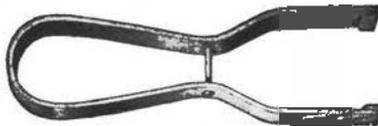
No. 59



No. 60



No. 97



No. 90



Nos. 94, 101 and 102

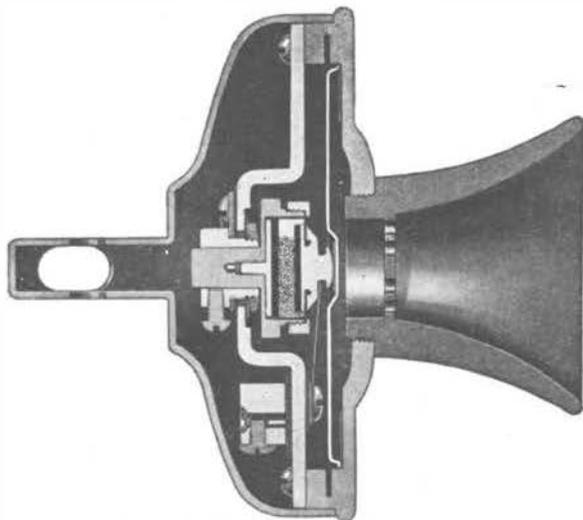
MISCELLANEOUS TOOLS

- | Code No. | Use |
|----------|---|
| 43 | Double wrench for $\frac{1}{8}$ in. and $\frac{1}{4}$ in. nuts. |
| 59 | Long handle round nose pliers. Overall length, 19 ins. |
| 60 | Long handle diagonal cutting pliers. |
| 74 | Double wrench; same as No. 43 except arranged for $\frac{5}{8}$ in. and $\frac{3}{4}$ in. hexagonal nuts. |
| 90 | Removing caps of message registers. |
| 94 | Socket wrench for use on $\frac{1}{8}$ in. hexagonal nuts. |
| 97 | Socket wrench for $\frac{3}{8}$ in. hexagonal nuts. |
| 101 | Socket wrench for use on $\frac{1}{2}$ in. hexagonal nuts. |
| 102 | Socket wrench for $\frac{3}{8}$ in. hexagonal nuts. Similar to No. 94 except for size of hexagonal nut. |

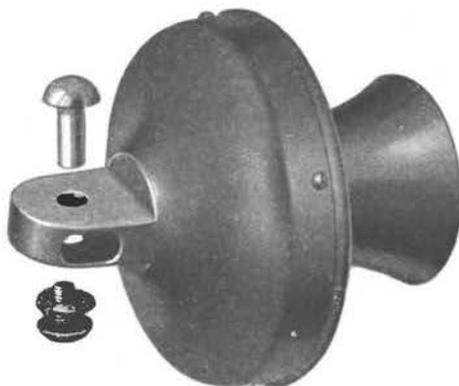
Western Electric TRANSMITTERS

Western Electric transmitters represent the highest development from all angles, and are recognized as standard throughout the world by leading telephone authorities.

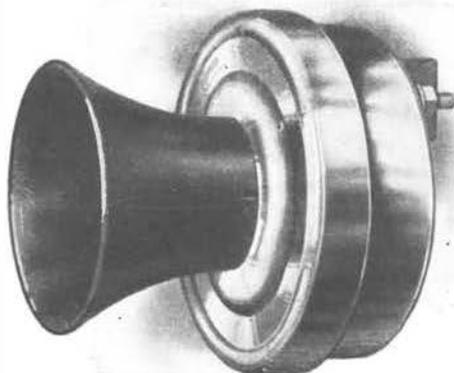
Low resistance transmitters (5 to 15 ohms) are used for train despatching service, whereas high resistance transmitters (35 to 50 ohms) are used for standard central battery and local battery service. For short line telephones a much higher resistance transmitter (about 200 ohms) is found desirable as it gives maximum length of life to the batteries.



Cross-Section of No. 323 Transmitter



No. 323-BW



No. 312-W



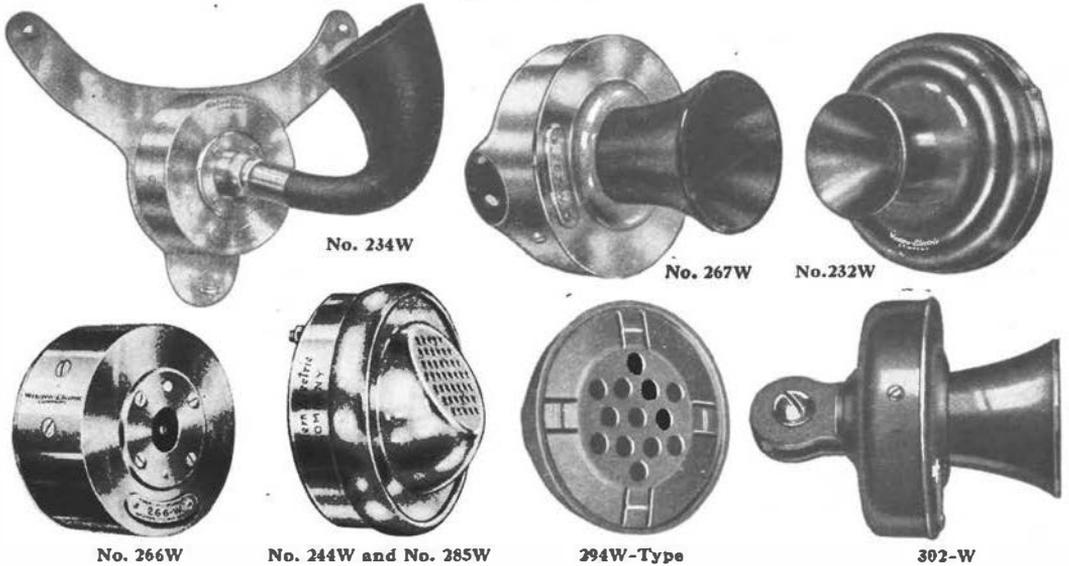
No. 353-W

TRANSMITTERS FOR STANDARD CENTRAL BATTERY AND LOCAL BATTERY TELEPHONES AND DESKSTANDS

Code No.	Use	Description	Finish	Method of Mounting
312W	No. 1336 type mine telephones.	Treated to resist the action of moisture and fumes. Equipped with black finished brass mouth-piece.	Nickel Plate	Drilled and tapped for mounting screws.
323BW	General Standard Transmitter for telephones and deskstands.	Same as No. 323W, except finish.	Black	By means of bolt and screw.
337BW	For use on long subscribers loops	Similar to the No. 323BW.	Black	By means of bolt and screw.
353BW	Former standard for wall type magneto telephones.	Transmitter mounted—on an adjustable bracket. Overall length, $8\frac{1}{4}$ inches.	Black	Bracket mounts by means of four wood screws.

*Nickel plated transmitter will be furnished until present stocks are exhausted.

(Continued)



Transmitters

SWITCHBOARD--SUSPENDED TYPE--CENTRAL OR LOCAL BATTERY

Code No.	Use	Description	Finish
232W	{ Used on switchboards where a suspended type of transmitter is required. }	{ One side of the circuit is grounded on the frame. Arranged to be suspended by two transmitter cords. }	Black

OPERATORS--CHEST TYPE--TRANSMITTERS--CENTRAL OR LOCAL BATTERY*

234BW	{ Intended principally for use by switchboard operators. }	{ Ball and socket joint permits of mouthpiece being adjusted to any desired position. Arranged for but not equipped with a No. 3 Transmitter attachment. }	Black
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TRANSMITTERS FOR USE ON HAND SETS--CENTRAL OR LOCAL BATTERY

244W	{ Standard for use on No. 1001 type hand set. }	{ Cylindrical metal case. Perforated metal mouthpiece secured to case by clamping ring. }	Nickel Plate
285W	{ Used on No. 1001C hand set. For train dispatching circuits. }		
267W	{ Central battery and local battery transmitter for use on No. 1002 type hand sets. }		

TRANSMITTERS FOR SHORT LINE TELEPHONES AND INTER-PHONES

These transmitters have different electrical characteristics from the transmitters for standard central battery and local battery service listed above, and should, therefore, not be used for service other than that for which they are intended.

294W	{ Inter-phones. }	{ A capsule type transmitter having a carbon diaphragm not insulated from case. }	Nickel Plate
302W	{ Inter-phones. }		
362W	{ For use with No. 1527A and No. 1539A Telephones for 1801 Type switchboard systems. }	{ A unit (capsule) type transmitter, but differing in construction from the 294W type. Mounts interchangeably with 294W type. }	Nickel Plate

TRANSMITTERS--FOR USE IN LINEMEN'S TEST SETS

266W	{ No. 1017 type test sets. }	{ Arranged to mount directly back of the perforated plate which forms a part of the No. 1017 type test sets. Equipped with mounting screws. }	Black
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TRANSMITTER PARTS AND ACCESSORIES

Transmitter Parts

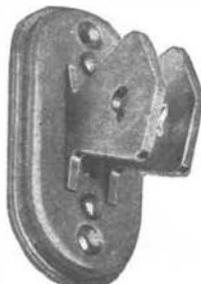
No.	Description	Used on
P-106561	Brass—black finish	No. 312W
P-84570	Composition	Nos. 323W, 323BW, 353W, 267W, 302W
P-91818	Semi-hard Rubber	Nos. 234W, 234AW
P-93553	Reinforced mouthpiece	May be used on 323W and 323BW
Mouthpiece		
Rim Screws		
P-91811	Nickel plated	323W, 323BW, 353W
P-92773	Nickel plated	302W
P-180658	Nickel plated	267W
Miscellaneous Parts		
P-92375	Bolt	For mounting and adjusting the position of the 323W and 323BW transmitters.
P-92381	Spring washer	
P-92378	Screw	



No. 3A



No. 3D



No. 8A

No. 7A
Transmitter Bracket

Transmitter Attachments

Code No.	Description	Color of Strap
2A	Nickel plated buckle used in connection with the No. 3 type transmitter attachments	
3A	These transmitter attachments consist of a tape strap equipped with two No. 2A transmitter attachments. They are used for supporting operator's chest type transmitters. Overall length 21½ inches. (For use with No. 234BW Transmitter).	Slate
3B		Black
3C		White

Transmitter Brackets

These transmitter brackets will mount any Western Electric transmitter that is equipped with a mounting lug and screw, for example the 323W transmitter.

Code No.	Finish	Description
3D	Black	For mounting old style grounded transmitters on wooden telephones. Has a stud for making the ground connection.
3E	Black	For mounting insulated transmitters. Used principally on wooden telephones
7A	Nickel plate	For mounting insulated transmitters in a semi-flush position on metal telephones. For example, No. 1533 type and similar telephones.
8A	Black	For mounting insulated transmitters on wooden telephones. For example, No. 1317 type telephones.

TESTING APPARATUS



No. 1020A Test Set



No. 16A Test Set

No. 16—A Test Set

This set is used by cablemen when splicing cables as a means of identifying any particular wire in the cable and in testing the continuity of circuits. A telephone receiver is used in connection with this test set but is not included in the apparatus composing the set.

The No. 16A test set contains:

1 No. 31A condenser
1 No. 13115 switch
1 No. 12036 buzzer

4 No. 2A binding posts
6 Type III Columbia invincible dry cells

The woodwork is oak and the case is supplied with a leather carrying strap having an adjusting buckle.

No. 1020—A Test Set

This portable cable test set consists of a special vibrating device, an exploring coil and a receiver. It is used for locating short circuits, grounds and wet spots in cable and it is so designed that it may also be utilized in testing the continuity and insulation of the conductors or to locate special pairs of wires. This set, therefore, includes the usual cable splicer's equipment as well as the exploring coil features.

In operating the set for the location of grounds and short circuits, the vibrating element is used to place a varying voltage upon the line being tested and the operator, by passing along the cable with the exploring coil and telephone receiver, can tell when he passes the fault for which he is testing by the change which then results in the sound produced in his telephone receiver.

An electro-magnetic mechanism is provided for making interruptions in the circuit of the vibrator, producing a distinctive tone which can easily be recognized. The design features of the vibrating coil give a long battery life.

The exploring coil is waterproofed in order that it will not be injured through accidental contact with water when being passed over cable in man-holes, etc.

The set is accurate in its results, simple and easy to operate and requires no mathematical calculations.

A set consists of:

1 instruction book
1 No. 189W receiver

1 No. 20A test set: includes—

1 No. 18AC resistance
1 No. 21K condenser
1 vibrator
1 interrupter
1 2 point switch
1 No. 19A test set: includes—

1 exploring coil
1 4 ft. No. 577 cord
1 connecting plug

Overall dimensions 12 x 10½ x 6½ inches.

Material, birch with mahogany finish.

Weight, without batteries, 12½ pounds.

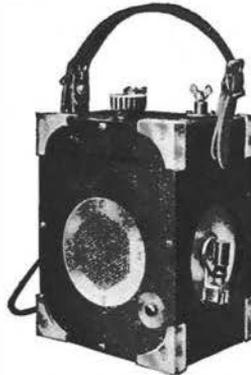
All metal corner pieces, lock, etc., are finished in nickel. The leather carrying strap has an adjusting buckle.

TESTING APPARATUS

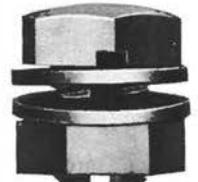
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No. 90530 Test Set



No. 1017B Test Set



No. 3
Test Connector

Linesmen's Test Sets

This test set is equipped for signaling service only. It consists of a generator for ringing through certain resistances and a ringer for receiving test signals. The generator and ringer are connected in series between the two line binding posts. The generator is normally short circuited. No provisions are made for telephone transmitting and receiving, if such additional service is required, the No. 1017 type test set is recommended.

The case of the set is finished in birch and is designed to withstand rough handling. A leather strap handle is provided.

List No.	Generator	Ringer		Gen. Operates Through	Size of Case in In.
		Type	Ohms		
90530	22K	19B	2500	10,000 ohms	5 1/4 x 6 5/8 x 5 1/4
90510	22K	19H	500	35,000 ohms	
90511	22N	19A	1000	50,000 ohm	
90512	22N	19B	2500	100,000 ohms	

No. 1017 TYPE

The No. 1017B test set is provided with the standard local battery talking circuit, but is designed for use both on magneto and central battery lines. The case of the telephone is made of birch with a mahogany finish and is designed to withstand rough handling. A leather strap handle is provided. The transmitter is mounted inside the case with its mouthpiece opposite a perforated plate mounted flush with the outside surface of the set.

A switch actuated by a knob, mounted on the top of the case is provided for, connecting either the talking or ringing circuit to the line terminals. A push button is connected in series so as to insure that there will be no drain on the battery except when the local battery talking circuit is being used.

Code No.	Trans.	Rec.	Rec. Cord	Gen.	Buzzer
1017B	266W	515W	No. 572 2 ft. long	29B	2D (100 ohms)
1017C	266W	515W	No. 572 2 ft. long	29F	2D
1017E	266W	515W	No. 572 2 ft. long	29F	2D

Code No.	Gen. Operate Through	Switch	Battery	Ind. Coil	Size of Case in Inches
1017B	2500 ohms	2 position	Eveready No. 703	13	8 1/4 x 6 5/8 x 4 3/4
1017C	.....	.....	No. 703	13	.....
1017E	5000*	Special 3 position	No. 703	13	9 1/4 x 6 5/8 x 4 1/4

In addition to the above apparatus the No. 1017E test set is equipped with a No. 6000A interrupter. See description.

*Will operate a No. 19A drop through 11500 ohms.

WESTERN ELECTRIC BRIDGING TEST CONNECTORS
For description see Connectors listed elsewhere

TESTING APPARATUS

(Continued)

Artificial Lines and Cable

These instruments are designed for use in telephone transmission and telegraph line testing.

The one illustrated contains the necessary resistance and capacity to represent a total length of 32 miles of standard No. 19 B. & S. gauge cable, having a loop resistance of 88 ohms per mile and a mutual electrostatic capacity of .060 M.F. per mile, and is so arranged by means of switches that various sub-divisions to form any length between 1 mile and 32 miles can be made.

Other standard sizes having a total length of 1, 5 or 10 miles can be furnished.

These artificial lines and cables are made to order owing to the varying conditions that are encountered in practice. They are available in standard or special sizes, as desired.



Artificial Lines and Cable

Peerless Improved Lineman's Fault Finder

This instrument is especially adapted for the use of wire chiefs in locating crosses, grounds and other cases of line and cable trouble, as well as for straight resistance measurements.

It may be used either as a portable or stationary set and is arranged for mounting vertically or horizontally on desk or wall.

Unknown resistances can be read directly from the scale thus avoiding reference to tables or other data in working out resistance problems.

It is simple, accurate and dependable when an accuracy not higher than $\frac{1}{2}$ of 1% is desired.

Test set No. T-2062 is the same as the Western Electric No. 1407A except that it has contacts and other facilities for connecting it directly to the No. 1407 testing cabinet.

Approximate overall dimensions, 15 x 8 $\frac{1}{2}$ x 6 $\frac{1}{2}$ inches.

List No.

T-2062

Peerless improved fault finder.

T-2063

Sole leather carrying case.



Peerless Fault Finder

No. 1407A Bridge Unit

Used in connection with a No. 1407 testing cabinet. This bridge unit is the same as No. 2062 Peerless Improved Lineman's Fault Finder above described, except that it has facilities for attaching direct to the No. 1407 testing cabinet by means of the No. 1407B bracket supporting unit. A further and more comprehensive description of this equipment will be found in connection with the No. 1407 testing cabinet listed elsewhere in this catalog.

Approximate overall dimensions, 12 x 8 x 6 inches.

List No.

1407A

Western Electric Bridge Unit.

1407B

Bracket Supporting Unit.

Direct Reading Ohmmeter

These instruments are built in the laboratory type open form, or the combination laboratory and portable type equipped with a cover which can be closed and locked and the instrument used as a portable. The cover in this case is on detachable hinges so that it may be taken off and the set used in the laboratory. The ohmmeters are made with single, double and triple scale and are built complete with contained standard galvanometers and with or without self-contained battery.

Price applications should state range and scale required.

Approximate overall dimensions, 10 x 8 x 5 $\frac{1}{2}$ inches.



Direct Reading Ohmmeter

TESTING APPARATUS

(Continued)



Peerless Portable Plug Set

Peerless Portable Plug Set

The bridge arms in this set are reversible and are arranged as follows:

Bridge coils in "A" arm have values of 1, 10 and 100 and are accurate to 1/20 of 1%.

Bridge coils in "B" arm have values of 10, 100 and 1000 and are accurate to 1/20 of 1%.

The rheostat coils are arranged in units, tens, hundreds and thousands with multiples of 1, 2, 2 and 5 of each denomination, producing a total of 11,000 ohms. By using the 1 to 1000 ratio on the bridge, a range of 11 megohms in single ohm steps may be obtained. The rheostat coils are accurate to 1/10 of 1%.

Provision is made for an outside battery in case a higher E.M.F. than that of the cells in the set is required.

The set is designed for ease in reading. The bridge is at the top, out of the way of the tester. The plugs are in vertical columns, beginning with the thousands at the left-hand side and followed by the hundreds, tens and units. When balance is obtained, the desired result is obtained by adding the values of the resistances plugged out, in the same way that a column of figures is added.

The case is of highly polished mahogany and the metal work of polished brass, gold lacquered.

The weight, complete, is 7 $\frac{3}{4}$ lbs.; the size, 8 x 5 $\frac{1}{2}$ x 5 $\frac{1}{2}$ inches.

List No.

T-2010

Peerless plug type testing set.

T-2016

Sole leather carrying case for T-2010.

T-2040

Folding tripod for supporting T-2010 in street.

Government Standard Testing Set

Government standard, testing set, made in strict accordance with the rigid requirements of the United States Navy Specifications, 17-T2.

A high-grade type of "plug-in" set.

Battery consists of 6 silver chloride cells.

Bridge values in the A and B arms, 1, 10, 100, 1000 and coils are accurate to 1/20 of 1%. Rheostat on the decade plan, with 10 coils on each decade, of the values of units, tens, hundreds and thousands.

Approximate over all dimensions, 12 x 8 x 6 inches.

List No.

T-2070

Peerless G.S. decade portable testing set.

T-2085

Carrying case of sole leather, with shoulder strap.



Government Standard Testing Set

The Peerless Switch Dial Set

The bridge arms in this set have values of 1, 10, 100 and 1000 in each arm. The coils are accurate to 1/20 of 1%.

Rheostat has four dials of 10 coils each, with values of units, tens, hundreds and thousands. The coils are adjusted to an accuracy of 1/10 of 1%.

An Ayrton shunt is part of the set apparatus. Provision is made for outside galvanometer and outside battery. Any commercial cell may be used for the latter.

A specially designed switch, with negligible contact resistance, is furnished.

The sets are equipped with quick make and break switches for changing from test to test.

Weight, complete, 7 $\frac{3}{4}$ lbs.

Approximate over all dimensions, 9 $\frac{1}{4}$ x 5 $\frac{3}{4}$ x 5 $\frac{1}{2}$ inches.

The case is of highly polished mahogany and the metal work of polished brass, gold lacquered.

List No.

T-2000

Peerless switch dial decade testing set.

T-2015

Sole leather carrying case for T-2000.

T-2020

Flexible contact clutches for gripping heavy conductors.

T-2040

Folding tripod for supporting T-2000 in street.



Peerless Switch Dial Set

TESTING APPARATUS

(Continued)

Universal Ayrton Shunt

The Universal Ayrton Shunts are designed for use with any galvanometer. They have a new type of switch construction, and are rapid to manipulate, as well as being extremely accurate. These Shunts are made in a number of sizes, and can give 1, .1, .01, .001, .0001 of the full current through the galvanometer.

The approximate overall dimensions are 3 x 5 x 3½ inches.



No. T-3000

List No.	Description
T-3000	Ayrton Universal Shunt of about 100,000 ohms, for galvanometers having resistances of 3000 to 10,000 ohms.
T-3005	Ayrton Universal Shunt of about 20,000 ohms, for galvanometers having resistances of 1000 to 3000 ohms.
T-3010	Ayrton Universal Shunt of about 10,000 ohms, for galvanometers having resistances of 500 to 1000 ohms.
T-3015	Ayrton Universal Shunt of about 3000 ohms, for galvanometers having resistance of 100 to 500 ohms.

Vawter Indicating Ohmmeter

The operation of this instrument is extremely simple. The resistance to be measured is connected to the line posts and the position of the index on scale gives the resistance directly. There are no calculations to be made and no dials to adjust.

Readings are accurate, within 1 per cent. for the standard types, and to within 1/10 of 1 per cent. for a special type which can be supplied when such accuracy is required.

While various types of these instruments are made, the most generally useful type is that in which the E.M.F. is in the instrument, making it completely self contained. This E.M.F. consists of small gaslight batteries, easily replaced and obtainable from any electrical dealer.

The multiplier switch is an entirely new feature in ohmmeter operation. By setting a switch marked "Mult," the scale of the instrument is at once made to indicate 0.1 or 10 times its calibrated values. It being independent of voltage and magnetic variations, no magnetic shunt is required in connection with the operation of this ohmmeter, nor is any calibration required before making readings.

