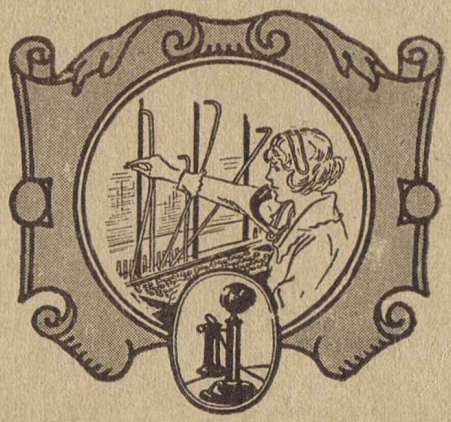
Western Electric

Telephone Apparatus and Supplies

No. 7



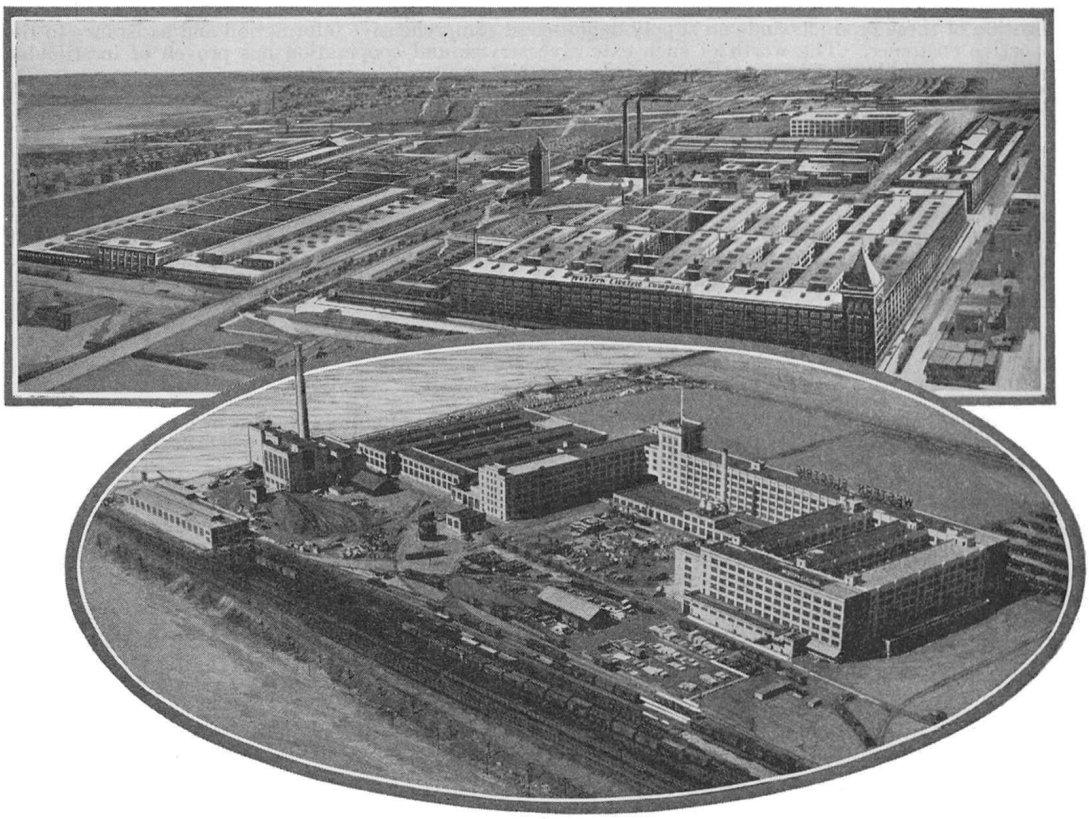


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Western Electric

Telephone Apparatus and Supplies

Catalog No. 7



Airplane View of (*top*) Hawthorne Works at Chicago, Ill., and (*bottom*) Kearny Works at Kearny, N. J.

Western Electric Company

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Western Electric Company

History

THE Western Electric Company was organized in 1881 as the successor to the Western Electric Manufacturing Company of Chicago, manufacturers of telephone apparatus. This was just five years after Alexander Graham Bell invented the telephone. The Western Electric Company is therefore the oldest electrical manufacturer in the United States continuously engaged in the production of electrical apparatus.

Factory, Products, Distribution

Telephones and telephone central office equipment have always been the chief products of this company. The main factory which covers 115 acres, is located at Hawthorne, Illinois, six miles from the center of Chicago. Another plant of 60 acres, is located at Kearny, N. J. A third plant of 125 acres located at Point Breeze, Baltimore, Md., will manufacture telephone cable and wire. These manufacturing facilities combined with a centralized system of purchasing and inspection enable the Western Electric Company to produce at all times telephone equipment which sets the standard in the field of communication.