Approximate overall dimensions 8 x 8 x 5½ inches.



Vawter Ohmmeter

List No.	Range Ohms	Notes
VA-124	0-.01	One range
VA-125	0-.1	One range
VA-126	0-1.	One range
VA-127	0-10	One range
VA-128	0-100	One range
VA-224	0-10	Double range
	0-100	
	0-1000	
VA-225	0-1000	Double range
	0-5000	
	0-10000	
VA-226	0-10000	Double range
	0-100000	
	0-1000000	
VA-227	0-10	Double range
	0-100	
	0-1000	
VA-324	0-100	Triple range
	0-1000	
	0-10000	
VA-325	0-100	Triple range
	0-1000	
	0-10000	

Note--Any range supplied on special order.

TESTING APPARATUS

(Continued)

T-2002 Switch Dial Decade Test Set

This instrument is of the standard Wheatstone Bridge type and has in its rheostat four decades. The coils have values of units, tens, hundreds and thousand ohms. The bridge is controlled by a single multiplying dial, giving ranges varying from .001 to one thousand times the rheostat readings. The rheostat coils are accurate to 1/10 of 1 per cent. and the bridge arm coils to 1/20 of 1 per cent.

This set makes all the tests of resistances of the Standard Wheatstone Bridge Sets and has provisions for making the Murray and Varley Loop Tests for fault location in lines and cables.

The galvanometer is of the high sensibility and dead beat D'Arsonval type.

A commercial battery is used.

The set has been simplified so that technical education is not required to operate it.

Approximate overall dimensions, $9\frac{1}{4} \times 5\frac{3}{4} \times 5\frac{1}{2}$ inches deep.



T-2002 Switch Dial Decade Test Set

Plug Type Resistance Box and Wheatstone Bridge

The resistance units in the rheostat are adjusted to an accuracy of 1/10 or 1 per cent. and the bridge arms to 1/20 of 1 per cent. These are built on the well-known post office plan, and are very satisfactory for ordinary testing work. The coils are carefully treated and aged, and are wound on wooden spools. The plugs are carefully made to an exact taper, and will fit in the plug holes smoothly, with practically no contact resistance. The line posts are of a double-grip type, for gripping small or large sized wire, and all binding posts are of a substantial size throughout.



Plug Type Resistance Box and Wheatstone Bridge

List No.	Description
T-1550	Resistance box and Wheatstone Bridge. Approximate overall dimensions: $9 \times 5\frac{1}{2} \times 3\frac{3}{4}$ inches deep. Resistance coils, 1, 2, 2, 5, 10, 20, 20, 50, 100, 200, 200, 500, 1000, 2000, 2000, 5000; ratio coils--A arm 1, 10, 100 and 1000; B arm 1, 10, 100 and 1000; supplied with battery and galvanometer key having a short circuit strap.
T-1552	Resistance box. Approximate overall dimensions: $9 \times 3 \times 3\frac{3}{4}$ inches deep. Resistance coils of 1, 2, 2, 5, 10, 20, 20, 50, 100, 200, 500.
T-1554	Resistance box, similar to the above, except coils of 1, 2, 2, 5, 10, 20, 50, 100, 200, 200, 500, 1000, 2000, 2000, 5000. Approximate overall dimensions: $9 \times 3 \times 3\frac{3}{4}$ inches deep.

TESTING APPARATUS

(Continued)



No. T-4042



100 Cell Silver Chloride Testing Battery

Peerless Portable D'Arsonval Galvanometers

These instruments are of extremely high sensibility, and are built to stand rough usage, being capable of handling the same as one would handle an ordinary voltmeter. They will show a deflection on a variation of 1/10 of 1 per cent. in the resistance measurements. The sensibility ranges from one half of a megohm, in the less expensive types, to a full megohm in the better grades, this meaning that one volt, through a resistance of 500,000 ohms, will cause the pointer to move 1 millimeter division over the scale in the cheaper forms, and that one volt through a resistance of 1,000,000 ohms will cause the pointer to move 1 millimeter division over the scale in the higher grade instruments. The scale is well lighted and easily read, is uniform throughout, and is divided into 30 millimeter divisions of 15+ and 15-, with center zero. The scale is so calibrated that the divisions are proportional to the current, a feature which is not usually furnished without extra charge.

These instruments are recommended for use with Wheatstone bridges for all commercial purposes; they will also meet the requirements in a large number of laboratory applications.

List No.	Description
T-4040	Peerless Portable D'Arsonval Galvanometer
T-4041	Peerless Portable D'Arsonval Galvanometer, with Shunt.
T-4042	Same as T-4040, but mounted in a carrying case with lid and leather handle.
T-4043	Same as T-4042, except with self-contained four point shunt.
T-4047	Government standard type.
T-4048	Government standard type, four point shunt.
T-4049	Government standard type, complete with carrying case, lid, and leather handle.
T-4050	Same as T-4049, but with addition of four point shunt.

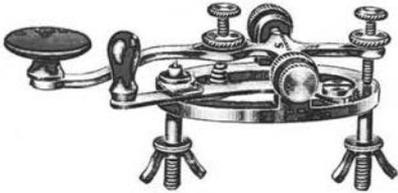
Silver Chloride Testing Battery

The chloride of silver cell has the advantage over the ordinary dry cell of not deteriorating as a result of not being used, uniform electromotive force, and small size. Each cell will give between .8 and .9 of a volt. A battery of these cells forms a valuable adjunct for a testing equipment. Any individual cell or the total number can be placed in the circuit. The 100 cell battery measures 2 x 8 x 6 inches.

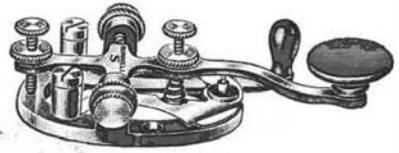
List No.	No. of Cells	List No.	No. of Cells
T-2090	100	T-2087	30
T-2089	75	T-2086	15
T-2088	50		

Single cells may be ordered separately.

TELEGRAPH APPARATUS



No. 9044



No. 8046

Steel Lever Solid Trunnion Keys

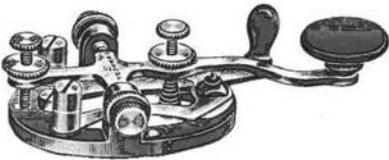
“The Key Supreme”

The lever used in this instrument is only one-half the weight of the ordinary brass lever. The lever and trunnions being made of but one piece of fine wrought steel, the common defect of loose trunnions is avoided. Strength is obtained with much less weight of metal, and, by the perfect bearing which the solid trunnion gives, together with the use of perfected contact points, sticking is absolutely prevented.

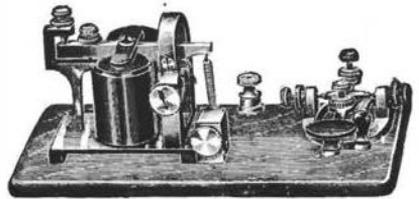
Their size and proportions make these keys ideal for operating either for the hand of the skilled and rapid expert, or for the beginner.

List No.	Description	List No.	Description
9044	Leg key with perfected contact points.	6208	Portable base only, for legless keys.
9046	Legless key with perfected contact points.		

Full nickel plated keys will be supplied at an added cost.



No. 9050



No. 759

The Triumph Key

This new model legless form of steel lever key has been adopted as the standard of the Western Union and Postal Telegraph & Cable Co.

In addition to the well-known superior points of the standard steel lever keys, it has mica insulations, lips for “Bug” wedge, and other valuable improvements.

List No.	Description
9050	Triumph key with perfected contacts.

New Main Line Sounders

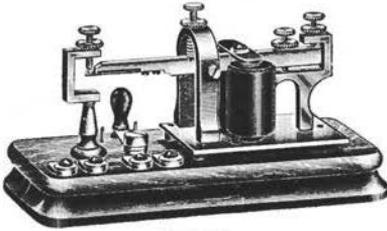
“MCM” Model

This instrument provides instantaneous adjustment of both armature spring and distance from magnet cores, both adjustment nuts being conveniently located at the front. An arrow on the upper adjusting nut indicates the relative distance between armature and magnet cores; the string arrangement used in the old-style tension springs is entirely dispensed with, and a wide and rapid range of spring adjustment is obtained by a cam lever operated by the lower adjusting nut. The MCM model is intended for use on main lines in place of the ordinary relay, and makes the use of a local sounder unnecessary, thus saving the continual expense of maintaining local batteries.

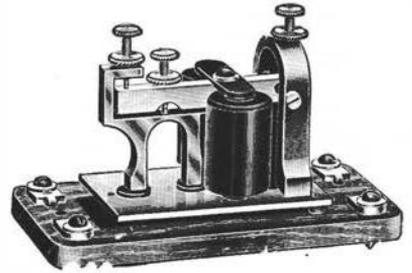
List No.	Description	List No.	Description
559	150 ohms, with key on base.	563	250 ohms, with key on base.
560	150 ohms, without key.	564	250 ohms, without key.
561.	Mahogany case for wrecking sets.	565	20 to 100 ohms, with key on base.
562	Leather case.	566	20 to 100 ohms, without key.

Nos. 563 to 566 are designed for use on all circuits from 1 to 1000 miles in length and, with ordinary main battery power suitable for such lines, they are equal to the best local sounders.

TELEGRAPH APPARATUS
(Continued)



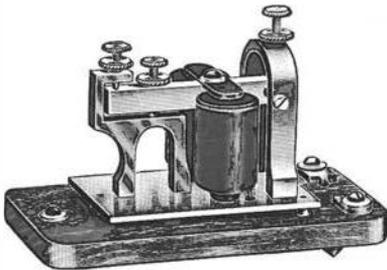
No. 514



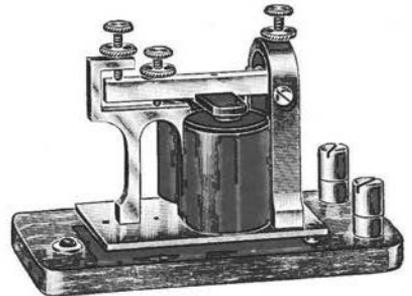
No. 9109

Repeating Sounders

List No.	Description
514	The standard spring point repeating sounder.
9109	"Quad" repeating sounder, Giant pattern, with rigid points.



No. 500



No. 515

The New Aluminum Lever Giant Sounder

For use where tone, loudness, and quick action are desired.

List No.	Description
500	Original Giant sounder, wound to 4 ohms. Requires half the usual amount of local battery.
501	Wound with fine wire to 20 ohms resistance; for main line use (without relay) on lines up to 15 miles in length.

Note. Old style sounders, with brass levers, will be furnished when desired at the same prices as the above instruments. Nickel plated sounders will be furnished at an increased cost.

The "1892" Giant Sounder

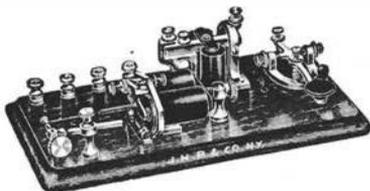
With Large Magnets and Important New Improvements

These sounders have aluminum or brass levers, and will give a loud, clear and quick stroke with on cell of local crowfoot battery.

List No.	Description	List No.	Description
515	Wound to 4 ohms resistance	516	Wound to 20 ohms resistance

Relay, Steel Lever Key and Giant Sounder Combination Set

A complete set of best quality instruments, mounted on a polished mahogany base 13 inches long by 6 3/4 inches wide. Designed for use as special office sets, and as testing sets at the switchboard.



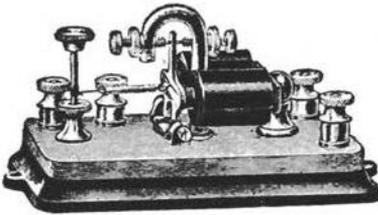
No. 9062

List No.	Description
9062	Wound to 150 ohms
9063	Wound to 250 ohms
9066	With large relay, wound to 250 ohms

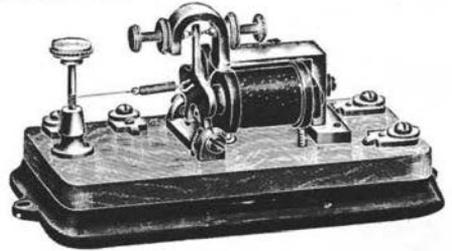
Note. Nickel plating on the metal parts of the above sets will be furnished at an increased cost.

TELEGRAPH APPARATUS

(Continued)



No. 567



No. 570

List No.

The Dandy Pony Relay

- 567 20 ohms, non-adjustable rubber covered magnets.
- 568 20 ohms, non-adjustable cloth covered magnets.
- 569 20 ohms, adjustable rubber covered magnets.

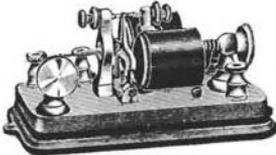
Novel Form Pony Relay

For lines of less than 75 miles in length. A finely finished instrument. Mounted on polished mahogany base, with ornamental subbase. Size of base, 6½ x 3½ inches.

- 570 20 ohms resistance or under, for lines up to 15 miles in length.
- 571 50 ohms resistance, for lines 20 to 40 miles long.
- 572 75 ohms resistance.
- 573 100 ohms resistance for lines of 75 miles.
- 574 With polish d rubber magnets, extra.

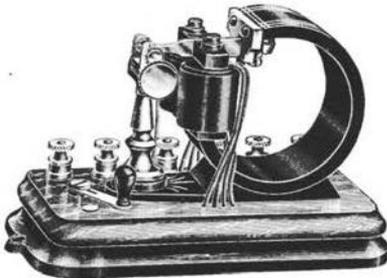
The "1900" Model Pony Relay

An improved form of Pony Relay, with rubber covered, adjustable magnets, etc. Finely finished.



No. 575

List No.	Description
575	Wound to 20 or 30 ohms.
576	Wound to 50 ohms.
577	Wound to 75 ohms.
578	Wound to 100 ohms.



No. 554

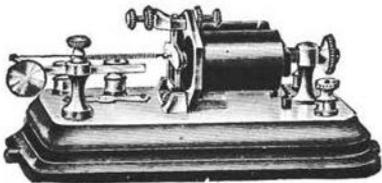
Standard Polarized Relays

List No.	Description
554	Differentially wound 400 ohms.
557	Polarized relay No. 2, 50 ohms.
558	Polarized relay No. 2, 100 ohms.

The improved form of clamping binding posts are used on all instruments.

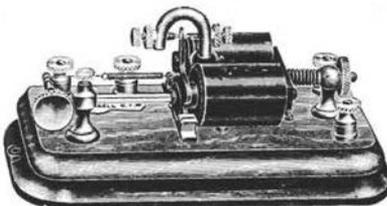
Main Line Relays

These relays are wound with silk covered wire, have polished rubber covered coils, mahogany base, extension adjustment and are mounted on ornamental subbases. The armature and lever are made from a single piece of malleable iron.



No. 533

List No.	Description
533	Standard No. 1 main line relay, 150 ohms.
534	Standard No. 1 main line relay, 250 ohms.
535	Standard No. 1 main line relay, 300 ohms.
536	Standard No. 2 main line relay, 150 ohms.
537	Standard No. 2 main line relay, 250 ohms.
538	Standard No. 2 main line relay, 300 ohms.



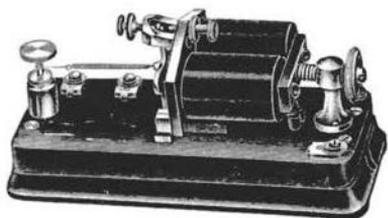
No. 536

The standard No. 2 main line relay has been adopted by the Western Union and Postal Telegraph Companies.

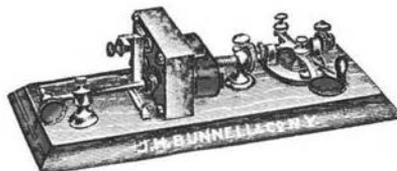
Nickel plated relays will be supplied at an additional cost.

Western Electric TELEGRAPH APPARATUS

(Continued)



No. 9070



Barclay Box Relay

C. Q. A. Relay

By means of a new magnet adjustment, the magnets may be instantly moved to any desired distance from the armature. The armature tension spring adjustment is also simplified and improved. The dimensions of subbase are only $8\frac{1}{2}$ inches long by $3\frac{1}{2}$ inches wide. The C.Q.A. relay is mounted on slate instead of wood. It is furnished with the latest style of W. U. clamp connections to which the magnet and local wires are soldered, thus making such a thing as a loose connection impossible. The magnets are supported and protected by a spectacle frame. An automatic stop prevents contact between the magnet cores and the armature.

The C.Q.A. relay will be furnished regularly with hardened silver contact points as adopted by the Western Union and Postal Telegraph Companies.

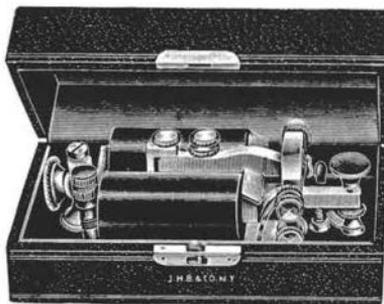
List No.	Description	List No.	Description
9070	Wound to 150 ohms resistance.	9072	Wound to 250 ohms resistance.

Barclay Box Relays

The snare drum principle produces a clear, pleasing sound that is very penetrating, consequently can be easily read even in noisy places or on lines having weak currents.

List No.	Description	List No.	Description
404	150 ohms, with key and local contacts.	426	150 ohms, without key with local contacts.
405	150 ohms, with key without local contacts.	427	150 ohms, without key or local contacts.

For 250 ohms, an added charge is made.



No. 581

Pocket Relays

Has all the practical qualities of a full size sounding relay and is a very compact and handsome instrument.

Furnished with nicely finished carrying case $5\frac{1}{4}$ inches long, $2\frac{1}{4}$ inches deep, $2\frac{1}{2}$ inches wide.

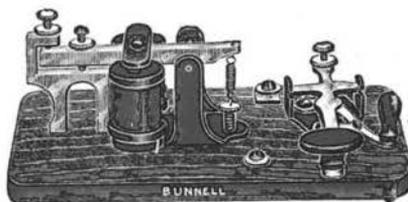
List No.	Description	List No.	Description
581	Wound to 150 ohms, with case.	6226	Wound to 250 ohms, with case.

TELEGRAPH APPARATUS

(Continued)



No. 607



No. 436

The "Dandy" Morse Learner's Outfit

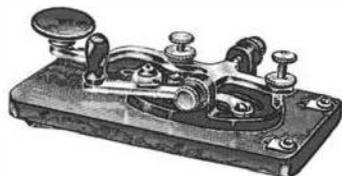
Consists of a full size, well made, complete Morse telegraph apparatus of the latest and best form for learners, including handsome sounder, with steel lever (solid trunnion) key, and a cell of gravity battery, latest form. It is the best working set of learner's instruments for short or long lines. The sounder lever, sounder yoke, adjustment screws, etc., are in finely finished brass composition, the same metal as in all the first class telegraph instruments. The magnets are strong. The sounder is loud and clear.

List No.	Description
605	Complete outfit consists of one No. 607 "Dandy" learner's instrument, with 5 x 7 crowfoot battery, wire, book of instructions, and all necessary material for operating.
606	Same as No. 605 but with dry cell instead of crowfoot battery.
607	"Dandy" Morse instrument only, wound to 4 ohms.
608	"Dandy" Morse instrument only, wound to 20 ohms.
609	Cell of 5 x 7 crowfoot battery complete (no chemicals).
610	Cell of Mascot dry battery.

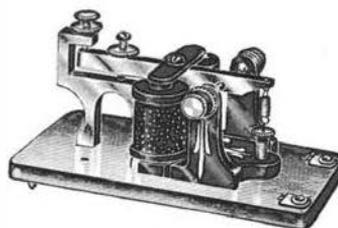
The "New Departure" Learner's Outfit

The ideal set for home practice. Always ready, neat, clean and attractive. The instrument is a well made Beeko learner's apparatus, with a steel lever key, arranged for use with a Mascot dry battery. The circuit closer is detached from the key, as it will prolong the life of the battery to leave the circuit open when not using the instrument. With circuit closer detached the Mascot battery should last for several months practice. It is sent with each apparatus so that it can be replaced when it is desired to operate two or more instruments on the same circuit with bluestone battery. The magnets can be rewound at slight expense for use on longer, outdoor lines. Instruction book sent free with each outfit. Manual of telegraphy sent free on application. This outfit, packed in wooden box, weighs 7 pounds.

List No.	Description
611	Complete outfit consisting of one No. 436 Beeko learner's instrument, with cell of mascot dry battery, wire and book of instructions.
436	Beeko instrument only, wound to 4 ohms.
437	Beeko instrument only, wound to 20 ohms.



No. 775



No. 776

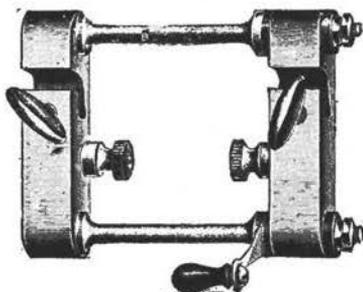
"Dandy" Learner's Key and Sounder

The "Dandy" is a higher grade learner's set, and is superior to any other learner's set on the market. These keys and sounders are the same as those furnished with our regular sets, but are mounted on separate bases.

List No.	Description
775	Dandy key. Postage weight 1 lb.
776	Dandy sounder, 4 ohms.
777	Dandy sounder, 20 ohms. Postage weight 2 lbs.

TELEGRAPH APPARATUS

(Continued)



No. 2282

Line Tapping Clamp

The line tapping clamp is for use in establishing a temporary office anywhere on the line. The line wire is clamped tightly in the upper clamps and then cut, and the operating instrument attached by two pieces of wire to the two lower clamps. The clamp is provided with a circuit closer, and may be left in the line after using until the line repairer can take it out and join the line.

List No.

2282 No. 2 oblong pattern.

Rheostats

Improved solid top, with coils carefully and accurately adjusted.

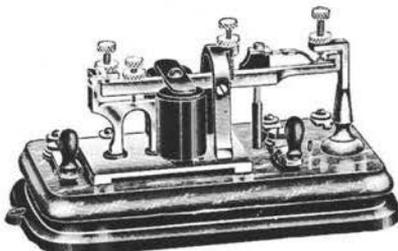
List No.

1248 Standard Rheostat. Capacity $\frac{1}{2}$ to 10000 ohms.

7551 Quadruplex rheostat. Total capacity 20025 ohms.

7554 Smith rheostat. Capacity 700 ohms each side.

7553 Standard duplex rheostat. Capacity 6300 ohms each side.



No. 592

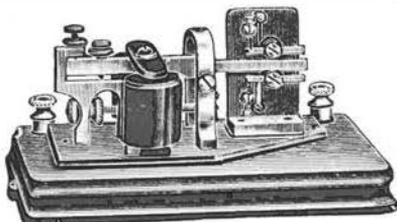
Milliken-Hicks (or Atkinson) Repeater Transmitter

List No.

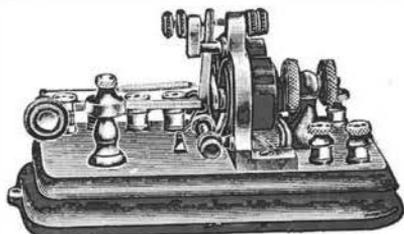
Description

592

Repeater Transmitter.



No. 600



No. 601

Battery Pole Changer

List No.

600

For duplex and quadruplex work.

Smith Neutral Relay

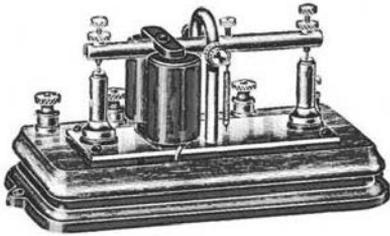
List No.

601

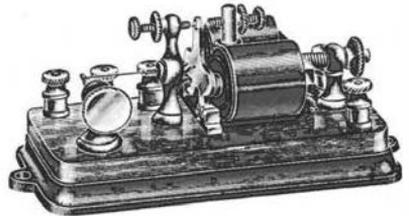
Three coil, for quadruplex circuits.

TELEGRAPH APPARATUS

(Continued)



No. 603



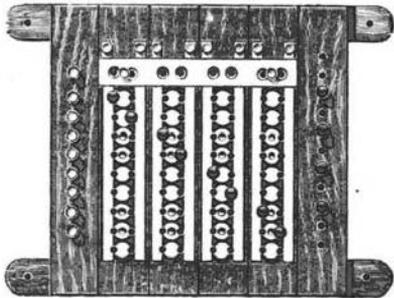
No. n04

Standard Dynamo Pole Changer

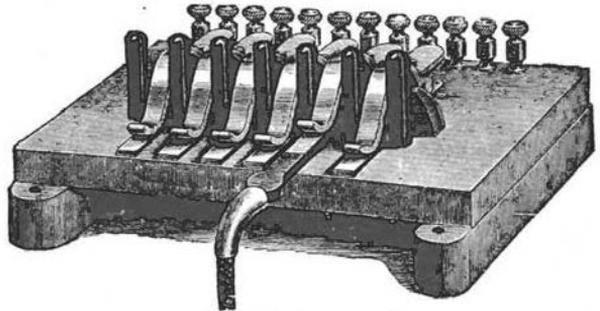
List No. 603 For duplex and quadruplex circuits.

Penn. R. R. Model

604 30 ohms or under, for duplex and quadruplex circuits.



Western Union Button Switch



No. 1268 Spring Jack

Western Union Button Switch, with Plate Lightning Arrester

List No.	Line	Perpendicular Bars	List No.	Line	Perpendicular Bars
1236	1	2	1242	7	14
1237	2	4	1243	8	16
1238	3	6	1244	10	20
1239	4	8	1245	12	24
1240	5	10	1246	Extra pins	
1241	6	12			

In ordering switches for large offices, give full particulars as to number and changes of wires, loops, batteries and instruments to be provided for. Information on larger sizes furnished upon application.

Western Union Spring Jack with Wedge and Cord

List No.	Per line (state number of jacks required in ordering).	List No.	Wedge, with 4 ft. cord, extra.
1268		1269	

In ordering or requesting prices on spring jack switchboards state the number of lines for which they are wanted, how many horizontal rows of discs, and whether a single or double row of jacks is required. Prices on spring jack switchboards, lampboards and terminal boards, furnished on application, accompanied with particulars of requirements.

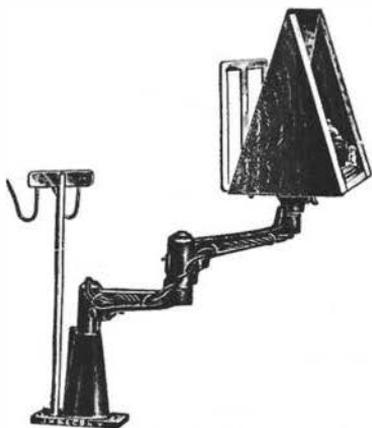
Loop Peg and Cord

Split peg or pin for use with Western Union Button switch to loop in an instrument.

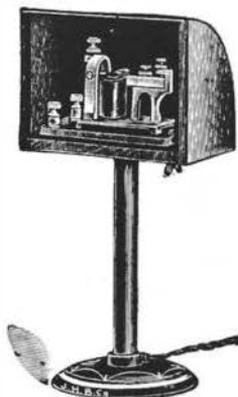
List No.	Loop peg, without cord.	List No.	Loop peg, with three-foot cord.
1234		1235	

TELEGRAPH APPARATUS

(Continued)



No. 7971



No. 619



No. 7972

Acme Adjustable Resonator

(Western Union Standard E. M. 33A.)

With double swing arm and swivelled hood.

The stand and arm are of iron finished in black japan, the hood of finely finished resonant wood; the message stand and rack are brass finished in gold lacquer, making a very handsome and attractive combination.

The height of the hook stand is 10½ inches, arm spread 15½ inches.

Made in three styles, as follows: Without message rack or stand; with message rack on wood, without stand; with message rack and stand, as shown in illustration.

List No.

- 7969 Without message rack or stand.
- 7970 With message rack without stand.

List No.

- 7971 With message rack and stand.

Mascot Resonator

Portable, can be moved to any desired position within range of cord. The cord enters base and passes through hollow stem to sounder.

- 619 Without sounder.

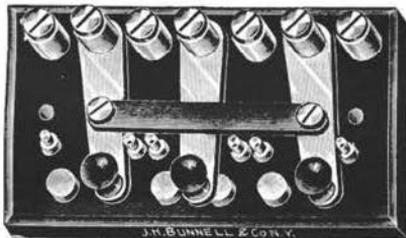
Acme Portable Resonator

(Western Union Standard E. M. 5A.)

A very popular and efficient type.

Furnished with or without message rack on back of hood.

- 7972 Without message rack (without sounder).
- 7973 With message rack (without sounder)



No. 1322



Table Jack Switch No. 634

Quadruplex Switches

Rubber Base with Spring Clip Contact

- List No.
- 8602 Single 3 point.
- 1321 Double 3 point.

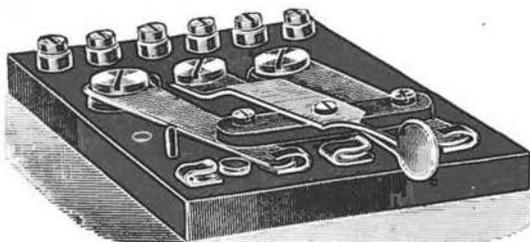
Quadruplex Switches, Slate Base

- 8528 3 point, 1 lever.
- 8529 6 point, 2 lever.
- 1322 7 point, 3 lever.

Table Jack Switches

For switching resonator set of instruments to any desired line.

- 633 3 line table jack.
- 634 Over 3 lines, per line.
- 635 Wedge with 4 foot cord, extra.



No. 1321

LOUD SPEAKING TELEPHONE EQUIPMENT

General

The proper design of an efficient loud speaking telephone represents one of the highest achievements in the electrical and acoustical arts as they exist today. The Western Electric Company have carried on extensive investigations upon the loud speaking telephone and loud speaking receivers with the result that they have developed the following line of apparatus which is suitable for use as an accessory to a radio receiving set.



No. 10-A

10A Loud Speaking Telephone Outfit

This outfit consists of the following:

1 No. 7A amplifier (2 stage with 3 No. 216A Vacuum Tubes)

1 No. 518W loud speaking receiver complete with horn.

The No. 7A amplifier consists of a wooden cabinet, approximately $12\frac{1}{2} \times 10 \times 4\frac{1}{2}$ inches, supporting a panel of approved insulating material on the under side of which are secured and mounted all transformers, grid batteries, tube sockets, etc. To repair or replace any part it is only necessary to remove six screws in the cover and lift off. Upon the panel are mounted a battery switch, multi-contact switch for controlling volume of sound, and necessary binding posts.

The No. 518W loud speaking receiver is of the balanced armature type, all parts of which are mounted in a metal housing. The No. 8A horn which is of molded composition is specially designed to give adequate volume and pure tone.

The No. 10A outfit requires for operation either a No. 2A current supply set, described below the following batteries:

A—Filament battery—6 volt storage battery (approximately 120 ampere hours)

B—Plate circuit. 120-130 volts.

C—Grid "C" battery, 9 volts, 2 No. 751 Eveready.

Replacement Parts:

Vacuum Tubes, No. 216A.

Receiver Cord for No. 518W receiver, No. 767.

Receiver horn, No. 8A.

2A Current Supply Set

This outfit is for use in place of the present "A" and "B" batteries for supplying both filament and plate current only to the No. 10A loud speaking telephone equipment where there is an alternating current lighting circuit available, whose voltage is not less than 100 or more than 120, and the frequency not less than 50 or more than 70 cycles. It cannot be used on a direct current lighting circuit.

The set, which with the exception of the tubes, is enclosed within a cast-iron case, weighs approximately 19 pounds. It consists of the necessary transformers to supply proper voltage, together with two No. 217A rectifier tubes which rectify the alternating current to direct current for the plate circuit. Two cords, one equipped with an attachment plug for connecting to the lighting circuit and the other for attaching to the No. 10A loud speaking telephone outfit, complete the equipment.



Type 2A Current
Supply Set

LOUD SPEAKING TELEPHONE EQUIPMENT



10-D



Type 522-W

10-D Loud Speaking Telephone Outfit

The No. 10D Loud Speaking Telephone Outfit is designed to operate directly from a radio receiving set which in itself provides a sufficient amount of amplification without the assistance of a separate power amplifier. It does not require any battery for energizing the magnetic circuit.

This outfit consists of a No. 518W receiver with the addition of a No. 112A transformer mounted in the base. It is approximately 2½ ft. high and the mouth of the horn is 14 inches in diameter.

The No. 112A transformer serves the purpose of giving the proper impedance ratio between the plate circuit of the radio receiving set and the No. 518W receiver and prevents the flow of any plate current through the receiver windings.

Replacement Parts:

Horn--No. 8A

Cord, No. 767

Transformer, No. 112A.

No. 522W Loud Speaking Telephone Receiver

This loud speaking telephone receiver has been developed to meet the demand of those who own phonographs, and who wish to use them in connection with their radio receiving sets.

The coils and windings of this receiver are the same as those used on our telephone head set, but the diaphragm is much larger and heavier and is so clamped as to give volume without distortion.

The construction is such that it is only necessary to remove the reproducer from the tone arm of the phonograph and slip in this receiver. The support attached to the receiver relieves any strain from the tone arm. The outfit is approximately 4 in. high, weighs about one-half pound and is equipped with a No. 762 cord for attaching direct to the receiving set.

Sufficient volume to fill the average size living room will be obtained with this receiver when used with one or two stages of amplification on an efficient vacuum tube radio receiving set within a radius of twenty miles of the broadcasting station.

The sound output from this receiver, when attached to a good receiving set, is very pleasing although not as loud as the No. 10-D.

Replacement Part:

Cord, No. 762.

LOUD SPEAKING TELEPHONE EQUIPMENT**Telephone Head Sets**

Type No. 1002C

No. 1002C Head Set

The No. 1002C head set, which is of the same design as those supplied to the U. S. Army and Navy during the war, is one in which every feature has been carefully studied and neither time nor expense has been spared in producing the very best known to the art.

The cases of the individual receivers are of brass nickel plated.

The inductance of each of the coil windings is held within exceedingly close limits by measurements made with a special type of alternating current Wheatstone bridge. The two coils employed in each receiver are each wound with copper wire to a direct-current resistance of approximately 550 ohms. This gives a total of approximately 2,200 ohms D.C. resistance when the two receivers are connected in series. The alternating current impedance of the receivers connected in series when measured at voice frequencies is approximately 20,000 ohms.

The pole pieces of the receiver are made of a special grade of silicon steel which insures the maximum alternating magnetic field with a minimum loss due to eddy currents.

The head band supplied with the No. 1002C head set is of a design that insures a close and comfortable fit to the head. It is made of non-corrosive phosphor bronze spring wire, covered with a heavy textile webbing and is equipped with adjustable yokes, slide rods and thumb screws to clamp the yokes in any desired position.

A high-grade cord is supplied with the head set. It has a black mercerized cotton covering and is equipped with tips which are concealed when attached at the receiver end, and with pin tips on the apparatus end. The cord is arranged to connect the receivers in series.

SPARE PARTS AND ACCESSORIES—Replacement parts for the No. 1002C headset are listed below.

Replacement Parts	Type No. 1002C
Complete Receiver Unit	509W
Ear Cap	P-99768
Diaphragm	P-98387
Head Band	No. 1B
Cord	No. 763



Your selection of the poles that are to form the basis for your outside wire lines is necessarily based on three determining factors:

- 1—Species of wood to meet specific requirements;
- 2—Quality of the poles;
- 3—Service on shipments.

Species

The first factor—that a certain species of wood is best fitted for one kind of installation to the exclusion of other species—is fully recognized by the Western Electric Company. It has recognized that fact by having available in its various pole yards throughout the country one or more of the five species that are generally used for poles—

Western Red Cedar
Northern White Cedar
Chestnut
Cypress
Creosoted Yellow Pine

Western red cedar and northern white cedar are preëminently the woods for poles.

Cedar poles are particularly suited for city use, as well as for the better class of suburban towns. Their symmetry and all-around fine appearance fit in well with the "City Beautiful" movement.

The use of cedar poles effects a great economy in line construction work. They weigh about one-half as much as chestnut poles—in fact they are the lightest of all types of poles, but are very strong and long lived. Cedar poles, therefore, require less men for the pole setting work. Furthermore they strip clean and do not have to be reshaved before setting. This lower installation cost more than offset the slightly higher first cost of cedar—a distinct advantage to the user.

Chestnut is next in importance to cedar for pole use. It possesses ample strength to withstand severe weather; is long lived; grows reasonably straight and is well proportioned. Chestnut for obvious reasons is mainly used in regions near the source of production. This is also true of cypress and creosoted yellow pine poles.

Pole Quality

Western Electric poles are quality products in the best sense of the term. All conform to nationally accepted terms. Inspections are thorough. Poles are inspected and measured on the ground immediately after felling and stripping. Another inspection is made before they are placed in stock. A third inspection takes place before shipping.

All poles that are delivered are guaranteed to be absolutely in accordance with the specifications under which they are ordered. That is a vital part of Western Electric service.

Service on Shipments

On the next page there will be found a graphic representation of the exceptional service the Western Electric Company is prepared to give on pole shipments.

There is at your command an exceptionally reliable and convenient source of supply for poles of whatever species you require for your outside wire plant.

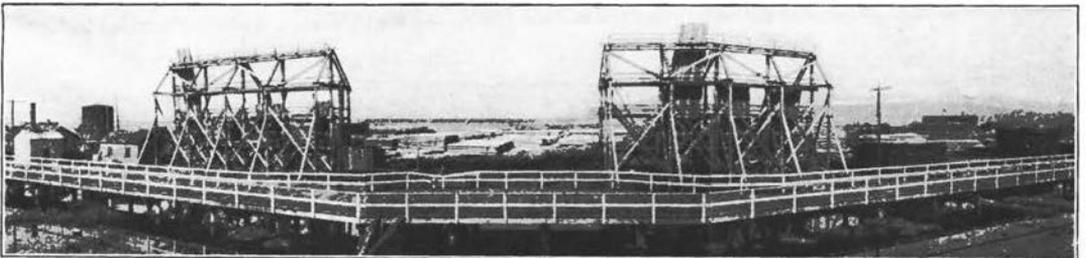
There is a total of thirty-five well-stocked pole yards containing western red cedar and northern white cedar in all standard sizes and in accordance with accepted standard specifications.

On the outskirts of Chicago, at the Western Electric Company's Hawthorne Works, there is a large cedar pole yard, ideally situated for service to every part of the middle western, eastern and southern sections of the country. East of this yard there is still another at Toledo, O.

Our many bases of supply for chestnut, cypress and pine are so situated throughout the regions in which these woods are grown that shipments can be made in any quantity and at any time.

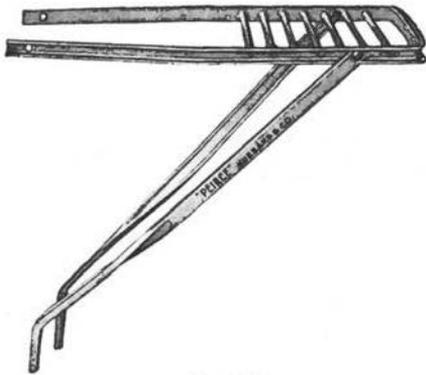
Our emergency service is always available to supply your needs when the unforeseen happens.

And this applies not only to poles, but to everything needed for your lines—cross arms, pins, insulators, hardware, wire, tools.

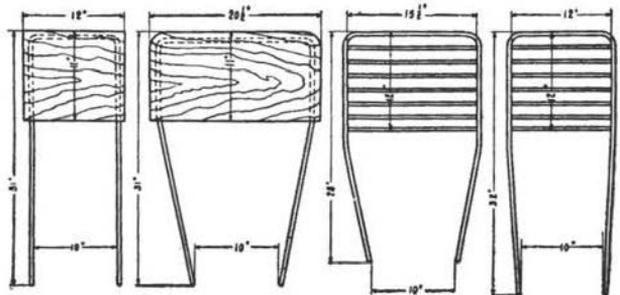


One of the Creosoting Plants

CONSTRUCTION MATERIAL



No. 755



No. 751 Wood Seat

No. 753 Wood Seat

Pole Seat No. 755

No. 757

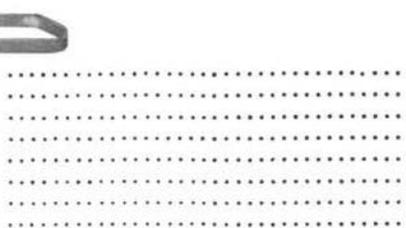
Peirce Pole Seats

Hot Galvanized or Painted

These seats in a competitive test held a dead load of 1740 lbs. without deflection. A 1 1/4 inch angle iron seat, weighing fifty per cent. more, collapsed with 960 lbs. load. The frames and braces of all styles are of 1 x 1/2 inch channel steel. The wood seats are 1 1/4 inch cypress, boiled in creosote. The bars of the all steel seats are 3/8 inch square steel let into the frame in such manner as to leave no projecting ends. There is no strain on the riveted joints. The bars are placed with corners up, to prevent slipping. They are shipped completely assembled in bundles of five.

List No.

- 750 No. 1, painted Pole Seat. . . .
- 751 No. 1, galvanized Pole Seat. . . .
- 752 No. 2, painted Pole Seat. . . .
- 753 No. 2, galvanized Pole Seat. . . .
- 754 No. 3, painted Pole Seat. . . .
- 755 No. 3, galvanized Pole Seat. . . .
- 756 No. 4, painted Pole Seat. . . .
- 757 No. 4, galvanized Pole Seat. . . .



Std. Bundle

Weight per 100

5	1260
5	1260
5	1400
5	1400
5	1400
5	1400
5	1260
5	1260

POLE BALCONY

Hot Galvanized or Painted

No. 9020 is the A. T. & T. Company's balcony for cable poles with narrow cable boxes. The legs are 1 1/2 x 1 1/2 x 1/8 inch angles, and the platform angle is 1 1/4 x 1 1/4 x 1/8 inch. Platform is 22 by 25 1/2 inches and extends 43 1/2 inches from the pole center.

Size Steel, Inches

List No.	Seat Angle	Legs Angle	Size Seat in.	Wt. Lbs.
9020	1 1/4 x 1 1/4 x 1/8	1 1/2 x 1 1/2 x 1/8	22 x 24	48

No. 9020 Balcony

MATTHEWS SCRULIX ANCHORS

Matthews Scrulix Anchors are screwed into solid ground. They have no moving parts to adjust, or that might be carelessly buried unadjusted. Nothing to assemble. They reach your men ready to install. The Matthews Earth Auger is the latest improvement to Matthews Scrulix Anchors. It is shown below.

The use of the No. 300 Matthews Earth Auger in hard grounds, such as "Adobe," "Hardpan," "Gumbo," Sunbaked Clay, disintegrated rock easily prepares the way for the quick installation of the No. 612R and 758R Matthews Scrulix Anchors.

The No. 375 Matthews Earth Auger should be used before attempting to screw down the Nos. 858R, 800, 1000 and 1200 Matthews Scrulix Anchors. It will pay to use it in all but very soft or sandy ground before installing any of these anchors.



LIST QUANTITY PRICES

Trade Nos.	Diameter of Anchor	Size of Rods	Weight, Lbs. per 100	Length Over all
612R	6 in.	1/2 in. round	750	6 ft.
758R	7 in.	5/8 in. round	1200	6 ft.
858R	8 in.	3/4 in. round	1500	6 ft.
567	Wrench	Wrench	2900	5 ft. 4 in.
300	Auger (3 in.)	Auger	1900	6 ft. 3 in.
301H	Auger Head		300	6 1/2 in.
302B	Auger Body		1200	31 in.
3375	Blackburn Telescopic Handle		83	2 ft. 2 in.
303C	Auger Blades		177	10 in.
375	Auger (3 3/4 in.)		2000	2 ft. 3 in.
376H	Auger Head		350	6 1/2 in.
377C	Auger Body		1300	31 in.
378C	Auger Blades		236	10 in.

The No. 300 is used before installing the No. 612 R and No. 758R. The No. 375 is used before installing the Nos. 758R, 858R, 800, 1000 or 1200.

800	8 in.	1 1/8 in. square	3700	6 ft.
1000	10 in.	1 1/4 in. square	5700	6 ft.
1200	12 in.	1 1/2 in. square	7900	6 ft.

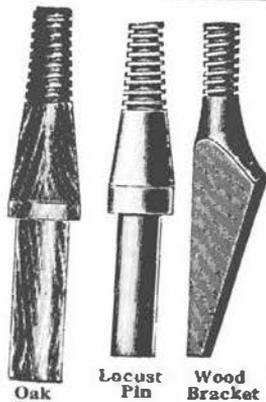
The Nos. 612R, 758R and 858R Matthews Scrulix Anchors will be furnished with Galvanized Rods. The Nos. 612R and 758R are packed in bundles of 4 each. All the rest are shipped singly. There has been no change in the wrench except to make it stronger. Nos. 800, 1000 and 1200 Matthews Scrulix Anchors are guaranteed to outlast galvanized steel round rods with a diameter of 1 1/8, 1 1/4 or 1 1/2 inches. The fact that the rods of these anchors are square gives them a greater cross section and makes it possible to use mild steel rods instead of high carbon steel rods. The square rods not only resist twisting strain better, but if they do begin to twist you can see it immediately, whereas the round rods do not show it. They will not twist if the No. 375 Matthews Earth Auger is used first. Mild steel rods resist rust very much better than high carbon steel. A No. 567 wrench must be used with all anchors smaller than 800. No wrench is needed for the 800, 1000 or 1200 anchors. Matthews Wrench is patented. That's the reason no one else uses it.