Western Electric telephone products are given world-wide distribution through selling organizations maintaining branch houses in the principal business centers. This means that products of this company are readily available everywhere together with the services of specialists who understand the use and application of these products and can supply definite and comprehensive information and assistance to the prospective customer. The worth of such extensive service and cooperation has proven of inestimable value on innumerable occasions.

Accessibility of Permanent Sources of Supply

An important factor to be considered in the purchase of telephone apparatus is the certainty of a permanent source of supply initially, as well as for repair and additional parts. Purchasers of Western Electric equipment are assured of this advantage. As advances in the art of communication make it necessary to develop new types of apparatus, the improved or newly developed equipment, when ready for the market, is made immediately available through the Western Electric Company's domestic and foreign distributors.

Prices

Prices have purposely been omitted from this catalog. They are always as low as possible consistent with the high grade of material, expert workmanship and excellent performance which form the basis of the Western Electric Company's manufacturing policy.

Due to market fluctuations, prices on apparatus listed and on any special equipment that we are in a position to furnish will vary from time to time. Quotations will be furnished upon application to the nearest distributing house (see list on last page of this catalog). Inquiries should clearly describe the apparatus and quantity desired.

Suggestions when Ordering Telephone Apparatus Parts and Supplies

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

1st Quantity desired.
2nd "P" number of the parts required when this information is available.
3rd Name of the part or apparatus required.
4th Code number of the part or the apparatus on or in which the part is used.
5th Page number and date or number of the catalog in which the part appears.

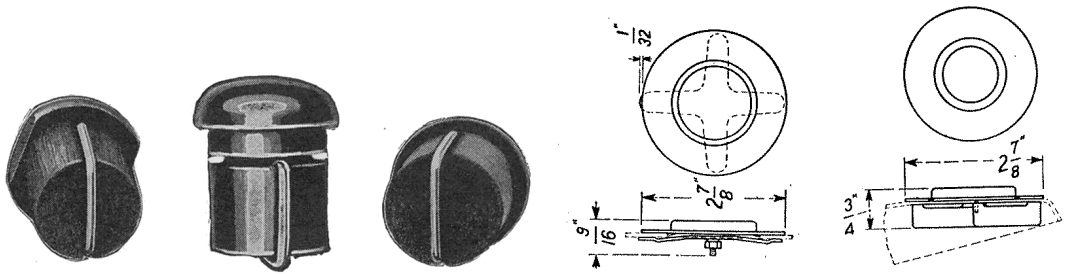
If the part desired is not shown in the catalog, please furnish the following information:

1st Quantity desired.
2nd Name of apparatus or part.
3rd Code number of part or the apparatus on or in which the part is used.
4th If possible, submit a sample of the part desired.

Be sure to place a tag on the sample, giving your name, the name of your company and description of the part wanted: for example: "3 Contact Springs for No. 48A Generator, per sample attached." Address your inquiry or order to any Western Electric distributor, preferably the one located nearest you. Location of distributors will be found on the last page of this publication.

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APPARATUS BLANKS

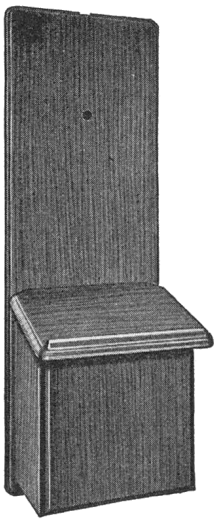


No. 32B | No. 39B | No. 42B | No. 50B | No. 50D

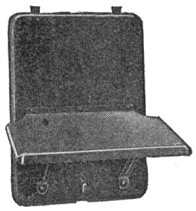
Code No.	Material	Finish	Used
28-A	Steel	Black	In unequipped positions of the No. 89-D Signal Mountings on the No. 105-B Magneto Switchboard.
32-B	Birch	Ebonized	In unequipped cord circuit positions of No. 1 Type Switchboards in No. 13 Lamp Sockets.
33-B	Birch	Ebonized	In unequipped positions of the No. 109 Plug. Recommended in place of the No. 26 Type.
38-B	Birch	Ebonized	In unequipped cord circuit positions for plugging drillings for Nos. 49, 110, 111 and 117 Plugs and plugs of similar size.
39-B	Birch	Ebonized	In unequipped positions of Nos. 2, 8, 55, 56, 60, 61, 65, 71, 72, 91, 99, 102, 103, 104, 107, 108, 109, 110, 117, 118, 123, 124, 126, 127, 128, 134, 136, 139, 140, 151, 153, 154, 155, 156, 159, 160, 165, 172, 174, 175, 176, 177, 178, 184, 188, and 189 and similar Type Jacks. Recommended in place of No. 12 Type.
40-B	Birch	Ebonized	For plugging unequipped drillings for the Nos. 16, 33 or 34 Lamp Sockets and No. 92-B Keys in the piling rail of toll switchboards arranged for pneumatic tube equipment. Recommended in place of the No. 6 Type.
42-B	Birch	Ebonized	In unequipped No. 13 Lamp Socket drillings and Nos. 22, 27, 32, 37, 53, 65, and 78 Plug drillings. Recommended in place of the No. 7 Type.
50-B	Metal	Black	To clamp on No. 553 Type Subscriber Sets to cover unequipped dial position when sets are used in manual service.
50-C	Metal	Black	To mount on 50 Type Coin Collector to cover unequipped dial position when coin collector is used in manual service.
50-D	Metal	Black	To clamp on No. 50 Type Desk Stand to cover unequipped dial position when stand is used in manual service.
50-E	Metal	Black	To clamp on No. 51 Type Desk Stands to cover the unequipped dial position when the stand is used in manual service.
50-H	Metal	Black	To clamp on "B" Type Handset Mounting to cover the unequipped dial position when the mounting is used in manual service.