Western Electric CONSTRUCTION MATERIAL



Wood Crossarm
RAINIER FIR, YELLOW PINE OR CREOSOTED

Spacings			Brace	Size and Length	Wt. per Arm Fir Lbs.	Wt. per Arm Yel. Pine Lbs.	Wt. per Arm Creosoted Lbs.	Spacings			Brace	Size and Length	Wt. per Arm Lbs.	Wt. per Arm Yel. Pine Lbs.	Wt. per Arm Creosoted Lbs.
Center	Sides	Ends						Center	Sides	Ends					
TELEPHONE ARMS				3 1/2 x 4 1/4				PONY TELEPHONE ARMS				2 1/2 x 3 3/4			
28	—	4	25	3 ft. 2 pin	10.2	13.2	16.5	17	—	3 1/2	—	24 in. 2 pin	5.	6.5	8.1
18	12	4	28	4 ft. 4 pin	13.6	17.6	22.	23	—	3 1/2	—	30 in. 2 pin	6.25	8.125	10.15
18	17	4	28	5 ft. 4 pin	17.	22.	27.5	29	—	3 1/2	—	36 in. 2 pin	7.5	9.75	12.19
22	21	4	32	6 ft. 4 pin	20.4	26.4	33.	16	9 1/4	3 1/2	25	42 in. 4 pin	8.75	11.375	14.21
16	12	4	32	6 ft. 6 pin	20.4	26.4	33.	16	9 3/4	3 1/2	28	62 in. 6 pin	13.	16.8	21.00
18	17 1/2	4	32	8 ft. 6 pin	27.2	35.2	44.	16	9 3/4	3 3/4	28	82 in. 8 pin	17.	22.2	27.75
16	12	4	32	8 ft. 8 pin	27.2	35.2	44.	16	9 3/4	4	28	102 in. 10 pin	21.25	27.625	34.51
18	9 3/4	4	32	8 1/2 ft. 10 pin	28.9	37.4	46.75	16	9 3/4	4	28	120 in. 12 pin	25.	32.5	40.60
17 1/2	15 3/4	4	42	10 ft. 8 pin	34.	44.	55.								
18	12	4	42	10 ft. 10 pin	34.	44.	55.								
16	9 3/4	3 3/4	42	10 ft. 12 pin	34.	44.	55.								

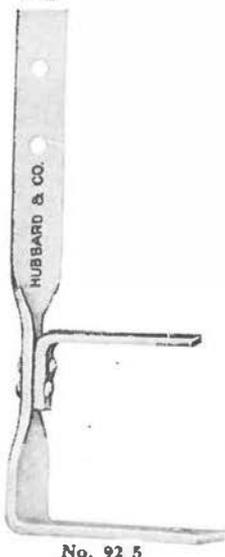


WOOD PINS

Size	Description	Std. Pkg.	Approx. Wt. per 1000
1 x 8 ins.	Standard oak pin	500	300
1 1/2 x 9 ins.	Standard oak pin	350	450
1 1/4 x 8 ins.	Standard locust pin	500	300
1 1/2 x 9 ins.	Standard locust pin	350	450
1 1/2 x 2 x 10 ins.	Oak bracket, painted or paraffined	250	560
1 1/2 x 2 x 12 ins.	Oak bracket, painted or paraffined	200	600
1 1/2 x 2 1/4 x 12 ins.	Oak bracket, painted or paraffined	200	700
2 x 2 1/4 x 12 ins.	Oak bracket, painted or paraffined	175	850
2 x 2 3/8 x 12 ins.	Oak bracket, painted or paraffined	175	900
1 3/8 x 2 x 12 ins.	Oak bracket, painted or paraffined	200	850
1 5/8 x 2 1/4 x 12 ins.	Oak bracket, painted or paraffined	175	900
2 x 2 3/8 x 11 1/2 ins.	Oak bracket, painted or paraffined	175	900

STANDARD TRANSPOSITION BRACKETS

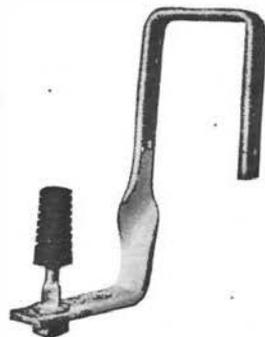
The three kinds of transposition brackets listed are similar to No. 9251, except that the Western Union Standard Bracket, No. 9250, does not have the 3/8 inch round hole for lacing the bracket to the arm. Bracket No. 9251 is the A. T. & T. Company standard for one wire, and No. 9252 for two wires on a transposition insulator. The Western Union bracket is clamped on the arm by a 3/8 x 4 inch carriage bolt. The A. T. & T. Co. brackets use 3/8 x 4 1/2 inch bolts. All have holes for 3/8 inch insulator pins.



No. 925

List No.	Dimensions in Inches		Wt., Lbs. per 100
	Steel	Crossarm	
9250	1 1/4 x 1 1/8	3 x 4	235
9251	1 1/4 x 1 1/8	3 1/4 x 4 1/4	235
9252	1 1/2 x 3/8	3 1/4 x 4 1/4	360

The A. T. & T. Company standard transposition bracket for 4 wire transpositions with large, double petticoated porcelain insulators, such as are used on the transcontinental circuits, is fastened to the crossarm by two 1/2 x 4 3/4 inch machine bolts, spaced 2 3/8 inches apart, and has holes for 5/8 inch pins. The price includes the two parts shown, the smaller of which projects above the arm, but no bolts or pins.



No. 9251

9275	1 1/2 x 3/8	3 3/4 x 4 1/4	685
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ANCHOR RODS



Standard Anchor Rods with Drop Forged Oval Eye

Size	Weight per 100	
	Plain	Galv.
1/2 in. x 6 ft.	420 lbs.	460 lbs.
5/8 in. x 6 ft.	645 lbs.	710 lbs.
5/8 in. x 8 ft.	880 lbs.	990 lbs.

CROSSARM BRACES



No. 7960. Flat Steel Back Braces



No. 743. Peirce Channel Steel Back Braces



No. 7966



No. 7969. Angle Steel Back Braces

Flat Steel Back Braces

These braces are used for back bracing crossarms at corners and terminal poles, and in many cases eliminate the necessity for double arming. They are made of three shapes of open hearth steel: flat, angle and channel, and are fastened to the cross-arm by 1/2 inch carriage bolts, and to the pole by the 5/8 inch cross arm through bolt. The Peirce Channel Braces are stiffer than any other form of brace of the same weight. They are provided with two prongs at each bolt hole, which bite into the arm and pole, and prevent any lost motion between the arm, brace and bolt.

Nos. 7967 and 7969 are the A. T. & T. Co. standard braces.

List No.	Size Steel, Inches	Length, Feet	Weight, Lbs.
7960	1 1/2 x 3/4	6 ft.	1150

Peirce Channel Steel Back Braces

Angle Steel Back Braces

List No.	Size Steel Inches	Length	Weight Lbs.	List No.	Size Steel Inches	Length	Weight Lbs.
740	1 x 1/2 x 1/2	5 ft.	410	7964	1 1/2 x 1 1/2 x 1/2	4 ft.	512
741	1 x 1 1/2 x 1/2	6 ft.	510	7965	1 1/2 x 1 1/2 x 1/2	5 ft.	635
742	1 1/2 x 1 1/2 x 1/2	5 ft.	670	7966	1 1/2 x 1 1/2 x 1/2	6 ft.	1100
743	1 1/2 x 1 1/2 x 1/2	6 ft.	820	7967	1 1/2 x 1 1/2 x 1/2	7 ft. 10 ins.	1650
744	1 1/2 x 1 1/2 x 1/2	8 ft.	1060	7969	1 1/2 x 1 1/2 x 1/2	9 ft. 2 ins.	1935
745	1 1/2 x 1 1/2 x 1/2	9 ft. 2 ins.	1250				
746	1 1/2 x 1 1/2 x 1/2	4 ft.	420				

National Electric Light Association Standard Brace, No. 8128

No. 7994 Vertical Brace

Flat Crossarm Braces

The standard crossarm brace of the National Electric Light Association is the 1/2 x 1 1/2 inch brace, 28 inches long over all, with one 1/4 inch hole and one 1/2 inch hole, the centers of which are one inch from the ends of the brace. This arrangement of holes is also standard with the A. T. & T. Company and the Western Union Telegraph Company, and will be furnished on all orders unless otherwise specified, although the Railway Signal Association brace with 1/2 and 3/4 inch, holes similarly arranged, or any other desired combination, can be supplied. Hot galvanized or plain.

1 INCH X 1/2 INCH BRACES

List No.	Length Inches	Weight Lbs. per 1000	List No.	Length Inches	Weight Lbs. per 1000
7920	20	1000	7924	24	1200
7922	22	1100			

1 1/2 INCH X 1/2 INCH BRACES

8020	20	1420	8026	26	1840
8022	22	1560	8028	28	1950
8024	24	1700	8030	30	2120
			8032	32	2260

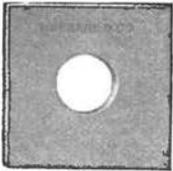
1 1/4 INCH X 3/4 INCH BRACES

8120	20	1670	8126	26	2165
8122	22	1835	8128	28	2335
8124	24	2000	8130	30	2500
			8132	32	2665

VERTICAL BRACES

List No.	Dimensions in Inches		Length over All	Spacing	No. of Arms	Weight Lbs.
	Size	Angle				
7990	1 1/2	1 1/2 x 1/2	16	12	2	240
7991	1 1/2	1 1/2 x 1/2	28	12	3	420
7992	1 1/2	1 1/2 x 1/2	40	12	4	600
7993	1 1/2	1 1/2 x 1/2	22	18	2	385
7994	1 1/2	1 1/2 x 1/2	40	18	3	700
7995	1 1/2	1 1/2 x 1/2	58	18	4	1015

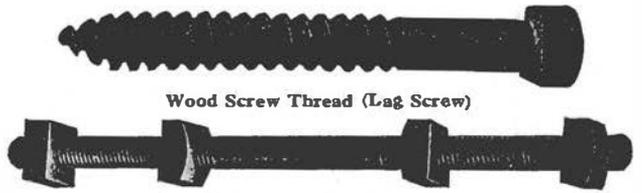
CONSTRUCTION MATERIAL



Square Washer



Round Washer



Wood Screw Thread (Lag Screw)

Standard Double Arming Bolt

CARRIAGE BOLTS
Plain or Galvanized

Used for bolting braces to crossarms.

Can be furnished in any length desired.

$\frac{5}{8}$ x $3\frac{1}{2}$ inch bolts are the ones most commonly used.
When ordering, specify plain or galvanized.

ROUND WASHERS
Plain or Galvanized

For use with carriage bolts.

Diameter	Size Hole	Size Bolt
1 in.	$\frac{1}{16}$ in.	$\frac{3}{8}$ in.

SQUARE WASHERS
Plain or Galvanized

For use with machine bolts when bolting crossarms to poles.

Description	Weight per 100	
	Plain	Galv.
2 x 2 x $\frac{1}{8}$ in. for $\frac{1}{2}$ and $\frac{5}{8}$ in. bolt.....	15 lbs.	17 lbs.
$2\frac{1}{4}$ x $2\frac{1}{4}$ x $\frac{1}{8}$ in. for $\frac{3}{8}$ and $\frac{3}{4}$ in. bolt.....	25 lbs.	28 lbs.
4 x 4 x $\frac{1}{8}$ in. for $\frac{5}{8}$ and $\frac{3}{4}$ in. bolt.....	82 lbs.	90 lbs.

Galvanized furnished unless otherwise ordered.

LAG SCREWS OR BOLTS
Plain or Galvanized

Used for fastening braces to the poles, and are sometimes called heel bolts.
 $\frac{1}{2}$ x 3 ins., $\frac{1}{2}$ x $3\frac{1}{2}$ ins. and $\frac{1}{2}$ x 4 ins. are the sizes most commonly used.

DOUBLE ARMING BOLTS
Hot Galvanized or Plain

The standard length of thread on each end is: For 12 inch bolts, 5 inches; 13 and 14 inch bolts, 6 inches; 15 and 16 inch bolts, 7 inches; 17 inch and longer bolts, 8 inches. The points are finished and prices include 4 square nuts, but no washers.



No. 7125 Step for Wood Poles

STEPS FOR WOOD POLES

Of the steps for wood poles, the 10 inch hook head step is the standard of the National Electric Light Association, the American Telephone & Telegraph Company and the Western Union Telegraph Company. It has the fetter drive thread, which makes it easy to install and does not tear the wood of the pole when driven. The 10 inch button head step is also an A. T. & T. Co. standard and has the twist drive thread and a square shoulder under the head for a wrench hold.

HOOK HEAD

List No.	Diam., Inches	Length, Inches	Wt. Lbs. per 1000
7123	$\frac{1}{8}$	9	652
7124	$\frac{5}{8}$	9	810
7125	$\frac{5}{8}$	10	890

BUTTON HEAD

List No.	Diam., Inches	Length, Inches	Wt., Lbs. per 1000
7128	$\frac{5}{8}$	9	833
7129	$\frac{5}{8}$	10	913

GALVANIZED GUY THIMBLES

Used on guy strand when it passes through the eye of the guy rod and enables it to withstand a more severe strain by equalizing the strain on the individual wires comprising the strand.



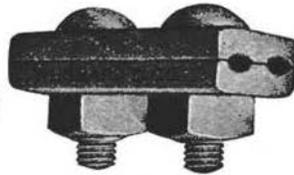
Guy Thimble

Size, Strand, Inches	Approx. Wt. in Lbs. per 100	Size, Strand, Inches	Approx. Wt. in Lbs. per 100
$\frac{1}{4}$	20	$\frac{1}{16}$	32
$\frac{3}{8}$	20	$\frac{5}{8}$	32
$\frac{5}{8}$	20	$\frac{3}{4}$	32
$\frac{1}{2}$	20	$\frac{1}{8}$	32
$\frac{1}{2}$	20	1	32

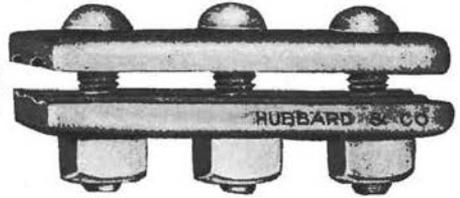
CONSTRUCTION MATERIAL AND TOOLS



"Baby" Clamp



No. 7448



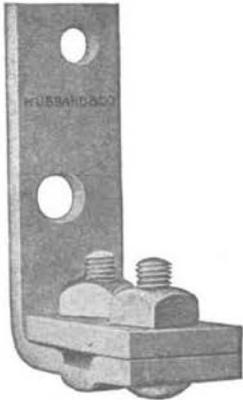
No. 7460

GUY CLAMP

List No.

Wt., Lbs.

.....	Matthews boltless Guy clamp, baby	50
.....	Matthews boltless Guy clamp, giant	130
.....	Matthews 2 bolt Guy clamp	175
7448	Rolled steel, 2 bolt Guy clamp, 3 inches long	115
7449	Rolled steel, 3 bolt Guy clamp, 4 inches long	185
7450	Rolled steel, 3 bolt Guy clamp, 6 inches long	210
7460	Heavy forged steel, 3 bolt Guy clamp, 6 inches long, 2 inches wide	370
7465	Forged, 3 bolt, 5 1/2 inch length, 1 1/2 inch width, 1/4 to 1/2 inch size strand	210



No. 8911



No. 8905



No. 8901

UNIVERSAL MESSENGER HANGERS

REINFORCING AND SAFETY STRAPS FOR SUSPENSION CLAMPS

List Nos.	Size Steel Ins.	Length of Legs Ins.	Wt., Lbs. per 100	List Nos.	Size Steel Ins.	Wt., Lbs. per 100
8911	2 x 1/2	5 x 3 1/4	325	8905	1 3/4 x 1/8	50
8912	1 3/4 x 3/8	5 x 3 1/4	235			

CABLE SUSPENSION CLAMPS

Hot Galvanized

These are the standard A. T. & T. cable suspension clamps, the one-bolt type being used for light cables and on cable arms, and the three-bolt clamp for heavy cables and long spans. Clamps are made of special rolled sections of open hearth steel 2 1/4 inches wide and 3/8 inch thick, and are shaped so as to securely grip messenger strands of the sizes shown.

List No.	Type	Length Ins.	Size Strand Ins.	Wt. Lbs.
8901	One bolt	2 1/8	1/4 to 1/8	80
8903	Three bolt	5 3/4	1/4 to 1/8	205



Crow and Digging Bar, Nos. 1061, 1065



Tamping and Digging Bar, Nos. 1071, 1075, Octagon



Plain Digging Bar, Nos. 1081 and 1085, Round

CROW, TAMPING AND PLAIN DIGGING BARS

List No.	Style Bar	Size	Wt. Lbs.	List No.	Style Bar	Size	Wt. Lbs.
1060	Crow, octagon	1 in. x 6 ft.	17	1073	Tamping and digging	1 1/8 in. x 6 ft.	22
1061	Crow, octagon	1 in. x 7 ft.	20	1074	Tamping and digging	1 1/8 x 7 ft.	26
1062	Crow, octagon	1 in. x 8 ft.	23	1075	Tamping and digging	1 1/8 in. x 8 ft.	30
1063	Crow, octagon	1 1/8 in. x 6 ft.	22	1080	Plain digging	1 in. x 6 ft.	16 1/2
1064	Crow, octagon	1 1/8 in. x 7 ft.	26	1081	Plain digging	1 in. x 7 ft.	19
1065	Crow, octagon	1 1/8 in. x 8 ft.	30	1082	Plain digging	1 in. x 8 ft.	21 1/2
1070	Tamping and digging	1 in. x 6 ft.	17	1083	Plain digging	1 1/8 in. x 6 ft.	21
1071	Tamping and digging	1 in. x 7 ft.	20	1084	Plain digging	1 1/8 x 7 ft.	24 1/2
1072	Tamping and digging	1 in. x 8 ft.	23	1085	Plain digging	1 1/8 in. 8 ft.	28

Western Electric
CONSTRUCTION TOOLS



Electric Tamping Bar No. 1044



Loy or Slick No. 853

ELECTRIC TAMPING AND LOY OR SLICK

List No.	Description	Size	Wt. Lbs.	List No.	Description	Size	Wt. Lbs.
852	Digging Spud, with tamper..	9 ft.	20	855	Loy or slick handle.....	8 ft.	18
1044	Electric tamping bar.....	8 ft.	20				



Tamping Bar with Extra Heavy Iron Shoe Nos. 1054 and 1055

TAMPING BAR

WITH HEAVY IRON SHOE

WITH EXTRA HEAVY IRON SHOE

List No.	Description	Wt. per Doz. Lbs.	List No.	Description	Wt. per Doz. Lbs.
854	Tamping bar, 7 ft. handle.....	150	1054	Tamping bar, 7 ft. handle.....	160
855	Tamping bar, 8 ft. handle.....	170	1055	Tamping bar, 8 ft. handle.....	180



Regular Pattern



Western Electric Pattern Nos. 818-824

CARRYING OR LUG HOOKS

REGULAR PATTERN

EXTRA HEAVY WITH STEEL SWIVELS

List No.	Description	Weight per Doz.	List No.	Description	Weight per Doz.
295	2½ 4 ft. maple handle.....	85 lbs.	299	6 ft. maple handle.....	155 lbs.
297	2½ 5 ft. maple handle.....	95 lbs.	300	7 ft. maple handle.....	165 lbs.

WASHINGTON FIR PIKE POLES

List No.	Handles	Weight per Doz.	List No.	Handles	Weight per Doz.
700	10 ft., 2 ins.....	75 lbs.	702	14 ft., 2 ins.....	115 lbs.
701	12 ft., 2 ins.....	95 lbs.	703	16 ft., 2 ins.....	135 lbs.

WESTERN ELECTRIC PATTERN PIKE POLES

818	12 ft., 2½ ins.....	150 lbs.	821	18 ft., 2½ ins.....	215 lbs.
819	14 ft., 2½ ins.....	165 lbs.	822	20 ft., 2½ ins.....	240 lbs.
820	16 ft., 2½ ins.....	185 lbs.			



Socket Peavy



Cant Hook

MALLEABLE SOCKET PEAVIES

List No.	Description	Weight per Doz.
124	With 4 ft. select maple handle.....	110 lbs.
137	With 4 ft. select hickory handle.....	110 lbs.

CANT HOOKS

List No.	Handles	List No.	Handles
188	4 ft. select maple handle.....	199	4 ft. select hickory handle.....
189	4½ ft. select maple handle.....	200	4½ ft. select hickory handle.....
Weight per dozen, 4 ft., 85 lbs.		Weight per dozen, 4½ ft., 90 lbs.	

Western Electric
CONSTRUCTION TOOLS



Tel. and Tel.
Crooked Handle
Round Point Shovel
Short Strap



Tel. and Tel.
Eastern Pattern
Post Hole Spade
Long Strap



Tel. and Tel.
Western Pattern
Flat or Post Hole
Spoon, Short Straps



Standard
Earth Auger



Bush Hook No. 10



Iwan Post
Hole Auger

SHOVELS AND SPOONS

The Telephone and Telegraph Shovels are from 6 to 8 feet in length with round point and crooked handles have strap regularly 9 inches. Up to 30 inch strap can be supplied at slight increase in price.

	Point	Length Handle
Tel. and Tel. shovel, with short strap, 9 inches long	Round	6 feet
Tel. and Tel. shovel, with short strap, 9 inches long	Round	7 feet
Tel. and Tel. shovel, with short strap, 9 inches long	Round	8 feet
Tel. and Tel. shovel, with long strap, 18 inches long	Round	6 feet
Tel. and Tel. shovel, with long strap, 18 inches long	Round	7 feet
Tel. and Tel. shovel, with long strap, 18 inches long	Round	8 feet

The Tel. and Tel. spoons are made from 6 to 8 feet long with regular round point and crooked handle. Up to 30 inch strap can be supplied at slight increase in price.

Tel. and Tel. spoons, Eastern pattern, with short strap, 9 inches long	Round	6 feet
Tel. and Tel. spoons, Eastern pattern, with short strap, 9 inches long	Round	7 feet
Tel. and Tel. spoons, Eastern pattern, with short strap, 9 inches long	Round	8 feet
Tel. and Tel. spoons, Eastern pattern, with long strap, 18 inches long	Round	6 feet
Tel. and Tel. spoons, Eastern pattern, with long strap, 18 inches long	Round	7 feet
Tel. and Tel. spoons, Eastern pattern, with long strap, 18 inches long	Round	8 feet
Tel. and Tel. spoons, Western pattern, with short strap, 9 inches long	Round	6 feet
Tel. and Tel. spoons, Western pattern, with short strap, 9 inches long	Round	7 feet
Tel. and Tel. spoons, Western pattern, with short strap, 9 inches long	Round	8 feet
Tel. and Tel. spoons, Western pattern, long strap, 18 inches long	Round	6 feet
Tel. and Tel. spoons, Western pattern, long strap, 18 inches long	Round	7 feet
Tel. and Tel. spoons, Western pattern, long strap, 18 inches long	Round	8 feet

List

AUGERS AND POST HOLE DIGGERS

- No. 5 Standard earth auger will bore 5, 6, 7, 8 in. holes 3½ ft. deep.
- 8 Standard earth auger will bore 8, 9, 10, 11, 12, 13, 14 in. holes 3½ ft. deep.
- 10 Standard earth auger will bore 8, 9, 10, 11, 12, 13, 14 or 16 in. holes 8 ft. deep.
- 14 Standard earth auger will bore 8, 9, 10, 11, 12, 13 or 14 in. holes 8 ft. deep.
- 15 Standard earth auger will bore 5, 6, 7, 8 in. holes 8 ft. deep.

- | | |
|---|--|
| 3 in.; length 4 ft., Iwan post hole augers. | 9 in.; length 4 ft., Iwan post hole augers |
| 4 in.; length 4 ft., Iwan post hole augers. | 10 in.; length 4 ft., Iwan post hole augers. |
| 5 in.; length 4 ft., Iwan post hole augers. | 12 in.; length 6 ft., Iwan post hole augers. |
| 6 in.; length 4 ft., Iwan post hole augers. | 14 in.; length 6 ft., Iwan post hole augers. |
| 7 in.; length 4 ft., Iwan post hole augers. | 16 in.; length 6 ft., Iwan post hole augers. |
| 8 in.; length 4 ft., Iwan post hole augers. | |
| 7 in. diameter, 4½ ft. handle, lock lever post hole digger. | |

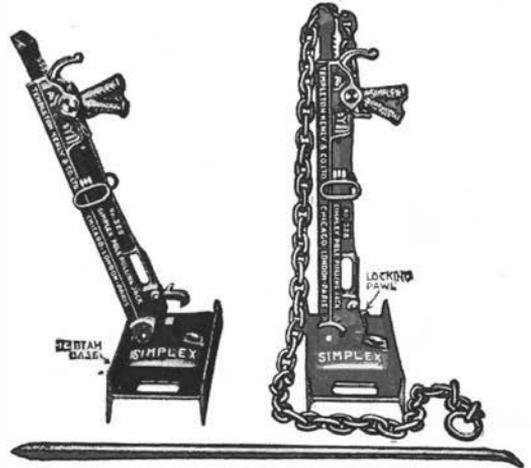
BUSH HOOK

- 10 Bush hook and hickory handle, 3½ lbs.

Western Electric
CONSTRUCTION TOOLS



No. 1 Cable Reel Stand



Simplex No. 328

THE RATCHET ADJUSTABLE CABLE REEL STAND

Height of stand only, 16 inches. Weight of stand, 58 lbs. Length of base, 27 inches.
Height of stand to bearing point in yoke, 20 inches. Width of base, 12 inches.

No. 328 SIMPLEX JACK

Pole Pulling and Pole Straightening Jack

Its "hinged" base (an exclusive Simplex feature) is the feature that specifically and successfully adapts the No. 328 Simplex to every phase of pole maintenance work. This jack insures enormous saving in time and labor of the pole crew—no digging around pole, no breaking up of pavement or curbing. Takes but a minute to make jack ready to operate and but a few minutes for one or two men to pull the heaviest pole no matter how deep in ground or the character of the soil.

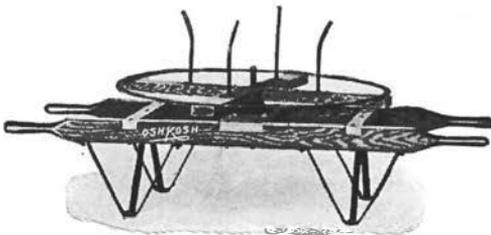
In moving entire pole lines from one location to another, this jack has shown it insures extraordinary economies in time, labor and expense over all other available methods. Lines moved any distance, easily and without interrupting current.

In every phase of pole maintenance work, the Simplex stands supreme, covering speed, safety, economy and satisfaction. Used by hundreds of telephone, telegraph, electric and steam railways, central power stations, etc.

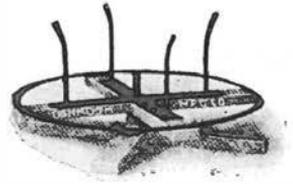
Pulling pole with Simplex is a one or two man job only.

Straightening pole with Simplex is a one man—minute—job.

List No.	Capacity Tons	Lift, Ins.	Height, Ins.	Complete, Lbs.
328	15	23	39	187



Light Reel for Telephone Work



Pay-out Reel

No.	Light reel for telephone work.....	Wt. Lbs.	No.
899		70	902

BARROW REELS

Pay-out reel of rock elm.....	Wt. Lbs.
	40

PAY-OUT REELS



Buffalo Grip Without Pulley

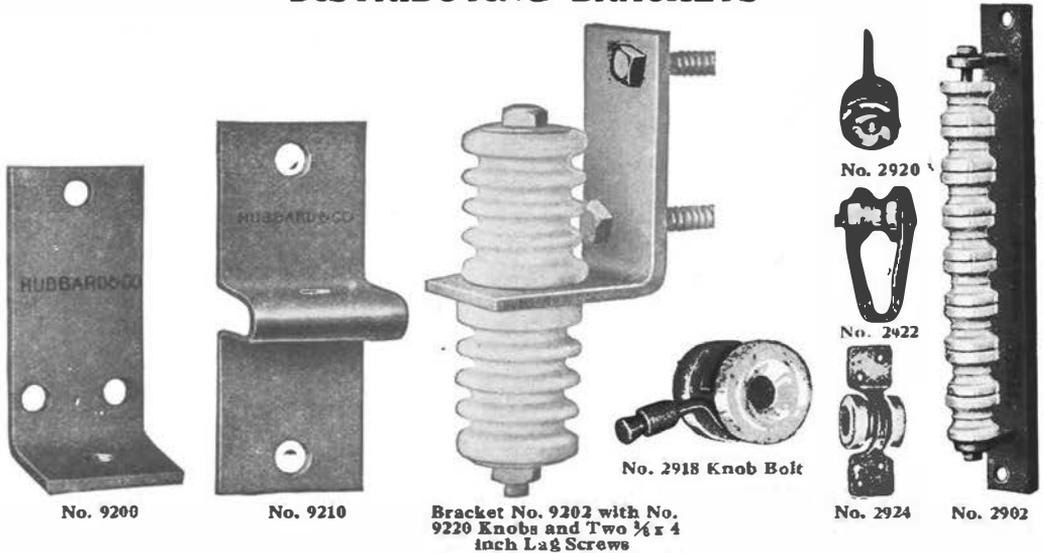


Buffalo Grip With Pulley

No.	Gr p, extreme opening, .22 in. for all sizes of wire up to No. 6, inc.....	Wt., Lbs.
1	Same, with pulley for 3/8 in. rope.....	1 1/4
1	Gr p, extreme opening .35 in. for all sizes of wire up to No. 0, inc.....	1 1/2
2	Same, with pulley for 1/2 in. rope.....	1 3/4
2		2 1/4

BUFFALO GRIPS

DISTRIBUTING BRACKETS



Hubbard Telephone Distributing Brackets

For twist wires on poles, No. 9202, the A. T. & T. Company standard bracket of 2 x 3/4 inch steel is used by nearly all telephone companies. Two 3/8 x 4 inch lag screws secure it to the pole.

No. 9200 is the standard house bracket of the A. T. & T. Company for dead ending twist wires on buildings. It has three 1/8 inch holes, in which No. 16 galvanized screws, 1 1/2 inch long, are used for fastening it to buildings, and is made of 1/4 x 3/8 inch steel.

The style "T" distributing bracket, No. 9210, has a spring or cushioning effect, which decreases insulator breakage. It is made of 2 x 1/2 inch steel and two 3/8 x 4 inch lag screws are required for its installation.

List No.	Style Bracket	Length of Inches	Weight Lbs. per 100
9200	L House	3 1/8 x 2 1/8	51
9202	L Pole	4 x 3	87
9210	T Pole	5 x 2 1/2	65

Porcelain Knobs Complete With Galvanized Bolts

The knobs illustrated are the A. T. & T. Company's standard and are of dry process white glazed porcelain. No. 9215, which is used with bracket No. 9200, has a 1/8 x 2 inch flat stove bolt, No. 9216, a 3/8 x 3 inch machine bolt, and No. 9220 a 3/8 x 5 1/2 inch machine bolt. The No. 9216 and No. 9220 four groove knobs are used with brackets Nos. 9202 and 9210.

9215	One double groove	68
9216	One four-groove	128
9220	Two four-groove	250

Peirce Single Knob Fixtures

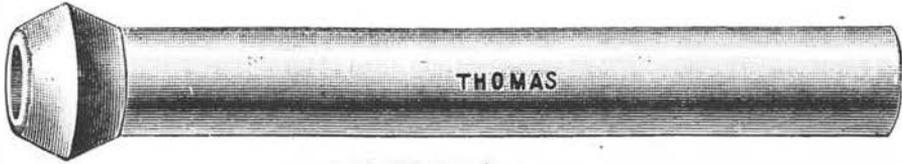
Single knob fixtures are for either telephone or lighting wires, but for the latter should only be used in localities not visited by snow and sleet. No. 2922 can be fastened to wood buildings by a screw in the center hole, and to brick walls by a Peirce expansion bolt. It makes a strong fastening and one that is especially adapted to duplex service wires. The knob bolt, No. 2918, consists of a 1/4 inch Peirce expansion bolt holding a porcelain knob, with a large central hole for the twisted pair. It is used for dead ending and running wires on brick, stone or concrete buildings in the same way as the knob screw is used on wood buildings. No. 2920 is a new design of the Peirce knob screw, in which the shank is lengthened to 2 1/2 inches. No. 2924 is a fixture used for telephone wires in New England, in which the knob is strapped to the wall.

2918	Knob Bolt	35
2920	Knob Screw	35
2922	Swinging Knob	48
2924	Knob Strap	40

Peirce Distributing Racks for Telephone Wires

List No.	Pair Wires	Frame	Wt. Lbs. per 100
2900	4	Channel single	225
2901	6	Channel single	300
2902	8	Channel single	475

CONSTRUCTION MATERIAL AND TOOLS

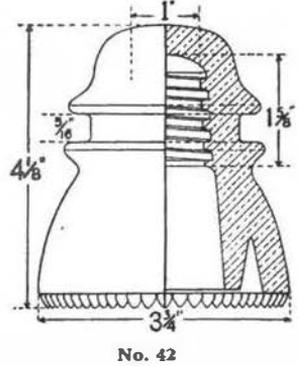
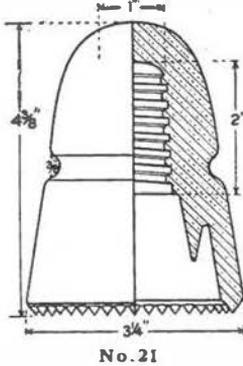
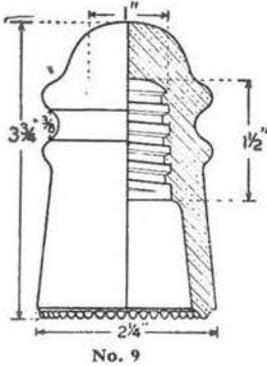


PORCELAIN TUBES

Length Under Head
1 to 18 ins.

Diameter Outside
 $\frac{1}{8}$ to $\frac{1}{2}$ in.

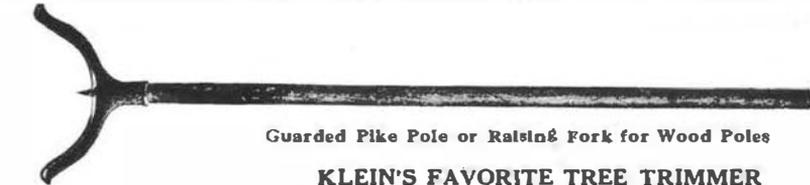
Diameter Inside
 $\frac{1}{8}$ to $\frac{1}{4}$ in.



GLASS INSULATORS

List No.	Description	Std. Pkg. Quantity	Wt. per Bbl. Packed
9	Pony.....	400	270 lbs.

List No.	Description	Diam. Groove	Wt. Each	Wt per Bbl. Packed	Std. Pkg. Quantity
21	W. U. Double Petticoat.....	$\frac{3}{8}$ in.	22 ozs.	310 lbs.	200
42	Double Petticoat, new W. U. Standard.....	$\frac{1}{8}$ in.	24 ozs.	300 lbs.	175



Guarded Pike Pole or Raisin& Fork for Wood Poles

KLEIN'S FAVORITE TREE TRIMMER



List No.	Description	Wt. Lbs.	Length
3600-20	Tree trimmer.....	3 1/2	19 ins.
3600-21	Tree trimmer with saw.....	4	21 ins.
913-12	Tree trimmer saw.....	$\frac{3}{8}$	12 ins.
3601-18	Tree trimmer handle.....	9	18 ft.
3601- 9	Two 9 ft. handles with ferrule in center.....	9 1/4	18 ft.
3603-16	Tree trimmer handle.....	8	16 ft.
3603- 8	Two 8 ft. handles with ferrule in center.....	8 1/2	16 ft.

PLAIN PIKE POLES

12, 14 and 16 ft. lengths

Handles made of Washington Fir, and Pikes of Crucible Steel.

RAISING FORK

(or Guarded Pike Pole)

12, 14 and 16 ft. lengths

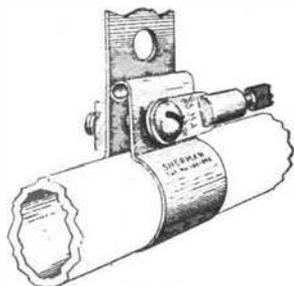
Handles made of Washington Fir, and Pikes of Crucible Steel.



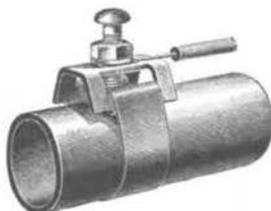
No. 3600-20 Klein's Favorite Tree Trimmer

No. 3600-21 Tree Trimmer with Saw

CONSTRUCTION MATERIAL



No. 1



New York Type A



Bridle Ring

List No.	Size Pipe	Carton	Std. Pl.	Approx. Wt. Std. Pkg.
1	3/8 to 1 in.	100	1000	80 lbs.
2	3/8 to 2 ins.	100	1000	105 lbs.
3	3/8 to 3 ins.	50	500	70 lbs.

SHERMAN GROUND CLAMPS

NEW YORK GROUND CLAMP

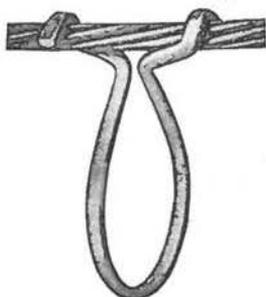
These Ground Clamps are made in three types, A, B, and D. Type A clamps are for connecting telephone and telegraph ground wires to pipe or cables. Type B clamps are for making ground connections for electric light wires without the use of solder. Binding posts provide connections for No. 2 and No. 4 B. & S. wire. Type D for electric light and motor work.

Type	Size	Type	Size
A	1 in. pipe	B	4 in. pipe
A	2 in. pipe	D	1 in. pipe
A	3 in. pipe	D	2 in. pipe
B	1 in. pipe	D	3 in. pipe
B	2 in. pipe	D	4 in. pipe
B	3 in. pipe		

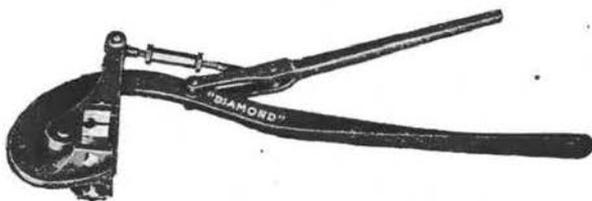
BRIDLE RINGS

Are for the carriage and distribution of wires. Due to the superior process of enameling, no chafing of the wire, absolute smoothness, perfect insulation, and proof against rust are points of distinction.

List No. Style	Eye, Ins.	Opening, Ins.	Shank, Ins.	Steel, Ins.
A	1 5/8	1/4	1 1/4	1/4
C	1 1/4	1/4	1 1/4	1/4
E	5/8	1/8	1/8	1/8
F	3	1/8	1/8	1/8



Cable Ring in Position



Crimper

BONITA AERIAL CABLE RINGS

Bonita Aerial Cable Rings are the latest development in this line and afford many advantages over the older styles. Bonita rings snap on to the supporting strand by hand, and eliminate the necessity of a special tool or plier in applying. They grip the strand in a remarkable manner and remain in position thereon at all times.

Bonita rings are made of a semi-spring steel of special cross section which insures a liberal bearing surface for the cable to rest upon. They are heavily and smoothly hot galvanized after forming. The zinc coating on Bonita rings is not injured in the least in placing same on the supporting strand and they may be removed at will and re-used should occasion require.

In ordering Bonita rings the size of strand on which they are to be used should be stated and it is advisable to allow about 3/4 inch larger ring size than the diameter of cable to be installed.

Bonita rings are made in five sizes and packed in standard packages as follows:

Size Inside Diam., Ins.	Std. Pkg.	Shipping Wt., Lbs.	Size Inside Diam., Ins.	Std. Pkg.	Shipping Wt., Lbs.
2	1000	90	3	500	60
2 1/2	500	55	3 1/2	500	65

DIAMOND CRIMPER

Crimper complete with three sets of jaws.

CONSTRUCTION TOOLS



No. 1900-1903 Eastern



No. 1901 Eastern



No. 1002 Eastern



No. 1003



No. 1004



No. 1004-2

POLE CLIMBERS

List No.		Length, Ins.	Wt. Mfrs. per Pair. Lbs.
1900	Eastern—without straps, riveted strap loops.....	15 to 18	3¾
1903	Special light weight Eastern riveted loops—without straps.....	16 to 16½	2¾
1901	Eastern—without straps, punched strap loops.....	15 to 18	3¾
1904	Eastern—without straps (woodpecker).....	15 to 18	3½

NOTE. When ordering climbers, always specify length wanted by half inch variation.

BUHRKE CLIMBER STRAPS AND PADS

List No.		Wt. per Doz. Sets, Lbs.
1003	Straps only (no pads).....	12
1002	Straps for Eastern Climbers, with plain leather pads.....	15
1002-1	Straps for Eastern Climbers with sheep-lined pads.....	16
1002-2	Straps for Eastern Climbers, with felt-lined pads.....	16
1004-1	Strap Pads, sheep lined, 4 x 4 inches. (2 to set).....	3
1004-2	Straps Pads, felt lined, 4 x 4 inches. (2 to set).....	3
1004	Straps Pads, plain leather, 4 x 4 inches. (2 to set).....	3

Eastern Climber straps set consists of two upper straps with 4 x 4 leather pads and two lower straps



No. 1016



No. 1035

SAFETY BELTS AND STRAPS

List No.		Wt., Lbs.
1016	2 ins. x 6 ft. safety strap, drop forged snaps and drop forged buckle, all rivets, solid copper, hand set, A. T. & Co., style.....	2½
1035	2½ ins. double belt, with rings, for attaching safety strap.....	2

SMALL TOOLS



"Diamond" Side Cutting Pliers



With Sleeve Twister

"DIAMOND SPECIAL" SIDE CUTTING PLIERS

List No.	Size	Wt., per Doz. Lbs.	List No.	Size	Wt., per Doz. Lbs.
201-5	5 ins.	3	201-8	8 ins.	12
201-6	6 ins.	5	201-9	9 ins.	12½
201-7	7 ins.	7½			

WITH SLEEVE TWISTER

List No.	Description	Wt. per Doz. Lbs.
212-6	6 in. B. & S. sleeve twister for No. 17 sleeve or No. 19 B.W.G. iron wire.	5
212-7	7 in. B. & S. sleeve twister for No. 12 sleeve or 14 B.W.G. iron wire.	7½
212-8	8 in. B. & S. sleeve twister for No. 10 sleeve or 12 B.W.G. iron wire.	12



Long Nose Pliers



Oblique Diagonal Cutting Pliers

EXTRA LONG NOSE PLIERS
No. 303 Same as No. 301, Except It Is More Sharply Pointed

List No.	Size, Ins.	Wt. per Doz., Lbs.	List No.	Size, Ins.	Wt. per Doz., Lbs.
301-5	Without cutter	2¾	303-6	Without cutter	3
301-6	Without cutter	3			

OBLIQUE DIAGONAL CUTTING PLIERS

202-5	5 in. diagonal cutting pliers.	4	202-6	6 in. diagonal cutting pliers.	4¼
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No. 102-1



No. 102-3

BABY PATTERN FOR TELEPHONE WORK

List No.	Description	Length Inches	Wt. per Doz., Lbs.
102-1	For Nos. 10, 12, 14, and 16 copper wire; 12, 14, 16, 18 iron wire.	8	6
102-3	For Nos. 6, 8, 10, 12 and 14 iron wire, 4, 6, 8, 10 and 12 copper wire.	10¾	15



No. 102-5 For Telephone, Telegraph and Railroad Construction



No. 105-15 For Telephone and Telegraph Work

FOR TELEPHONE, TELEGRAPH AND RAILROAD LINE CONSTRUCTION

102-5	For No. 4 to 14 B.W.G. iron wire and 2 to 12 B. & S. copper wire.	10¾	15
105-15	For 10 to 17 B. & S. copper wire and 12 to 17 B.W.G. iron wire.	8	5
105-17	For 8 to 17 B. & S. copper wire and 10 to 19 B.W.G. iron wire.	10¾	15



EXTENSION BIT HOLDER No. 35

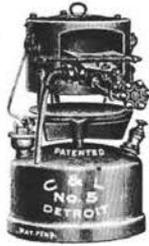
Follows Bits ¼ Inch and Larger into Their Bores

Length, polished and nickel-plated steel	12 ins.	15 ins.	18 ins.	21 ins.	24 ins.	30 ins.
Weight, per doz.	7 lbs.	8 lbs.	9 lbs.	10 lbs.	11 lbs.	13 lbs.

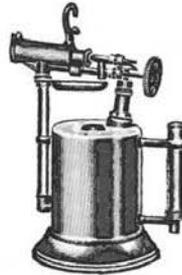
SOLDERING ACCESSORIES



No. 108 Torch



No. 5 Fire Pot



No. 26 Gasoline-Kerosene



No. 53

SOLDERING TORCHES AND POTS

List No.	Description	Size	Wt., Lbs.
108	Gasoline torch with hook and support for soldering copper.	Quart	4
5	Fire pot for gasoline.	5 pints	10½
26	Furnished with hook and support for holding soldering copper.	1 quart	4
53	Seven pints capacity fire pot.	7 pints	15½

TELEPHONE KEROSENE FURNACE

This furnace is especially adapted to the use of telephone and telegraph companies. It is economical because 2 quarts of kerosene will burn as long and do as much work as 4 quarts of gasoline, a saving of one-half. Kerosene furnace—capacity 3 quarts.



Bar Solder



Soldering Stick



Rosin Core Solder



Soldering Paste



Superior Compound

SOLDERING SALTS

Our soldering salt combines in soluble crystal form the most efficient soldering agents known to chemistry. It dissolves readily in water and does not give off any obnoxious odors or gases. Directions for dissolving in water to make a soldering agent of proper strength are included with each package. Put up in ½ lb. and 1 lb. cans.

ROSIN CORE AND BAR SOLDER

- Rosin core solder, in ½ lb. boxes
- Rosin core solder, on 1 lb. spools
- Rosin core solder, on 2 lb. spools
- Rosin core solder, on 5 lb. spools
- Rosin core solder, on 10 lb. spools
- 40-60 bar solder
- 50-50 bar solder
- No. 8 wire solder

SOLDERING PASTE

It may be applied with a rag, a stick or even with the fingers.