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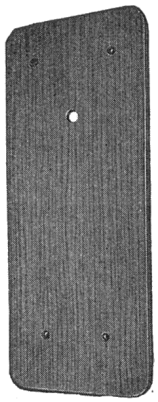
BACKBOARDS



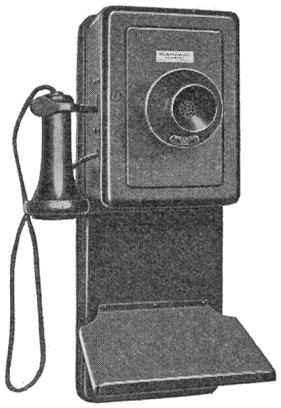
No. 136C Backboard



No. 146A Backboard



No. 148A Backboard

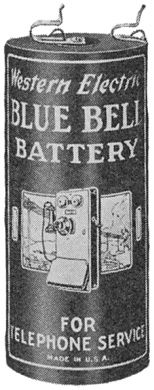


No. 1533 Type Telephone Mounted on a No. 148A Backboard together with a No. 146A Backboard

Code No.	Description and Principal Use	Overall Dimensions, Ins.
79	Wood, black finish. Used to facilitate mounting No. 58 Type Protectors on brick or stone walls	12½ x 5 x 1 3/16
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 7 13/16
136C	Wood, black finish. Arranged with battery box for 3 dry cells. Used with Nos. 1293, 1533 and 1553 Type Telephone Sets. Top of battery box forms a writing shelf	24 5/16 x 8⅛ x 7⅛
144B	Wood, black finish. For mounting a No. 50 Type Coin Collector and a No. 534 Type Desk Set Box. Replaces the No. 144A	27 5/16 x 7¼ x ¾
146A	Black finished pressed metal shelf attachment; used with Nos. 1533 and 1553 Telephone Sets and Nos. 534 and 554 Type Desk Set Boxes. Has lugs at upper end which engage slots in the base of the telephone. May be used with or without a backboard. Has flanged edge the same as the telephones it is used with	9 3/16 x 7½ x 6¾
147A	Wood, black finish. Used with Nos. 1533 and 1553 Type Telephone Sets and Nos. 534 and 554 Type Desk Set Boxes in cases where it is desired to insulate them or facilitate mounting on brick or irregular surfaces	9 9/16 x 7⅛ x 9/16
148A	Wood, black finish. Used with Nos. 1533 and 1553 Type Telephones and No. 534 Type Desk Set Boxes in connection with the No. 146A Backboard	18 7/16 x 7⅛ x 9/16
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	8 1 1/16 x 6⅛ x ⅝
151A	Black finished sheet metal writing shelf for use in connection with No. 50 Type Coin Collectors	4 1 9/32 x 7½ x 5 17/32
152A	Green finished wood with removable front cover. For use in mounting Nos. 292 and 392 Type Extension Bells. Replaces the No. 149A	15 x 13 x 6 9/16

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BLUE BELL DRY BATTERIES
For Telephone Service



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

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

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

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



Size of Zinc Cans Ins.	Size Overall Ins.	Description	Wt. per Cell	No. in Bbl.	Shipping Wt. per Bbl.
2½ x 6	2⅝ x 6¾	Standard Fahnestock	2	125	300 lbs.

BATTERY CONNECTOR
(No. 540 Cord)

This is a stranded conductor battery connector for connecting dry cells equipped with Fahnestock clips. It insures freedom from short circuits 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 proofed cotton insulation is cut back at each end ⅝ of an inch and the bare stranded conductor soldered to prevent fraying.