- 2 oz. tin cans
- 4 oz. tin cans
- ½ lb. tin cans
- 1 lb. tin cans
- 5 lb. tin cans

NOTE. Other makes of soldering salts, paste, sticks, etc., can be furnished on application.

SUPERIOR COMPOUND

5 lb. carton and 10 lb. cartons.

SOLDERING ACCESSORIES



Melting Pot



Soldering Furnace

TRUNDY SOLDERING FURNACE

15 inches long, 9 inches high and 7 3/4 inches wide.

List No. 7609-16

Wt. Lbs. 19

MELTING POTS

5 inch cast iron pot

6 inch cast iron pot

8 inch cast iron pot



Wiping Cloth



Pouring Ladle



WIPING CLOTHS

For Wiping Lead Joints, Etc.

Moleskin, each

||

Ticking

||

2 1/2 in. bowl, each.

||

3 in. bowl, each

POURING LADLES

PONY SOLDERING COPPERS



Pony Soldering Coppers



Standard Soldering Copper

Specially adapted for electrical work. Made of pure copper, tinned. Fitted with Black Lacquered Handles.

	Length of Handle, Inches	Weight Lbs.		Length of Handle, Inches	Weight Lbs.
Copper.....	8 1/2	2	Copper.....	11 1/2	1 1/2
Copper.....	9	1 1/2	Copper.....	12	2
Copper.....	10 1/2	1 1/4			

STANDARD SOLDERING COPPERS

3 lbs. to pair and heavier, without handles
 2 1/2 lbs. to pair, without handles
 2 lbs. to pair, without handles

1 1/2 lbs. to pair, without handles
 1 lb. to pair, without handles

Pointed soldering coppers with handles 7 inches long by 1/8 and 3/8 inch diameter, weighing 2 lbs. to 6 lbs. to pair inclusive, can also be furnished.

SOLDERKITS

Solderkits.....

INSULATING MATERIALS



Victor Tape



Amazon Tape



Signal Tape

FRICTION TAPES

These tapes are used to protect the splicing compound on a wire joint from abrasion and we offer to the trade four brands of tape all made under our own specifications and sold under our own trade names; all grades are standard in half pound rolls $\frac{3}{4}$ inch width.

	Weight	Length, per Lb.	Color
Sticka	8 oz. gross	126 ft.	Black
Victor	8 oz. net	144 ft.	Black
Amazon	8 oz. net	168 ft.	Black
Signal	8 oz. net	168 ft.	Blue Gray

Standard rolls contain one-half pound of $\frac{3}{4}$ inch tape.

Sticka and Victor brands are of about the same quality and are offered for all ordinary commercial work. Sticka is packed 8 oz. gross including foil and carton, and Victor is 8 oz. net.

Amazon tape is of better quality and passes the majority of specifications in use.

Signal tape is of superior quality and is offered where quality is the first consideration; it is particularly designed for railway signal work.

Other widths and weights to order.

RUBBER SPLICING TAPES

These tapes are used to replace the rubber insulation necessarily removed from a conductor in splicing wire joints. We offer two qualities to the trade under our own trade names:

	Wt., per Roll	Length, per Lb.	Thickness, In.	Color
Victor	8 oz. gr.	43 ft.	.030	Black
Amazon	8 oz. gr.	48 ft.	.027	Gray

Victor is a commercial grade, unvulcanized compound which will "fuse" into a homogeneous mass at average air temperatures under the heat of the fingers.

Amazon is a compound partially vulcanized which increases both dielectric and tensile strength. It does not "fuse" as quickly as Victor but the adjacent layers adhere readily on a joint and after two or three minutes becomes a solid, homogeneous mass. This compound passes the majority of specifications on splicing compounds.

All tapes are packed in shipping cartons containing 50 lbs.

GRIMSHAW TAPES

$\frac{3}{4}$ inch, $\frac{1}{2}$ lb. Rolls

- Description
- Black Friction
- White Friction
- Rubber Tape

OKONITE TAPES

$\frac{3}{4}$ inch, $\frac{1}{2}$ lb. Rolls

- Description
- Manson Black Friction
- Manson White Friction
- Okonite Rubber Tape

COMPETITION FRICTION TAPE

$\frac{3}{4}$ inch, $\frac{1}{2}$ lb. Rolls

- Black Friction

COMPETITION RUBBER TAPE

$\frac{3}{4}$ inch, $\frac{1}{2}$ lb. Rolls

- Competition Rubber

WIRES AND CABLES



Solid Weatherproof Triple Braided

Weatherproof Hard Drawn Copper

WEATHERPROOF COPPER WIRE

These wires have three closely woven braids of cotton, all thoroughly saturated with a black weatherproof compound. The outer braid is smoothly polished.

Triple Braid--Solid Conductor

Size B. & S. Gauge	Approximate Weight in Pounds		Approximate Diameter Over Insulation, Ins.	Standard Packages					
	Per 1000 Ft.	Per Mile		Reels			Cases Containing		Coils Approx. Wt. Pounds
				Diameter Reels Ins.	Approx. Length Ft.	Approx. Wt., Lbs.	Approx. Coils	200 lbs., Wt.	
10	53	280	1/4	....	....	....	8	25	....
12	35	185	3/32	....	....	....	8	25	....
14	25	130	1/8	....	....	....	8	25	....
16	14	75	3/16	....	....	....	12	17	....
18	11	58	1/8	....	....	....	12	17	....

WEATHERPROOF HARD-DRAWN COPPER WIRE--Triple Braided

These wires are insulated especially for the telephone and telegraph trade and railway signal work, combining the highest conductivity with the greatest tensile strength. Unless specially ordered otherwise, these wires are put up in coils as shown, thoroughly burlapped.

Size B. & S. Gauge	Capacity Circular Mils.	Triple Braided Approximate Lbs. per Mile	Length of Coils, Miles	Size B. & S. Gauge	Capacity Circular Mils.	Triple Braided Approximate Lbs. per Mile	Length of Coils, Miles
12	6530	185	1/2	14	4107	130	1/2

Double braid will be furnished on request.

WEATHERPROOF IRON WIRE--Double and Triple Braided

These wires are extensively used in telephone and telegraph work, and have the same insulation as regular weatherproof line wires. They are finished with the same smooth polish as all other wires, and are put up for shipment in coils only, thoroughly wrapped in burlap.

No. 10 double braided is made up on special order only.

Size Iron Wire Birmingham Gge.	Double Braided Approximate Lbs. per Mile	Triple Braided Approximate Lbs. per Mile	Length of Coils, Miles	Size Iron Wire Birmingham Gge.	Double Braided Approximate Lbs. per Mile	Triple Braided Approximate Lbs. per Mile	Length of Coils, Miles
12	350	400	1/2	14	150	175	1/2
10	230	260	1/2				

GALVANIZED IRON TELEPHONE WIRE

There are three grades of galvanized wire, classified as follows: Extra Best Best (E. B. B.), Best Best (B. B.) and Steel. Specify grade desired.

Extra Best Best (E. B. B.) wire is made from a special stock of great purity, producing wire of absolutely uniform quality, in which the elements of softness and elongation are combined with low electrical resistance to a marked degree. It is largely employed in long lines or service where low electrical resistance is both desirable and necessary.

Best Best (B. B.) wire is made from a stock of high quality, producing a wire somewhat less uniform and of higher resistance than E. B. B., but of greater tensile strength. This grade is used almost exclusively for the construction of subscribers' lines in exchanges, and on account of its great tensile strength is best adapted for rural or farmer lines.

Steel wire has a greater tensile strength than either E. B. B. or B. B., but on account of its greater electrical resistance is not very generally used.

The different grades of wire are Extra Galvanized, i.e., the wire is protected from atmospheric action by a heavy uniform coating of spelter.



Telephone and Telegraph Wire

B.W.G. Gauge	Diameter in Ins.	Wt. in Lbs. per Mile	Length Coils Miles	Resistance Ohms per Mile
10	.134	258	1/2	22.04
12	.109	170	1/2	33.3
14	.083	99	1/2	57.44

Western Electric
WIRES AND CABLES



Galvanized Steel Strand

STANDARD COMMERCIAL GRADE

For guying poles, etc. Composed of seven steel wires twisted together. Not suitable for supporting cables.

Diameter Ins.	Wt. per 1000 Ft. in Lbs.	Approximate Breaking Strain in Lbs.	Diameter Ins.	Wt. per 1000 Ft. in Lbs.	Approximate Breaking Strain in Lbs.
3/8	510	8500	1/2	210	3800
1/2	415	6500	5/8	125	2300
5/8	295	5000			

EXTRA GALVANIZED, HIGH STRENGTH STRAND

Manufactured under Western Electric specifications. For supporting aerial cables, or for use wherever a high-grade, high-strength strand is required.

Diameter Ins.	Approximate Breaking Strain in Lbs.	Size of Wires	For Cables	
			No. 19 Gauge 50 pair 100 pair	No. 22 Gauge 100 pair 200 pair
1/2	8100	12 B.W.G.		
5/8	10600	11 B.W.G.		

SINGLE STEEL GUY WIRE

On light lines it is sometimes satisfactory to use a single steel wire for guying instead of using strands.

Size, B.W.G.	Diameter, Ins.	Approximate Breaking Strain in Lbs.	Length Size, Coils || 3/4 mi ||	B.W.G.	Diameter Ins.	Approximate Breaking Strai in Lbs.	Length Coils 3/4 mi.
6	.203	1770		8	.165	1170	

COPPERWELD STEEL WIRE

COPPERWELD wire is a non-corroding electric conductor, having an exterior copper coating or covering welded to a steel core and has distinct advantages over all other kinds of wire for many mechanical and electrical purposes. The exterior of COPPERWELD wire being copper, the life of the wire (insofar as corrosion is concerned) will be as long as that of a similar size wire of solid copper, and under sleet and wind loads greater on account of its superior tensile strength. The proportions of copper and steel are regulated to produce two standard grades, known as 40 per cent. conductivity and 30 per conductivity in terms of solid copper wire of equal size. COPPERWELD is 8 per cent. lighter and 50 per cent. stronger than copper wire.



Outside Telephone Wire



Bridle Wire

COPPER STEEL OUTSIDE TELEPHONE WIRES

These wires are furnished in coils, each coil carefully wrapped. Single conductor can be supplied when specified.

Gauge	Braid	Wt. per 1000 Ft. (Tw. Pair) Lbs.	Coil Lengths Feet
*17 B. & S.	Twisted pair, weatherproof braid.....	36	200-1500
†14 B. & S.	Twisted pair, weatherproof braid.....	63	200-1500

*This wire has very largely replaced No. 14 B. & S. copper drop wire.
†This wire is very often spoken of as copper drop wire.

BRIDLE WIRE

18 B. & S.	Twisted pair, weatherproof braid.....	33	200-1500
16 B. & S.	Twisted pair, weatherproof braid.....	42	200-1500

INSIDE TELEPHONE WIRE

19 B. & S.	Twisted pair, olive green finished braid.....	22	200-1500
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Packed in barrels, each coil specially wrapped in heavy craft paper.
Furnished in single or triple conductors when specified. A tracer thread is used in all conductors.



Flameproof Wire



Single Ground Wire

FLAMEPROOF TELEPHONE WIRE

16 B. & S.	Single, twisted or triple conductor, standard color, slate and red.....	38	200-1500
20 B. & S.	Single, twisted or triple conductor, standard color, slate and red.....	19	200-1500
22 B. & S.	Single, twisted or triple conductor, standard color, slate and red.....	16	200-1500

SINGLE GROUND WIRE

18 B. & S.	Single ground wire or sub-station wires.....	14	200-1500
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Also furnished in size No. 14 B. & S.

TWISTED TELEPHONE WIRES

Twisted telephone wires consist of two solid copper conducting wires, thoroughly twisted, as a protection against the corrosion of copper. The wires are then insulated with a rubber compound, which is made in three grades or qualities, i. e. for no immersion test, for 100 megohm test and for over 100 megohms test. Over the rubber is placed a black or colored braid, and the two wires are twisted together. For special work, three or more wires are often employed.

Western Electric

WIRES AND CONNECTORS



Pot Head Wire

POT HEAD WIRES

The standard wire for pot head work is either 19, 20 or 22 B.&S. gauge in single or twisted conductor. The insulation of this wire is of high quality, suitable to withstand the effects of the hot sealing compound and outside exposure without a protecting braid. As a distinguishing marker one conductor of the twisted pair has a double ridge on the insulation. Make sure in ordering this wire that it has the double ridge, as this insures you a "quality product."

Weight per 1000 feet (twisted pair), 19 lbs. Coil Lengths, 200-1500 feet.

Gauge	Pot-head wire	Weight per 1000 Feet, Twisted Pair	Coil Length
19, 20 or 22 B.&S.		19 lbs.	200-1500 ft.

IRON OUTSIDE DROP WIRE

A special drop wire which is stronger and lighter than copper and quite as flexible. The conductor is a high-grade non-rusting iron. It is insulated with good grade rubber compound, cotton braided and weatherproofed. The sizes most generally used are as follows:

Gauge	Description
19 BWG (18 B.&S.), $\frac{7}{16}$ inch diameter,	insulation twisted pair outside wire.
18 BWG (16 B.&S.), $\frac{5}{8}$ inch diameter,	insulation twisted pair outside wire.
16 BWG (14 B.&S.), $\frac{3}{4}$ inch diameter,	insulation twisted pair outside wire.
14 BWG (12 B.&S.), $\frac{11}{16}$ inch diameter,	insulation twisted pair outside wire.

WIRE

The following table may be of assistance in deciding just what kind of wire should be ordered for any given service:

<p>Lines:</p> <ol style="list-style-type: none"> 1. Rural lines. 2. Town lines (open wires). 3. Toll or other long lines where the best transmission is very important. 4. Lines running through trees where it is impracticable to trim. 	<p>Galvanized iron, copper clad steel, or hard drawn copper.</p> <p>Galvanized iron, copper clad steel, or hard drawn copper.</p> <p>Hard drawn copper.</p> <p>Weatherproof iron or copper to correspond with other wire used on the line.</p>
<p>Subscribers' Wiring:</p> <ol style="list-style-type: none"> 1. Drops or loops (pole to protector). 2. Interior (protector to instrument). 3. Ground (protector to ground rod or other ground connection). 	<p>No. 17 twisted pair copper clad steel wire, No. 14 B. & S. twisted pair copper or No. 18 B.W.G. twisted pair ironite.</p> <p>Interior copper telephone wire (twisted pair or triple).</p> <p>Ground wire.</p>
<p>Miscellaneous:</p> <ol style="list-style-type: none"> 1. Pot heads (for making lead cable pot heads). 2. Switchboard and telephone wiring. 3. Cross connecting on distributing frames. 	<p>Pot head wire.</p> <p>Switchboard wire.</p> <p>Flameproof jumper or cross connecting wire.</p>



Fig. 10
Double Tube Sleeve



Fig. 11
Sleeve and Wire Welded Together in One Solid Piece

CONNECTOR COPPER

Length	Size	Length	Size
4 ins.	No. 18 B. & S. gauge	4½ ins.	No. 12 B. & S. gauge
4 ins.	No. 14 B. & S. gauge	4¾ ins.	No. 12 N.B.S. gauge
4½ ins.	No. 14 N. B.S. gauge	4¾ ins.	No. 10 B. & S. gauge

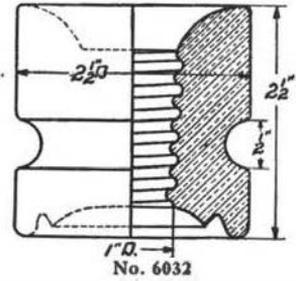
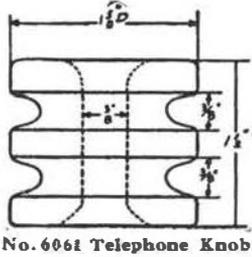
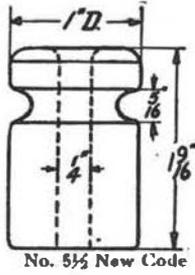
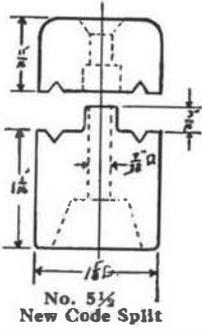
TINNED COPPER

No. 10 B.W.G. gauge
No. 12 B.W.G. gauge
No. 14 B.W.G. gauge

TINNED STEEL FOR SPLICING IRON WIRE

No. 10 B.W.G. gauge
No. 12 B.W.G. gauge
No. 14 B.W.G. gauge

PORCELAIN INSULATORS

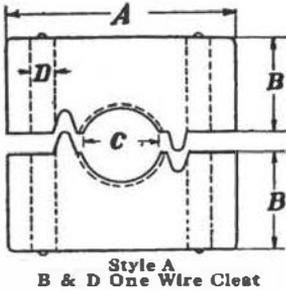


PORCELAIN KNOBS

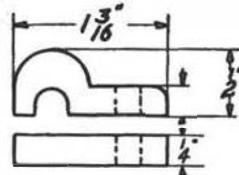
List No.	Height, Ins.	Diam., Ins.	Size Wire	Hole Ins.	Quantity per Bbl.	Wt. Lbs. per Bbl.	Gross Wt. Lbs. per 1000
5 1/2 New Code Split	1 1/2	1 1/2	12 and 14	1/8	3000	415	140
5 1/2 New Solid	1 9/16	1 1/2	Groove. 1/4 ins.	1/8	3500	410	120
6061 2-Groove	1 1/2	1 1/2	Groove. 1/4 ins.	1/8	2000	455	240

DUPLEX TELEPHONE INSULATORS

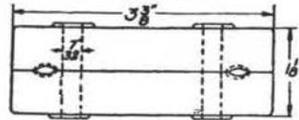
List No.	Height, Ins.	Diam., Ins.	Groove Ins.	Pin Hole	Quantity per Bbl.	Net Wt., Lbs. per 100
6032	2 1/4	2 1/4	1/4	1 in. std.	400	75
6053	3 1/4	2 1/4	1/4	1 in. std.	300	100



Style A
B & D One Wire Cleat



Top No. 333
Bottom No. 333 1/2



No. 334
Length 3 3/8 in. Width 1/2 in.
Groove 1/4 in.

B. & D. ONE WIRE CLEATS

List No.	Length, Ins.	Width, Ins.	Groove, Ins.	Quantity per Bbl., Lbs.	Wt. per Bbl., Lbs.
1	1 1/2	1 1/2	1/4	2300	510
1 1/2	2 1/2	1 1/2	1/4	1550	500
2	2 1/2	1 1/2	1/4	1350	490
2 1/2	2 1/2	1 1/2	1/4	900	600
3	3 1/2	1 1/2	1/4	600	490
3 1/2	3 1/2	1 1/2	1/4	600	490
3 1/2	3 1/2	1 1/2	1/4	650	480

TWO AND THREE WIRE CLEATS

List No.	Description	No. per Bbl.	Wt., Lbs. per Bbl.	Gross Wt., Lbs. per 1000
324U-2	Unglased, 2 wire	1850	385	210
334G-2	Glased, 2 wire	1850	395	220
334U-3	Unglased, 3 wire	1850	385	210
334G-3	Glased, 3 wire	1850	395	220
350U-2	Unglased, 2 wire	1250	395	324
350G-2	Glased, 2 wire	1250	395	324
360U-3	Unglased, 3 wire	1250	395	324
360G-3	Glased, 3 wire	1250	395	324

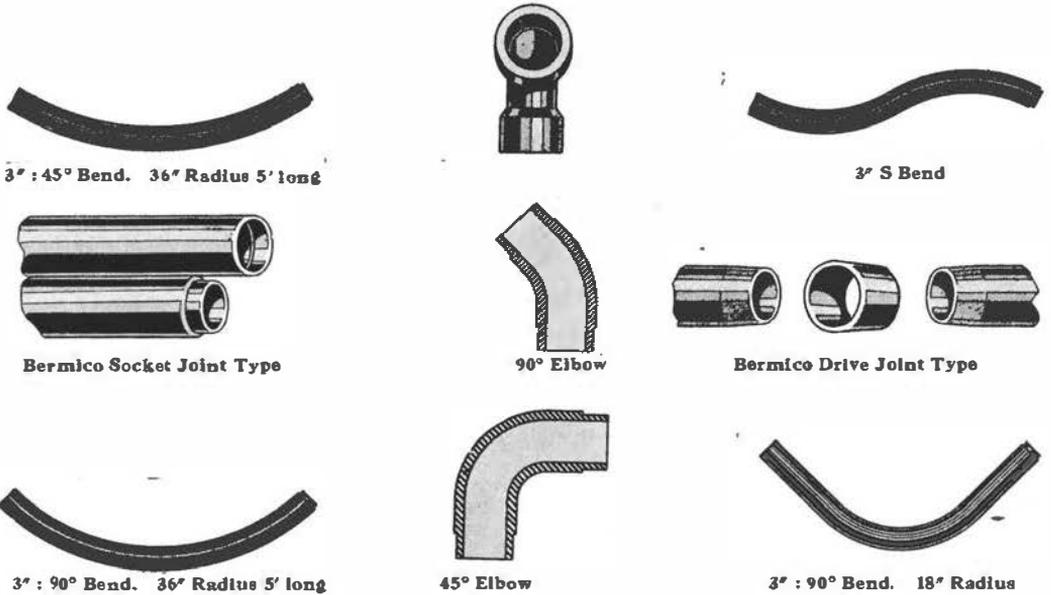
No. 334. Length 3 3/8 in. Width 1/2 in. Groove 1/4 in. No. 350. Length 3 3/8 in. Width 1/4 in. Groove 1/4 in.

SINGLE WIRE CLEATS

List No.	Description	No. per Bbl.	Sbpg. Wt. per Bbl.	Gross Wt., Lbs. per 1000
333	Top, glased 1/2 in. length, 1/2 in. wide. Groove 1/4 in.	21600	485 lbs.	24
363 1/2	Bottom, glased	22000	475 lbs.	24

Western Electric

BERMICO FIBRE CONDUIT



Bermico Fibre Conduit

Bermico conduit is made expertly by processes that save and develop the available strength of the pulp-stock used, and this product must not be confused with tubes of pulp less expertly made. It is tough and stronger, and gives better value for its cost, because it is made right in a long established pulp and paper plant that specializes on high grade products. The fibre is converted into lengths of conduit in automatic machines which produce a higher degree of precision than any skilled operative could produce. The conduit forming machines turn out automatically a succession of conduit lengths, highly standardised, more uniform in material, wall thickness, and density, than ever before. Bermico material takes a good thread, and screw jointed sections show a remarkable degree of precision in the automatically cut threads.

SOCKET JOINT TYPE

Lengths 7 feet.

Inside Diam. Ins.	Maximum Gross Wt. (Ap Prox.) Full Car (36 Ft.) in Lbs.	Maximum No. Ft. in 36 Ft. Car (Approx.)	Minimum 30,000 Lb. Car-load Approx. No. Ft.	Inside Diam. Ins.	Maximum Gross Wt. (Ap Prox.) Full Car (36 Ft.) in Lbs.	Maximum No. Ft. in 36 Ft. Car (Approx.)	Minimum 30,000 Lb. Car-load Approx. No. Ft.
2	32000	35000	33000	3½	32000	21000	20000
2½	33000	30000	27000	4	31000	17000	18000
3	33000	25000	23000	4½	30000	13500	13000

BERMICO DRIVE JOINT TYPE

One Coupling Supplied With Each Length

2	32000	33000	31000	3½	32000	20000	18000
2½	33000	27000	25000	4	32000	16000	15000
3	32500	23000	21000	4½	30000	12000	12000

BERMICO BENDS AND FITTINGS

SOCKET JOINT TYPE

*BERMICO DRIVE JOINT TYPE

Inside Diam. Ins.	Radius of Standard 45 and 90 Degree Bends, Ins.	Radius of Standard "S" Bends, Ins.†	Inside Diam. Ins.	Radius of Standard 45 and 90 Degree Bends, Ins.	Radius of Standard "S" Bends, Ins.†
2	18, 24, 36	36	2	18, 24, 36	36
2½	24-36	36	2½	24, 36	36
3	36	36	3	36	36
3½	36	36	3½	36	36
4	36	36	4	36	36
4½	36	36	4½	36	36

*One coupling included with each bend or fitting.

†Standard "S" bend has 20 in. offset.

APPROXIMATE DIMENSIONS OF ELBOWS

For Socket and Bermico Drive Joint Types

For 90 Degree Elbows

For 45 Degree Elbows

Diameter in Ins.	Radius	"L"	Wall Thickness	Diameter in Ins.	Radius	"L"	Wall Thickness
2	2½	6	½	2	2½	8½	½
2½	2½	6½	½	2½	2½	9	½
3	3	6½	½	3	3	9	½
3½	3	7	½	3½	3	9½	½
4	3½	7½	¾	4	3½	10½	½
4½	4½	8	¾	4½	4½	12	¾

VITRIFIED SALT GLAZED CONDUIT

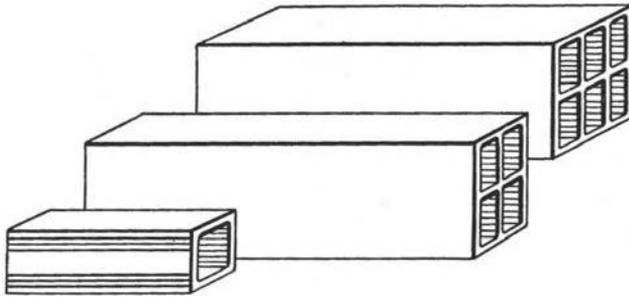


Illustration Showing One Duct, Four Duct and Six Duct

VITRIFIED CLAY CONDUIT

Short lengths of duct are made of the dimensions shown below. By means of these short pieces or "make-ups," joints can be broken and the end of the ducts can be finished in manholes and other terminals without having to cut any of the lengths. Both ends of all lengths of vitrified clay ducts are com ed or scarified on the outside to give a firm hold to the wrapping material and cement used at the joints.

Exact Dimensions of Vitrified Clay Ducts

Kind of Conduit	Size of Duct Opening, Ins.	Outside Dimensions, Ins.	Standard Lengths, Feet	Number of Duct Feet in each Piece	Lengths in which short Pieces are made, Ins.
Round duct					
Single duct	3 ³ / ₈	4 ³ / ₈ x 4 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	2 to 15
Single duct	3 ⁵ / ₈	4 ⁷ / ₈ x 4 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	2 to 15
Single duct	4 ¹ / ₄	5 ³ / ₄ x 5 ³ / ₄	1 ¹ / ₂	1 ¹ / ₂	2 to 15
Square duct					
Single duct	3 ⁵ / ₈	4 ³ / ₈ x 4 ³ / ₈	1 ¹ / ₂	1 ¹ / ₂	2 to 15
Two duct	3 ⁵ / ₈	4 ³ / ₄ x 9	2	4	6, 9, 12, 18
Two duct	3 ³ / ₈	5 ¹ / ₈ x 9 ¹ / ₄	2	4	6, 9, 12, 18
Three duct	3 ³ / ₈	4 ³ / ₄ x 13	2	6	6, 9, 12, 18
Three duct	3 ³ / ₈	5 ¹ / ₈ x 13 ¹ / ₂	2	6	6, 9, 12, 18
Four duct	2 ¹ / ₈	6 ¹ / ₄ x 6 ¹ / ₄	2 ¹ / ₂	10	6, 9, 12, 18
Four duct	3 ³ / ₈	8 ⁷ / ₈ x 8 ⁷ / ₈	3	12	6, 9, 12, 18, 24, 30
Four duct	3 ³ / ₈	9 ¹ / ₄ x 9 ¹ / ₄	3	12	6, 9, 12, 18, 24, 30
Six duct	3 ³ / ₈	9 x 13	3	18	6, 9, 12, 18, 24, 30
Six duct	3 ⁵ / ₈	9 ¹ / ₄ x 13 ¹ / ₂	3	18	6, 9, 12, 18, 24, 30
Nine duct	2 ¹ / ₈	9 ¹ / ₄ x 9 ¹ / ₄	3	27	6, 9, 12, 18
N ne duct	3 ⁵ / ₈	13 x 13	3	27	6, 9, 12, 18, 24

CREOSOTED WOOD CONDUIT

Yellow pine, 4¹/₂ inch square, with 3 inch bore through center; mortise at one end and tenon at the other; in radiom lengths, 2 ft. to 8 ft.; creosoted with full vacuum treatment.

Installation requires only laying the tubing in the trench, sometimes with a piece of similarly creosoted planking on top. Initial cost is comparable to fibre and clay, and it requires much less labor and expense to install as it does not require a concrete setting. The first installation is the last, as it is practically indestructible; breakage in transit and handling is practically zero, as compared to a large breakage n other conduits.

Uses for Which it is Adapted:

Railroads: Trunking, underground signal wires, high tension transmission lines, yard drainage where clay conduit is eas ly broken through, and system is usually placed on the surface of the ground.

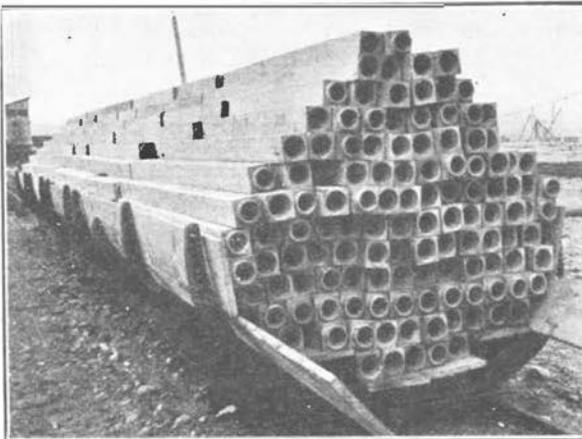
Telephone companies: All underground work.

Telegraph companies: All underground work.

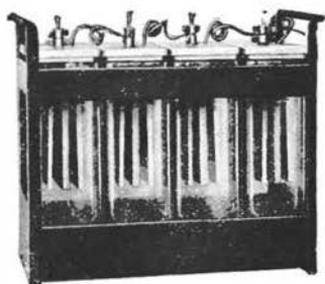
Police and fire alarm systems: For carrying wires, either high or low tension under ground.

Central stations: For distribution mains and services.

Any additional information regarding the practicability of installing this conduit will be furnished upon request to our nearest house.



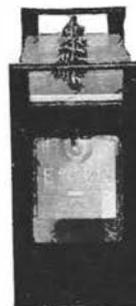
Creosoted Wood Conduit



Typical of
EDISON TYPE S-202 or S-252
Four Cell Battery in Tray
Side View



EDISON Primary Battery



EDISON TYPE S-202 or S-252
Four Cell Battery in Tray
End View

Edison Primary Batteries

ASSEMBLED TYPES

The Edison Primary Battery Assembled Type is the latest development of, and embodies all of the good features and many improvements over the class of cells formerly known as Edison Lalande and latterly as the Edison B. S. Co. The elements, or active materials, of Edison Primary Cells are the same as in the earlier types, but a remarkable gain in efficiency and effective capacity has been secured by better proportioning and increased conductivity, made possible by the improved method of suspension.

These cells have been brought to such a high state of perfection, and the cost of primary battery power has been so reduced thereby, that they are now used and are adaptable for many purposes which heretofore have been considered beyond the realm of primary cells. They are equally suitable for open circuit (intermittent discharge) or closed circuit (continuous discharge) and are noted for their high efficiency, great effective capacity, low maintenance cost and durable mechanical construction.

USE OF CELLS

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

Their Use in Telephone Service

EDISON primary cells are made up in capacities from 2 to 100 ampere hours. They are suitable for circuits in which the flow of current is either continuous or intermittent; there is no deterioration while the battery is idle and no attention required between renewal periods.

Type S-202: This cell is made up with a rectangular heat resisting glass jar, porcelain cover and regular 200 ampere hour element, electrolyte and oil. The rectangular jar allows the cells to be assembled compactly in a tray of various units as shown in accompanying illustration, which is furnished for four, five or six cells at a small additional cost. While the Type S-202 cells will render good service on any telephone talking circuit, they are particularly suitable for intercommunicating telephone systems, railway way stations and single transmitters generally.

Type S-252: This cell is made up with the regular 250 ampere-hour element, electrolyte and oil. The permanent parts are identical with Type S-202 cells, excepting that the jar is one-half inch higher than the Type S-202 jar. It is recommended for intercommunicating telephone systems, small private branch exchanges, etc.

The M-43 cell has a capacity of 400 ampere hours; the jar is of heat resisting glass cylindrical in shape and is furnished with Type M-400 element electrolyte and oil. This is the lowest priced 400 ampere hour cell, the jar being less expensive than those furnished with other cells of same capacity, but the current producing material is identical. For telephone transmitter circuits or similar service requiring a comparatively low discharge rate, and where the battery is not exposed to low temperatures the M-403 is equal in efficiency to any of the 400 ampere hour cells.

The Type M-403 cell is recommended for transmitter service in Local Battery Telephone Exchanges, Small Common Battery Telephone Systems, Private Branch Exchanges, Train Dispatchers' Offices, etc., also for Telephone Interrupters or Pole Changers, Supervisory Lamps, Trunk Line Relays, etc.

The Type S-502 cell has a capacity of 500 ampere hours; it has a rectangular heat resisting glass jar and Type 500 element, electrolyte and oil. This cell is suitable for the same purposes for which the Type M-43 is recommended. The shape of the cell is an item of importance when space is limited. The glass jar makes easy the task of inspecting, and as the approach of exhaustion is indicated by holes appearing in the zincs a convenient method for examining the plates is desirable.

The Type S-505 cell has a capacity of 500 ampere hours; it has a round heat resisting glass jar and round cover, but in other respects is identical with the Type S-502 cell.

The prefix "S" before a cell number indicates that the cell is furnished with a single plate element (one copper oxide and two zinc plates). The letter "M" indicates multiple-plate element (two copper oxides and three zinc plates). The multiple plate is designed for heavy service.

EDISON PRIMARY BATTERIES AND RENEWALS



Type No. S-202 Cell



Type No. S-206



Type No. S-208



Type No. S-252

EDISON TYPE S-202

Capacity 200 Ampere-hours

Size over all, $3\frac{1}{2} \times 6 \times 11\frac{3}{4}$. Jar only, inside $2\frac{1}{8} \times 5\frac{1}{4} \times 9\frac{1}{2}$.

List No.	Description
340371	Complete cell with rectangular heat resisting glass jar.
340372	Complete renewal.

TYPE S-206

Size over all, $5\frac{3}{4} \times 9$ inches. Jar only, inside dimensions $5 \times 7\frac{1}{2}$ inches.

List No.	Description
40000	Complete cell with porcelain jar and hollow rubber gasket ring.
30001	Complete Renewal.

Adapted for motor boats. Use five cells for single cylinder; six cells for multiple cylinder, make-and-break engines. Use eight cells for jump-spark.

Cover is fitted with a hollow rubber gasket to prevent splashing.

TYPE S-208

Size over all, 6×9 inches. Jar only, inside dimension $5 \times 7\frac{1}{2}$ inches.

List No.	Description
340007	Complete cell with porcelain jar.
340008	Complete Renewal.

Adapted for stationary gas or gasoline engines, small motors, burglar alarms, bell systems, program and self-winding clocks, annunciators, electric time stamps, mine signals, intercommunicating telephone systems, talking circuits for way station telephones in railway train dispatching systems, etc.

Use five cells for stationary engines having make-and-break ignition. Use eight cells for stationary engines having jump-spark ignition.

250 Ampere-Hour Types

TYPE S-252

Size over all, $3\frac{1}{4} \times 6 \times 12\frac{1}{2}$ inches. Jar only, inside dimension $2\frac{1}{8} \times 5\frac{1}{4} \times 10$ inches.

List No.	Description
340539	Complete cell, with heat resisting glass jar.
340540	Complete renewal.

RENEWAL PARTS FOR ABOVE TYPES

340012	Zinc-oxide, assembled.
340013	One can Caustic Soda.
340014	One bottle Special Battery Oil.

For stationary gas or gasoline engines, burglar alarms, bell systems, program and self-winding clocks intercommunicating telephone systems, fire alarms, etc.

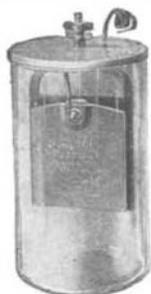
MISCELLANEOUS SEPARATE PARTS

Large Wing Nuts
Brass Washers
Hexagon Jamb Nuts
Nuts, other sizes
Double Connectors

ENAMELED STEEL TRAYS FOR USE WITH TYPES S-202, S-252 AND S-302 CELLS

2 cell tray, $6\frac{1}{2} \times 11\frac{1}{2} \times 8$ ins.
3-cell tray, $6\frac{1}{2} \times 11\frac{1}{2} \times 12$ ins.
4-cell tray, $6\frac{1}{2} \times 11\frac{1}{2} \times 15\frac{1}{2}$ ins.
5-cell tray, $6\frac{1}{2} \times 11\frac{1}{2} \times 19\frac{1}{4}$ ins.
6-cell tray, $6\frac{1}{2} \times 11\frac{1}{2} \times 23$ ins.

EDISON PRIMARY BATTERIES AND RENEWALS



Type No. M-401



Type No. M-402



Type No. M-403



Type No. M-404

400 Ampere-hour Types

TYPE M-401

Size over all 6 3/4 x 12 1/2 inches. Jar only, inside dimensions 6 x 10 1/2 inches.

List No.	Description	List No.	Description
340018	Complete cell, with heat resisting glass jar	340262	One can Caustic Soda
340019	Complete renewal	340263	One bottle Special Battery Oil
340020	Zinc-oxide, assembled		

For railway signals, crossing bells, battery motors, telephone train dispatcher's talking circuits, etc.

TYPE M-402

Size over all 5 3/8 x 6 3/8 x 12 3/4 inches. Jar only, inside dimension 5 x 6 x 10 1/2 inches.

List No.	Description	List No.	Description
340265	Complete cell, with heat resisting glass jar	340262	One can Caustic Soda
340019	Complete renewal	340263	One bottle Special Battery Oil
340020	Zinc oxide, assembled		

TYPE M-403

Size over all 7 1/2 x 10 3/4 inches. Jar only, inside dimension 6 3/8 x 8 3/4 inches.

List No.	Description	List No.	Description
340267	Complete cell, with porcelain jar	340262	One can Caustic Soda
340019	Complete renewal	340263	One bottle Special Battery Oil
340020	Zinc-oxide, assembled		

For railway crossing signals, mine signals, fire alarms, burglar alarms, program and self-winding clocks, small common battery telephone exchanges, private branch exchanges, intercommunicating telephones, pole chargers, supervisory lamps, trunk line relays, telephone train dispatchers' talking circuits, etc.

TYPE M-404

Size over all 7 x 11 1/2 inches

List No.	Description	List No.	Description
340268	Complete cell, with barrel shape heat resisting glass jar	340019	Complete renewal

RENEWAL PARTS

340020	Zinc-oxide	340263	One bottle Special Battery Oil
340262	One can Caustic Soda		

Suitable for all purposes for which Types M-401 and M-403 are recommended. It is more efficient than Type M-403 because of better location of plates, and when not exposed to extreme cold is fully as good as Type M-401. The jar has greater mechanical strength than glass jars with straight sides.

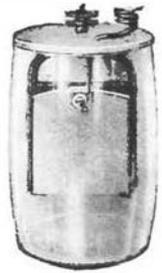
EDISON PRIMARY BATTERIES AND RENEWALS



Type S-501—Glass



Type S-502



Type S-504

500 Ampere-hour Types

TYPE S-501

Size over all 6¾ x 12½ inches. Jar only, inside dimensions 6 x 10½ inches.

<table border="0"> <tr> <th>List No.</th> <th>Description</th> </tr> <tr> <td>340542</td> <td>Complete cell, with heat resisting glass jar</td> </tr> </table>	List No.	Description	340542	Complete cell, with heat resisting glass jar		<table border="0"> <tr> <th>List No.</th> <th>Description</th> </tr> <tr> <td>340543</td> <td>Complete renewal</td> </tr> </table>	List No.	Description	340543	Complete renewal
List No.	Description									
340542	Complete cell, with heat resisting glass jar									
List No.	Description									
340543	Complete renewal									

For railway signals, crossing bells, battery motors, telephone train dispatchers' talking circuits, etc:

TYPE S-502

Size over all, 5¾ x 6¾ x 12¼ inches. Jar only, inside 5 x 6 x 10½ inches.

<table border="0"> <tr> <th>List No.</th> <th>Description</th> </tr> <tr> <td>340547</td> <td>Complete cell, with rectangular heat resisting glass jar</td> </tr> </table>	List No.	Description	340547	Complete cell, with rectangular heat resisting glass jar		<table border="0"> <tr> <th>List No.</th> <th>Description</th> </tr> <tr> <td>340548</td> <td>Complete renewal</td> </tr> </table>	List No.	Description	340548	Complete renewal
List No.	Description									
340547	Complete cell, with rectangular heat resisting glass jar									
List No.	Description									
340548	Complete renewal									

Recommended for railway signals, crossing bells, battery motors, and especially for talking circuits in dispatchers' offices, for electro-mechanical interlocking plants and for automatic signals.

The advantage of the rectangular jar is that a greater number of cells may be housed in a given space than is possible with round jars.

TYPE S-504

Size over all 7 x 11½ inches

<table border="0"> <tr> <th>List No.</th> <th>Description</th> </tr> <tr> <td>340549</td> <td>Complete cell, with barrel shape heat resisting glass jar</td> </tr> </table>	List No.	Description	340549	Complete cell, with barrel shape heat resisting glass jar		<table border="0"> <tr> <th>List No.</th> <th>Description</th> </tr> <tr> <td>340550</td> <td>Complete renewal</td> </tr> </table>	List No.	Description	340550	Complete renewal
List No.	Description									
340549	Complete cell, with barrel shape heat resisting glass jar									
List No.	Description									
340550	Complete renewal									

RENEWAL PARTS FOR ABOVE TYPES

<table border="0"> <tr> <td>340544</td> <td>Zinc-Oxide</td> </tr> <tr> <td>340545</td> <td>One can caustic soda</td> </tr> </table>	340544	Zinc-Oxide	340545	One can caustic soda		<table border="0"> <tr> <td>340546</td> <td>One bottle special battery oil</td> </tr> </table>	340546	One bottle special battery oil
340544	Zinc-Oxide							
340545	One can caustic soda							
340546	One bottle special battery oil							

Suitable for all purposes for which Type S-501 is recommended. It is more efficient because of better location of plates, and when not exposed to extreme cold is fully as good as Type S-501. The jar has greater mechanical strength than glass jars with straight sides.

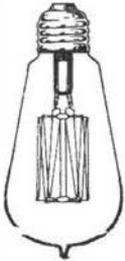
R. S. A. SIGNAL CELL

Types S-501 and S-504 conform to Railway Signal Association Specifications for copper-oxide, zinc and soda primary battery, known as R.S.A. Signal Cell.

PERMANENT PARTS FOR ALL TYPE BATTERIES

<table border="0"> <tr> <td>Heat-resisting glass jar, round</td> </tr> <tr> <td>HR glass jar, rectangular</td> </tr> <tr> <td>HR glass jar, barrel shape</td> </tr> <tr> <td>Enameled steel jar, round</td> </tr> </table>	Heat-resisting glass jar, round	HR glass jar, rectangular	HR glass jar, barrel shape	Enameled steel jar, round		<table border="0"> <tr> <td>Porcelain cover</td> </tr> <tr> <td>Terminal nuts and washers, per cell</td> </tr> <tr> <td>Rubber gasket</td> </tr> </table>	Porcelain cover	Terminal nuts and washers, per cell	Rubber gasket
Heat-resisting glass jar, round									
HR glass jar, rectangular									
HR glass jar, barrel shape									
Enameled steel jar, round									
Porcelain cover									
Terminal nuts and washers, per cell									
Rubber gasket									

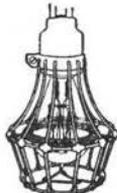
MISCELLANEOUS WIRING SUPPLIES



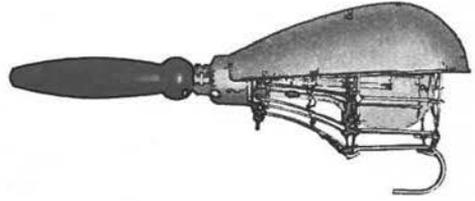
S-19 50 Watts



For Regular Socket
Matthews Holdfast Lamp Guards



For Porcelain Socket
Matthews Holdfast Lamp Guards



Holdfast Portable With Reflector

MAZDA B LAMPS FOR GENERAL LIGHTING SERVICE
110, 115 and 120 Volts

These lamps are fitted with medium screw bases

Watts	Approx. Lumens	Bulb	Max. Overall Length, Ins.	Stand. Pack. Quantity	Watts	Approx. Lumens	Bulb	Max. Overall Length, Ins.	Stand. Pack. Quantity
10	78	S-17	4 7/8	100	40	400	S-19	5 1/2	100
15	125				50	500			
25	230				60	600				S-21	5 1/2	100

REGULAR TYPE MAZDA LAMPS

MATTHEWS HOLDFAST LAMP GUARDS

List Nos.	Size of Wire	List Nos.	Size of Wire
114B	14 B.W.G.	514B	14 B.W.G.
114WP	14 B.W.G.	514WP	14 B.W.G.
112B	12 B.W.G.		
112WP	12 B.W.G.		

*Guards for protecting 6, 8, 10, 16 and 32 C.P. carbon and 15, 25, 40, 50 and 60 watt Mazda lamps.
**Guards for protecting 50 C.P. carbon and 75 and 100 watt Type C pear shape Mazda lamps.

Guards for brass sockets are shown by the letter "B" after the trade numbers and for weatherproof socket by the letters "WP" collars for "B" are 1 1/4 inches; for "WP" 1 1/2 inches inside diameter. Guards may be included with orders for Matthews Holdfast Adjustables, and Matthews Holdfast Shades, to obtain the maximum quantity prices on each speciality.