BATTERY BOXES



No. 1A—Battery Box

The Nos. 1 and 2 Type Battery Boxes provide a neat and convenient means of mounting dry cells and protecting them from injury. These boxes are made of sheet metal finished with black japan and are lined with insulating material. Pear shaped mounting slots in the back of the boxes provide an easy means of mounting on vertical surfaces and in such a way that they are readily removable. This feature permits of their being located at the sides or under desks and in other places where they will be out of the way and adjacent to the telephone or other apparatus to which they are connected and yet be accessible for maintenance purposes.

Code No.	Dry Cell Capacity	Dimensions Inches
1-A	3 No. 6-cells	3¼ x 7 15/32 x 9 7/16
2-A	4 No. 6-cells	3 7/32 x 7⅜ x 12 19/64
2-B	9 No. 6-cells	5 23/32 x 7 9/16 x 14 5/32

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BATTERIES AND SUPPLIES
Edison Primary Cells

Edison Primary Cells are furnished in capacities ranging from 200 to 1000-ampere hours. The sizes best adapted for telephone work are the 250, 400 and 500-ampere hour types, for average conditions, and the 1000-ampere hour cells for heavy duty service or when it is desirable to bring the renewal periods far apart.

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

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

TYPE 75 EDISON PRIMARY CELL
Capacity, 75-ampere Hours

With round glass jar. Size overall 3 x 7½ inches.

This new cell has been developed to meet the demand for a low capacity unit, constructed along the same lines as standard cells of greater capacity and established reliability.

At a continuous discharge of 100 milliamperes it will deliver 80 ampere hours to a cut-off voltage of 0.6. It is capable of sustained discharges up to 750 milliamperes or intermittent up to one ampere.

It is particularly well suited for telephone work and for all classes of service where dependable capacity, uniform voltage reliability are necessary requisites.

When the battery exhausts it is customary to replace with new cells and discard the entire exhausted battery.

Type	Description
75	Complete cell

TYPE S-202 EDISON PRIMARY CELLS
Capacity, 200-ampere Hours

With rectangular heat-resisting glass jar. Size over all, 3⅜ x 6 x 11 inches. Inside dimensions, 2⅞ x 5¼ x 9 inches.

Adapted for intercommunicating telephone systems, railway train dispatching systems, stationary gas or gasoline motors, electric clock systems, small motors, etc.

Use 5 cells for stationary gas or gasoline motors having make and break ignition and 8 cells for jump spark.

Type	Description
S 202	Complete Cell
S-200	Complete Renewal

Separate Parts

202	Jar
202	Cover
.....	Wing Nuts and Washers
S-200	Element, Assembled
200	Caustic Soda
200	Battery Oil

TYPE S-208 EDISON PRIMARY CELLS
Capacity, 200-ampere Hours

With heat-resisting glass jar. Size over all, 5¾ x 9 inches. Inside dimensions of jar only, 5 x 7½ inches.

Adapted for stationary gas or gasoline engines, electric motors, burglar alarms, bell systems, program and self-winding clocks, annunciators, electric time stamps, mine signals, intercommunicating telephone systems, etc. Use 5 cells for stationary engines having jump spark ignition.

Type S-208 supersedes old Type Q Cell.

Type	Description
S-208	Complete Cell
S-200	Complete Renewal

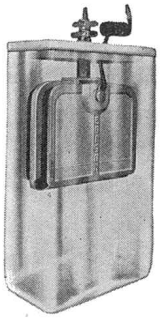
Separate Parts

208	Jar
208	Cover
.....	Wing Nuts and Washers
S-200	Element, Assembled
200	Caustic Soda
200	Battery Oil

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BATTERIES AND SUPPLIES

Edison Primary Cells



S-252 Cell

TYPE S-252 EDISON PRIMARY CELLS
Capacity, 250-ampere Hours

With rectangular heat-resisting glass jar. Size over all, 3½ x 6 x 12½ inches. Inside dimensions of jar only, 2⅞ x 5¼ x 10 inches.

This cell is recommended for railway telephone dispatching transmitters; intercommunicating telephones; self-winding and program clocks; fire and burglar alarm systems; radio "A" Batteries, etc.

Initial open circuit voltage, 0.95. Average closed circuit voltage, 0.6 to 0.65 per cell. Maximum recommended continuous current, 1 ampere. Maximum recommended intermittent current, 1.5 amperes.

Type	Description	Type	Description
S-252	Cell Complete	S-250	Complete Renewal
	Separate Parts		
252	Jar	S-250	Element
252	Cover	250	Caustic Soda
.....	Wing Nuts and Washers	250	Oil

TYPE S-302 EDISON PRIMARY CELL
Capacity, 300-ampere Hours

With rectangular heat resisting glass jar. Dimensions the same as the S-252.

This cell is designed for the same classes of work in which the S-252 is used. There is no difference in overall dimensions but the cell is provided with more active material and is recommended for service in which a capacity of 300 ampere hours is desirable.

Type	Description	Type	Description
S-302	Complete Cell	S-302	Complete Renewal
	Separate Parts		
302	Jar	S-300	Element, Assembled
302	Cover	300	Caustic Soda
.....	Wing Nuts and Washers	300	Battery Oil

TYPE S-401 EDISON PRIMARY CELLS
Capacity, 400-ampere Hours

With round heat-resisting glass jar. Size over all, 6¾ x 12½ inches. Inside dimensions of jar only, 6 x 10½ inches.

Adapted for railway signals, battery motors, intercommunicating telephone circuits, telephone pole changers, telegraph sounders and main line circuits, fire alarms, burglar alarms, program and self-winding clocks, etc.

Type	Description	Type	Description
S-401	Complete Cell	S-400	Complete Renewal
	Separate Parts		
401	Jar	S-400	Element, Assembled
401	Cover	400	Caustic Soda
.....	Wing Nuts and Washers	400	Battery Oil

TYPES S-402 AND S-404 EDISON PRIMARY CELLS
Capacity, 400-ampere Hours

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

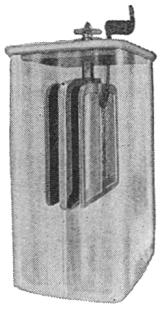
The maximum recommended continuous current is 2 amperes and the maximum intermittent current is 3 amperes. The initial open circuit voltage is 0.95 and the average closed circuit voltage 0.6 to 0.65 per cell.

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BATTERIES AND SUPPLIES
Edison Primary Cells

TYPE S-402

With rectangular heat-resisting glass jar. Size over all, 5½ x 6½ x 12¼ inches. Inside dimensions of jar only, 5 x 6 x 10 inches.



Type No. S-402

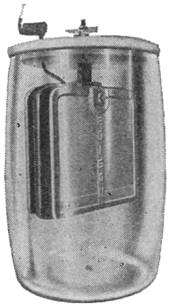
Type	Description
S-402	Complete Cell
S-400	Complete Renewal

Separate Parts

402	Jar
402	Cover
.....	Wing Nuts and Washers
S-400	Element
400	Caustic Soda
400	Oil

TYPE S-404

With barrel-shaped heat-resisting glass jar. Size over all, 7⅛ x 12¼ inches. Inside dimensions of jar only, diameter at top, 6 inches; depth, 10 inches.



Type No. S-404

Type	Description
S-404	Complete Cell
S-400	Complete Renewal

Separate Parts

404	Jar
404	Cover
.....	Wing Nuts and Washers
S-400	Element
400	Caustic Soda
400	Oil

TYPES S-502 AND M-502 EDISON PRIMARY CELLS
Capacity, 500-ampere Hours

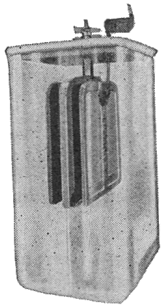
The 500-ampere hour cells are furnished with either multiple or single plate elements. The letter M before the reference number indicates multiple plate, 2 copper-oxide and 3 zinc plates. The letter S indicates single plate, 1 copper-oxide and 2 zinc plates.

The cells are used for telephone and telegraph service, railway signal, fire and burglar alarm systems, highway beacons, and in many other fields where a high capacity cell is desirable.

For service in which the load frequently goes to 3 amperes, or where the cells are exposed to low temperature, the multiple plate cells are recommended. For service in which the load does not go over 2½ amperes and the cells are protected from the cold, the single plate type will fully meet the requirements. Initial open circuit voltage, 0.95. Average closed circuit voltage 0.6 to 0.65 per cell. Maximum recommended continuous current for single plate types, 2 amperes; for multiple plate types, 2.5 amperes. Maximum recommended intermittent current for either types, 3 amperes.

TYPE S-502
Single Plate Element

With rectangular heat-resisting glass jar. Size over all, 5½ x 6½ x 12¼ inches. Inside dimensions of jar only, 5 x 6 x 10 inches.



Type No. S-502

Type	Description
S-502	Complete Cell
S-500	Complete Renewal

Separate Parts

502	Jar
502	Cover
.....	Wing Nuts and Washers
S-500	Element
500	Caustic Soda
500	Oil

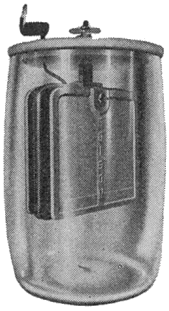
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BATTERIES AND SUPPLIES

Edison Primary Cells

TYPES S-504 AND M-504 EDISON PRIMARY CELLS

Capacity, 500-ampere Hours



Type No. S-504

With barrel-shaped heat-resisting glass jar. Size over all, 7 x 12¼ inches. Inside dimensions of jar only, 6 x 10 inches.