MATTHEWS HOLDFAST PORTABLES

No. 4112 includes lamp guard, socket and handle only.
No. 4112-S same as above with Matthews Holdfast Shade.



No. 21A Battery Clip



No. 2521



No. 2538



No. 2533



No. 2534



No. 2530



No. 2535

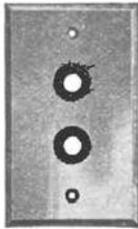
UNIVERSAL BATTERY CLIPS

List No.	Description
24A	15 ampere, screw connection, spread of jaws, 1 in., weight 1 oz.
21A	35 ampere, screw connection, spread of jaws, 1 1/2 in., weight 4 oz.
33A	200 ampere, cleat connection, spread of jaws, 1 in., weight 8 oz.

FRANKEL'S TEST CLIPS

2521	The standard test clip	2534	The reliable test clip
2538	The German silver test clip	2530	The special test clip
2533	The helpful test clip	2535	The efficient test clip

MISCELLANEOUS WIRING SUPPLIES



No. 3618



No. 1999



No. 66341
Mica Cap



Fixture Connector
Complete Connection Before Taping

TELEPHONE PLATES

Telephone Plates with One Bushing. When ordering "Combination Plates" specify "G" sections for telephone plates with one bushing.

List No.	Std. Pkg.	Schedule	Description	Schedule "H-3"	
				Pkg. Wt., Lbs.	Car-ton
3649	†	Single plate, solid, brass	45	10
3606	†	Single plate, struck-up, 1/8 inch, brass	40	10
3616	†	Single plate, struck-up, .040 inch, brass	35	10
3617	†	Single, struck-up, .040 inch, steel	34	10

Holes for supporting screws are spaced 3 3/7 inches on centers. Dimensions are the same as push button plates listed elsewhere.

Telephone Plates with two bushings. When ordering "Combination Plates" specify "H" sections for telephone plates with two bushings.

List No.	Std. Pkg.	Schedule	Description	Schedule "H-3"	
				Pkg. Wt., Lbs.	Car-ton
3651	†	Single plate, solid, brass	45	10
3618	†	Single plate, struck-up, 1/8 inch, brass	40	10
3619	†	Single plate, struck-up, .040 inch, brass	45	10
3620	†	Single plate, struck-up, .040 inch, steel	34	10

Holes for supporting screws are spaced 3 3/7 inches on centers. Dimensions same as push button plates listed elsewhere.

BELL PLATES

Bell Plates. The button (which is included in the price of the plate) is of the standard midget type, fitting a 1/2 inch hole. If any other type of button is specified, an extra charge will be made.

When ordering "Combination Plates" specify "T" sections for bell plates.

List No.	Std. Pkg.	Schedule	Description	Schedule "H-3"	
				Pkg. Wt., Lbs.	Car-ton
3668	†	Single plate, solid, brass	24	10
3669	†	Single plate, struck-up, 1/8 inch, brass	21	10
3670	†	Single plate, struck-up, .040 inch, brass	18	10
3671	†	Single plate, struck-up, .040 inch, steel	17	10

Holes for supporting screws are spaced 3 3/7 inches on centers. Dimensions same as push button plates listed elsewhere.

†A standard package of telephone plates consists of 100, assorted from all those listed.

†A standard package of bell plates consists of 50, assorted from all those listed.

ONE-PIECE ROSETTE

"Junior" Fuseless—660 Watts, 250 Volts

List No.	Description	Schedule "H-2"		
		Pkg. Wt., Lbs.	Car-ton	Std. Pkg.
1999	Cleat and concealed combined	135	10	500

Main diameter is 2 1/4 inches. Diameter over lugs 2 3/8 inches. Height 1 3/8 inches.

Holes for supporting screws are spaced 1 1/4 inches on centers.

BRYANT "PYROTITE" FUSE PLUGS

List No.	Pkg.	Schedule	Description	Schedule "I"	
				Pkg. Wt., Lbs.	Car-ton
66331	10	100	500	45	|| 66341
66337	20	100	500	45	|| 66341

Carton quantity for fuse plugs is 100.

The above fuses can also be furnished with solid brass caps on special order.

Add

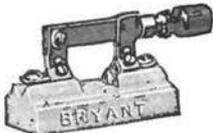
SHERMAN FIXTURE CONNECTORS

Suitable for All Small Connections

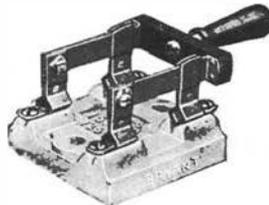
Sherman fixture connectors will connect all wires up to No. 12 with a maximum of two No. 12 solid or three No. 14 in either end.

Fixture connectors	Schedule "H-2"		
	Carton	Std. Pkg. Wt., Lbs.	Pkg. Wt., Lbs.
	100	500	12

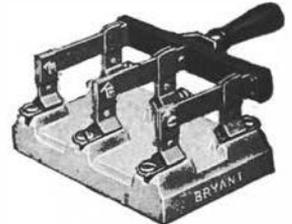
SWITCHES, LOCKNUTS AND BUSHINGS



List No. 1436



List No. 1438



List No. 1440

Bryant Baby Knife Switches
PORCELAIN BASE—125 VOLTS
Single Pole—Mounted

List No.	Description
1436	15 ampere, S. P., S. T.
1437	30 ampere, S. P., S. T.
1454	15 ampere, S. P., D. T.
1455	30 ampere, S. P., D. T.
Double Pole—Mounted	
1438	15 ampere, D. P., S. T.
1439	30 ampere, D. P., S. T.
1456	15 ampere, D. P., D. T.
1457	30 ampere, D. P., D. T.
Triple Pole—Mounted	
1440	15 ampere, T. P., S. T.
1441	30 ampere, T. P., S. T.

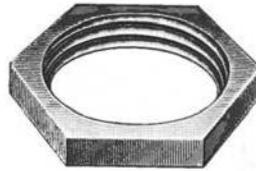
Schedule "H-2"		
Carton Quantity	Std. Pkg.	Pkg. Wt. Lbs.
10	100	40
10	100	45
10	50	25
10	50	27
Schedule "H-2"		
10	100	65
10	100	70
5	50	55
5	50	58
Schedule "H-2"		
5	25	30
5	25	32



No. 1695



No. 62965



Locknut



Bushing

Bryant Entrance Switches
DOUBLE POLE, 30 AMPERES, 125 VOLTS

List No.	Description
1695	Fuses at the top

Schedule "J-2"		
Carton Quantity	Std. Pkg.	Pkg. Wt. Lbs.
1	100	170

CUT-OUTS FOR GROUNDED CIRCUITS

These cut-outs will be supplied when specified to omit the fuse from the grounded wire without extra charge. Of the dimensions, the one first given is that parallel to the main.

List No.	Description	Dimensions, Ins.
62965	Double pole main	2 1/4 2 1/4

Schedule "J-2"		
Carton Quantity	Std. Pkg.	Pkg. Wt., Lbs.
10	150	100

BUSHINGS

Size	Unit Pkg.	Std. Pkg.	Wt. per Std. Pkg. Lbs.
1/2 in.	100	1000	45
3/4 in.	100	1000	60
1 in.	100	1000	90
1 1/4 in.	...	500	60
1 1/2 in.	...	200	30
2 in.	...	100	20
2 1/2 in.	...	100	30
3 in.	...	100	40
3 1/2 in.	...	25	14

LOCKNUTS

Size	Unit Pkg.	Std. Pkg.	Wt. per Std. Pkg. Lbs.
1/2 in.	100	5000	79
3/4 in.	100	5000	128
1 in.	100	1000	40
1 1/4 in.	...	500	40
1 1/2 in.	...	250	30
2 in.	...	100	16
2 1/2 in.	...	100	20
3 in.	...	100	30
3 1/2 in.	...	25	9

FISH WIRE

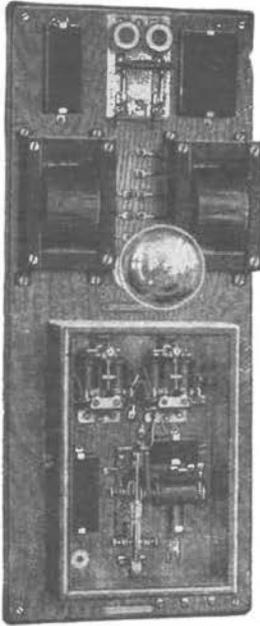
This wire will be furnished in any length up to 500 ft. in coils but can be furnished in any length desired.

List No.	Description
1000	Fish wire 1/2 x .060 in. (standard size)
1001	Fish wire 3/4 x .060 in. (standard size)
1002	Fish wire 1 x .060 in. (standard size)

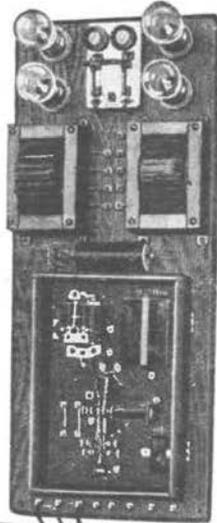
List No.	Description
1003	Fish wire 1/2 x .030 in. (standard size)
1004	Fish wire 3/4 x .030 in. (standard size)
1005	Fish wire 1 x .030 in. (standard size)

LEICH RINGING MACHINES

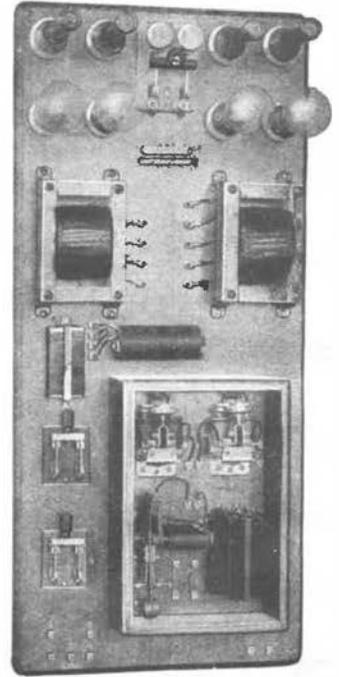
To Operate off A.C. or D.C. Lighting Circuit



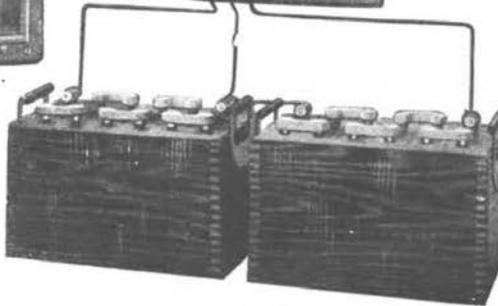
No. 7A



No. 15A



No. 9A



General Description

These Leich converters are designed to operate off a 60 cycle, 110 volt alternating current, or 110 volt direct current, delivering a 20 cycle alternating ringing current at 90 to 110 volts.

The Leich combined charging and ringing machine operates on 110 volt alternating current of any frequency from 25 to 60 cycles. The principle of the machine is the continued use of lighting current taken directly from the mains to charge two sets of self-contained storage batteries.

The batteries will automatically carry the ringing load for 48 hours or more.

To operate off alternating current lighting circuit.

Code No.	Description
7A	Frequency converter. Furnishes 20 cycle alternating current for straight line ringing. Operates off 110 volts, 60 cycle lighting circuit.

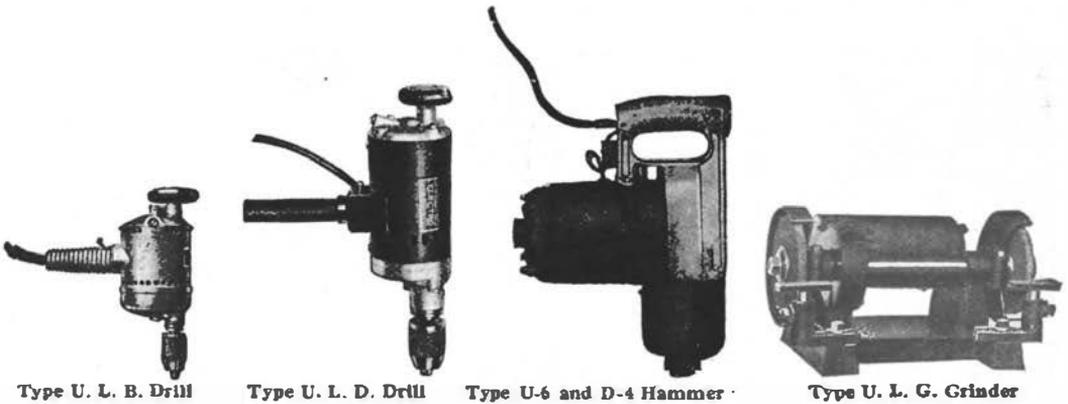
To operate off 110 volt direct current lighting circuit.

Code No.	Description
9A	Ringing converter. Furnishes 20 cycle alternating current for straight line ringing. Operates off 110 volt direct current lighting circuit.

To operate on intermittent alternating current lighting service.

Code No.	Description
15A	Combined charging and ringing converter to operate off 110 volts 60 cycle alternating current for straight line ringing. Requires two 12 volt storage batteries which must be ordered separately.

SPEED-WAY ELECTRIC DRILLS AND HAMMERS



Type U. L. B. Drill

Type U. L. D. Drill

Type U-6 and D-4 Hammer

Type U. L. G. Grinder

TYPE U. L. B. DRILL

Wagon and carriage makers, automobile body builders, wood workers, electrical contractors and in tailers will find this Type U. L. B. Drill particularly adapted to their work.

Equipment. All aluminum housings which give strength with lightness. Heat treated gears of alloy steel. Self-tightening three-jawed chuck. Heavy lead cord, connects with any lighting socket. Side handle with standard quick make-and-break switch directly under the operator's thumb. Comfortable knob handle for the hand.

Type	Voltage	Capacity, Ins.	Wt., Lbs.	Speed R.P.M.
U.L.B.	110 or 220	$\frac{1}{8}$ in steel	6	750-1500

Furnished for 110 or 220 volt circuit. Specify voltage when ordering.

TYPE U. L. D. DRILL

Garage, repair and machine shops, contractors and installers find this light duty yet sturdy U.L.D. drill best suits their needs as it weighs only 11 $\frac{1}{2}$ pounds.

This U.L.D. drill cannot be overworked and is practically impossible to stall, no matter how hard the task.

Equipment. Eight foot lead cord, screw plug, knob handle, side handle, chuck for straight shank drill bits 0 to $\frac{1}{2}$ inch or No. 1 Morse taper socket for taper shank drill bits.

Type	Voltage	Capacity, Ins.	Wt., Lbs.	Speed R.P.M.
U.L.D.	100 or 220	$\frac{1}{2}$ in steel	11 $\frac{1}{2}$	400

Attaches to any lamp socket. Specify voltage when ordering.

TYPES U-6 AND D-4 HAMMERS

Equipment. Each machine is fully equipped, ready for drilling with 8 foot lead cord and plug—switch in handle—control is always directly under operator's thumb—wrench and one drill steel as selected.

Type	Voltage	Capacity, Ins.	Wt., Lbs.	Blows per Minute
U-6	110 or 220 D.C. and A.C.	1	26	1800
D 4	110 or 220 D.C. only	1	26	1800

In ordering, voltage must be specified.

TYPE D-9 OUR 1 $\frac{1}{2}$ INCH HAMMER

It is a heavy duty tool equipped with quick make-and-break switch, lead cord and plug, wrench and one drill steel.

Type	Voltage	Capacity, Ins.	Wt., Lbs.	Blows per Minute
D-9	110 or 220 D.C. only	1 $\frac{1}{2}$	75	1100

TYPE U. L. G. GRINDER

Equipment—Universal motor, air cooled—the switch is a quick make-and-break and under the operator's instant control. Cramps special bearing bronze used throughout. Wheels 4 $\frac{1}{2}$ x $\frac{1}{2}$ inch. All parts interchangeable and built to jigs.

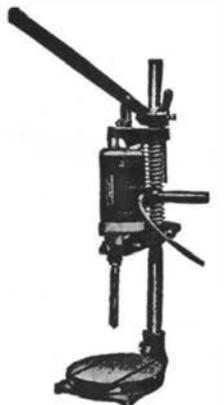
Each U. L. G. grinder is equipped complete with wheel collars, two grinding wheels, two adjustable grinding rests and 8 foot lead cord.

Type	Voltage	Motor	Speed R.P.M.	H.P.
U.L.G.	110, 220 or 32	Universal	3600	$\frac{1}{4}$

SPEED-WAY DRILL STAND

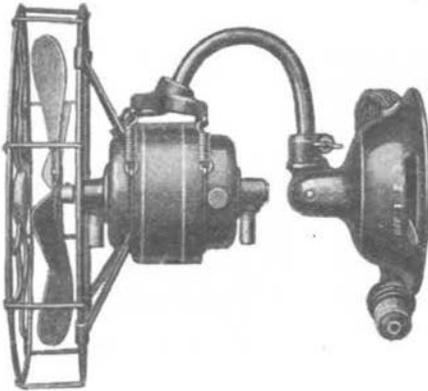
Type U.L.D. Speed-Way Drill in use in a Speed-Way Drill Stand. This arrangement is indispensable in every shop.

All drill stands built with correct vertical alignment and table leverage.



Type U. L. D. Drill Stand

MISCELLANEOUS SUPPLIES



9-Inch Telephone Booth Fan

Pyrene
Fire ExtinguisherGuardine
Fire Extinguisher

Pyrene Liquid

9 INCH TELEPHONE BOOTH FAN

It was designed primarily to meet the requirements of ventilating a telephone booth but is now being used in a great many small compartments of various sorts where a fan is needed. It is mounted on a side wall, suspended by springs which take up any vibration there might be in the fan and makes it practically noiseless in a small compartment where the vibration of an ordinary fan would be magnified so greatly as to disturb conversation. It can be used on either A. C. or D. C., has an adjustable socket for moving fan either vertically or horizontally and has three speeds. It is finished in standard polished black enamel with gold lines around the body and has a black guard with polished brass plates.

List No.	Size Ins.	No. Blades	
7300	9	4	110 volt Universal A. C. or D. C. 25 to 60 cycle.

PYRENE FIRE EXTINGUISHER

Made in two sizes, 1 quart and 1½ quart. Labeled by the Underwriters' laboratories. Compact, light, non-freezing; the liquid does not deteriorate. Especially suitable for homes, automobiles, motor boats, railway cars, power houses, etc.

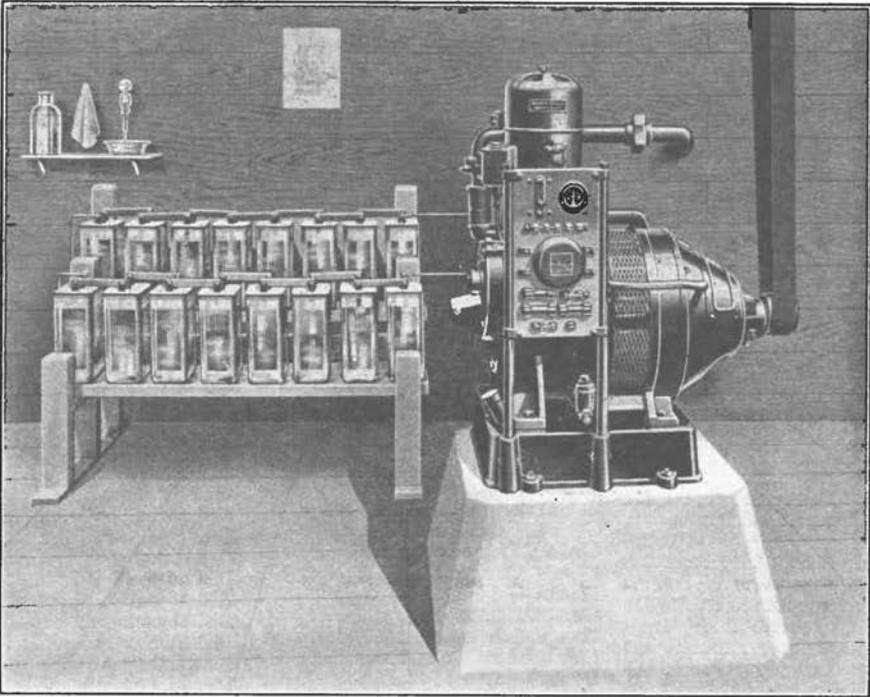
GUARDENE FIRE EXTINGUISHER

Polished copper. Capacity 2½ gallons. Labeled by the Underwriters' Laboratories. This is the standard soda-and-acid extinguisher which is universally used for the protection of industrial plants and public buildings.

PYRENE LIQUID

Sold in one quart cans, 20 to a case; gallon cans, 6 to a case, and 50 gallon drums. This liquid is especially compounded for fire extinguisher use, and labeled by the Underwriters' Laboratories. Only Pyrene Liquid should be used in the Pyrene Extinguisher; other liquids are liable to corrode the mechanism and ruin the extinguisher. Pyrene Liquid is non-corrosive, a non-conductor of electricity, and will not freeze at 50 degrees below zero.

32-VOLT 15 D. C. TYPE POWER AND LIGHT OUTFIT



32-Volt 15 D. C. Type Power and Light Outfit

Western Electric Power and Light Outfits are time and labor savers. They make it practical for anyone, no matter how remote from central service, to use electricity.

By simply pressing a button you can have electric power and electric light any time and anywhere you want it—electric power to run all the machines you now turn by hand.

Besides, it will automatically pump water for practically any purpose including main buildings, the barn, the dairy, the garage and the garden. Running water where and when you want it saves countless steps and gives the conveniences of a modern bathroom.

Electric light and power are economically and dependably produced without any care whatever.

It eliminates the disagreeable task of filling and trimming kerosene lamps and lanterns. Electric lights are safe on the farm.

Electric light has many uses. In the hen houses it increases egg production. Tests made by agricultural stations have proved this time and time again. It is just as advantageous in the telephone industry—with slight changes it is adaptable for charging telephone batteries as well as other features referred to herein.

The Western Electric 15-D. C. outfit runs on kerosene—very often less than was used to keep oil lamps burning. The kerosene is poured into a tank in the base of the outfit. The capacity of this tank is about four gallons so that tank does not need to be filled during charging period.

It is easy to operate. A slight pressure on the lever starts it; it stops itself when the battery is charged.

It gives the tapering charge which makes the battery last longer.

It can be furnished equipped with magneto for portable uses on construction work and for lighting and power wherever plant can be started when power is needed.

It has a circulating splash system of lubrication. Simply pour oil into the crank case and the engine does the rest. It runs in a steady stream over the crank pin bearing and keeps every moving part in a bath of oil.

Every part of the outfit is easy to get at. By taking off four bolts, the crank case cover can easily be removed, making easy access to every part and assembly simple.

The engine is air cooled and the outfit is equipped with a throttle governor so that, irrespective of load carried, the speed is always the same.

Two sizes of batteries are furnished as standard equipment—90 and 180 ampere hour. Larger sizes can be furnished if desired.

- | | |
|-----------|---|
| 15-DC-90 | Intermittent Rating of Battery 125 Amp. Hr. |
| 15-DC-180 | Intermittent Rating of Battery 250 Amp. Hr. |
| 15-DC | Magneto Type (no battery) |

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