This cell is suitable for the same classes of work as the type 502 and is furnished when a round jar is preferred.

Type	Description
S-504	Complete Cell
S-500	Complete Renewal

Separate Parts

504	Jar
504	Cover

Other items the same as S-502 and M-502.

TYPES S-507 AND M-507 EDISON PRIMARY CELLS

Capacity, 500-ampere Hours

With cylindrical enameled steel jar. Size over all 7¼ x 12 inches. Inside dimensions of jar only, 6⅛ x 10 5/16 inches.

This cell is adapted for traffic signals and other classes of work where there is a possibility of the battery being upset or subjected to rough usage. The element is the same as that used in types 502 and 504 and the electrical characteristics are identical with those types. Cover clamps and gaskets are provided so that cells can be moved without spilling.

Type	Description
S-507	Complete Cell
S-500	Complete Renewal

Separate Parts

S-507	Jar
S-507	Cover
S-507	Rubber Gasket
S-507	Clamps

Other items the same as S-502 and M-502.

TYPE M-1002 EDISON PRIMARY CELLS

Capacity, 1000-ampere Hours

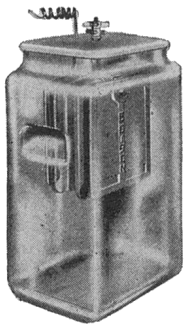
The 1000-ampere hour cells are furnished with either rectangular or cylindrical jars. Type M-1001 is the specification for the cell with the cylindrical jar and M-1002 for the rectangular. The prices are the same.

This size was developed to meet demand for a battery that would operate efficiently in classes of service where heavy discharges are required for long periods. In railway signaling these cells are used for operating remote controlled switch movements, color light signals and track circuits; in the general trade, for any heavy duty work or where it is desirable to bring the renewal periods as far apart as possible.

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

TYPE M-1002

With rectangular heat-resisting glass jar. Size over all, 6½ x 8⅜ x 14 inches. Inside dimensions of jar only, 5 x 6 x 12¾ inches.



Type No. M-1002

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

Separate Parts

1002	Jar
1002	Cover
.....	Wing Nuts and Washers
M-1000	Element
1000	Caustic Soda
1000	Oil

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BATTERIES AND SUPPLIES

Chloride Accumulator Storage Batteries

Chloride Accumulator Batteries are recommended where extraordinary durability and freedom from care and attention, together with absolute dependability are important factors. This type of storage battery may be obtained in either the old style open cell or the sealed jar type. The sealed glass jar types are furnished only up to size "F." If larger capacities are required it is necessary to go to the open lead lined type. Information on other types and sizes than those shown can be secured on application to the nearest Graybar House.

The grid of the positive plate is a cast lead antimony alloy which resists the "forming" action of the electric current during charge and discharge. It, therefore, retains its strength, shape and dimensions and provides the necessary support for the active material and the necessary conducting material for carrying the current to and from all parts of the plate during charge and discharge.

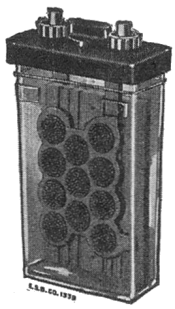
The negative plate has also a grid of lead antimony alloy arranged with horizontal and vertical ribs spaced about one inch apart, forming pockets which are closed on both sides with perforated sheet lead. In these pockets the active material is permanently held in place. The grid is rigid and inactive and holds the active material firmly in place. The active material is exceedingly porous and finely divided and retains this porosity in service. As a result of this construction, a permanent negative plate is secured.

The descriptions of the plates apply to both types of batteries. The remaining description will apply to the newer sealed glass jar type which are coming more into use and replacing in many cases the open type batteries.

The sealed glass jar type, due to its construction, completely confines the spray within the cell, and therefore, no special compartment or battery room is required.

The covers of the larger sizes of sealed glass jars (ETM, DMGO, EMGO, EMGF and FMGF) are made of a material known as gummite, which is an insulating non-absorbent acid-proof material of great strength. Intercell connections are made by means of either strips of lead tape or when the discharge rate requires, by means of flat lead-plated copper strips. Corrosion of the intercell connectors is prevented by the design of the cells.

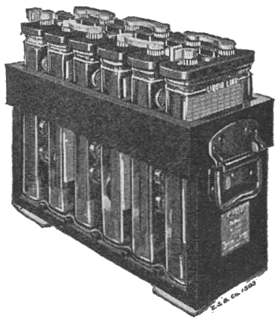
TWO PLATE SEALED TYPE



Single Cell BTM

The cells of the BTM, CTM, PTM and ETM types are similar in construction and assembly differing only in size and capacity. The elements are supported from the covers. The covers are equipped with standard vent plugs.

All two plate cells are shipped assembled, sealed and charged, filled with electrolyte, ready for service. They are furnished either as single cells or as units assembled in wood crates, the adjacent cells being connected by burned alloy intercell connectors. The units are furnished with the necessary bolt connectors on the terminal cell of each unit. Data on these cells is as follows:



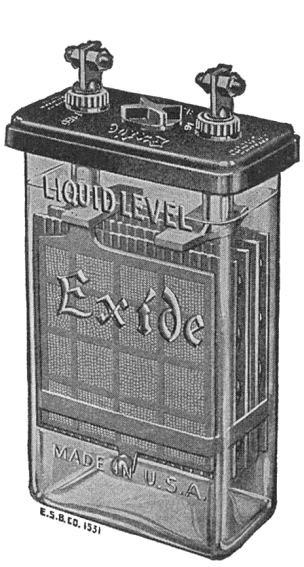
6 Cell PTM Unit

		BTM	CTM	PTM	ETM
Manufacturer's Designation					
Manufacturer's Catalog Number	Single Row	17411	16187	.....	.....
	Double Row	15643	15646	15653	.....
Discharge rate in amperes	For 8 hours	3/4	1 1/2	3	4 1/2
	For 5 hours	1	2	4 1/4	6 1/2
	For 3 hours	1 1/2	3	6	9
Nominal charging rate in amperes		3/4	1 1/2	3	4 1/2
Dimension of single cells without crates	Length	2 3/16	2 7/16	2 3/4	2 15/16
	Width	4 5/16	6 7/8	6 11/16	9 7/16
	Height	7 15/16	9 3/8	14 1/16	13 3/16
Weight of electrolyte required on cell in pounds		3/4	3	4 3/4	7
Weight of complete cell including electrolyte (unpacked)		5	9 1/2	16 3/4	24 1/2
Weight of complete 11 cell Battery including electrolyte (unpacked)		66	122	180	250
Overall dimension, Single Row, 11 cell battery in inches	Length	26 5/8	29 7/16	.....	.....
	Width	4 15/16	7 1/2	.....	.....
	Height	9 3/16	10 3/4	.....	.....
Overall dimension, Double Row, 11 cell battery in inches	Length	14 7/8	16 1/2	18 1/16	38
	Width	9 3/8	14 1/2	15 3/8	10 9/16
	Height	9 3/16	10 3/4	15 3/8	14 9/16

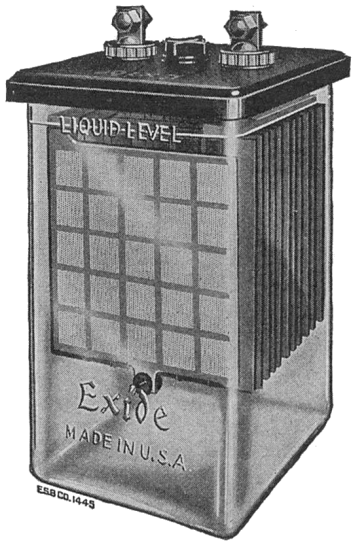
Types PTM and ETM are not furnished in eleven cell units in a single row. PTM is furnished in two rows, while the ETM must be ordered in one five cell unit and one six cell unit to secure eleven cells. These cells are too heavy to assemble in a single tray.

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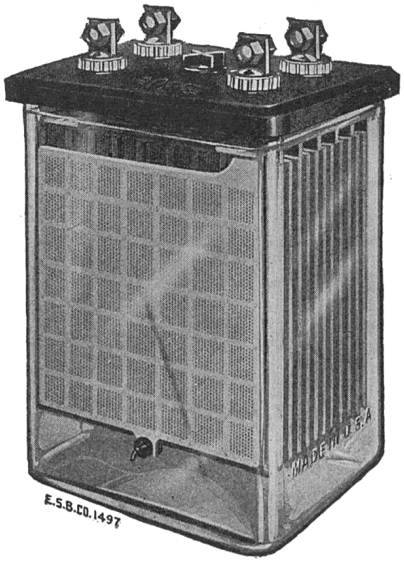
BATTERIES AND SUPPLIES



DMGO Cell



EMGF Cell



FMGF Cell

Chloride Accumulator Storage Batteries

Type DMGO and EMGO are similar in construction and assemblies differing only in size and capacity. The cells are shipped assembled, sealed and charged, including the necessary bolt connectors, but exclusive of intercell connectors, which should be ordered separately. Type D lead tape is used for both types. To place cells in service, unpack and connect the adjacent cells. Detail data as follows:

Type of Cell	Cat. No.	Approx. Weight in Pounds (Unpacked)	Pounds of Electrolyte per Cell	Width in Inches	Length in Inches	Height over Strap Post in Inches	Capacity Ampere Hours 8 Hour Rate	72 Hour Rate
DMGO-3	16870	25	9.2	8 1/16	4 11/16	14 13/16	20	28
DMGO-5	16871	29 1/4	7.5	8 1/16	4 11/16	14 13/16	40	56
DMGO-7	16872	42 3/4	12	8 1/16	7	14 13/16	60	84
DMGO-9	16873	47	11.5	8 1/16	7	14 13/16	80	112
EMGO-5	16874	60 3/4	20.5	10 3/16	7 1/8	16 1/2	80	112
EMGO-7	16875	70	18	10 3/16	7 1/8	16 1/2	120	168
EMGO-9	16876	79 1/4	16.5	10 3/16	7 1/8	16 1/2	160	224

Type EMGF and FMGF are similar in construction, differing only in size and capacity. On account of the size and weight of cells of these types, it is impractical to ship them filled with electrolyte and charged. These types of cells are shipped knocked down, to be assembled, filled and charged at the battery site. The cells are assembled as to groups and include the necessary bolt connectors but do not include the electrolyte and intercell connectors which must be ordered separately, E type lead tape being recommended for intercell connection. Data on the various cells is included in the following tables.

Type of Cell	Cat. No.	Approx. Weight in Pounds (Unpacked)	Pounds of Electrolyte per Cell	Width in Inches	Length in Inches	Height over Strap Post in Inches	Capacity Ampere Hours 8 Hour Rate	72 Hour Rate
EMGF-11	16987	128	41 1/4	10 1/8	12	17 3/8	200	280
EMGF-13	16988	138	39	10 1/8	12	17 3/8	240	336
EMGF-15	16989	148	36 3/4	10 1/8	12	17 3/8	280	392
FMGF-11	17554	219	65	13 1/2	10 15/16	19 5/8	400	560
FMGF-11*	17553	229	69	13 1/2	10 15/16	21 1/8	400	560
FMGF-13	17566	237	61 1/4	13 1/2	10 15/16	19 5/8	480	672
FMGF-13*	17565	247	65	13 1/2	10 15/16	21 1/8	480	672

* Including glass jar 18 1/2" high for telephone service. Standard jar is 17" high.

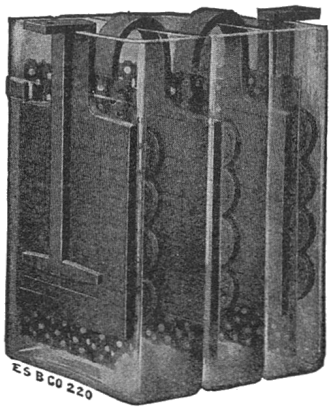
To facilitate handling of type FMGF cells the following tools should be ordered separately:

	No. Required	Cat. No.
Seal Nut Wrench	1	16759
Straight Steel Bolt 6" x 1/4"	2	17677
Rubber Cushion Strip 3/16" x 3 3/4" x 15"	2	17680
Wood Stick 24" x 3" x 5/8"	1	17678
Element Lifting Hook	4	17676
Wood Block 11" x 5" x 1 3/4"	2	17675
Pure Gum Tubing (6 ft.) 1/4" inside diameter	1	17679

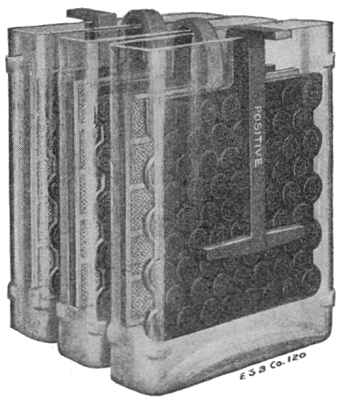
Wood racks for DMGO, EMGO, EMGF and FMGF batteries can be furnished. These racks hold from one to sixty-four cells. Racks for the DMGO and EMGO cells are in two tiers. Racks for the EMGF and FMGF cells can be furnished either in one or two tiers.

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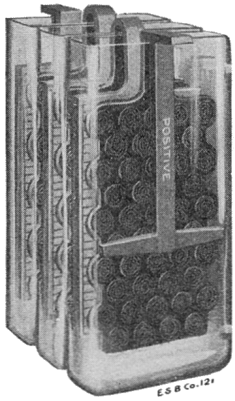
BATTERIES AND SUPPLIES



Type "BT"



Type "ET"



Type "PT"

Chloride Accumulator Storage Batteries

TWO-PLATE OPEN TYPE

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

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

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

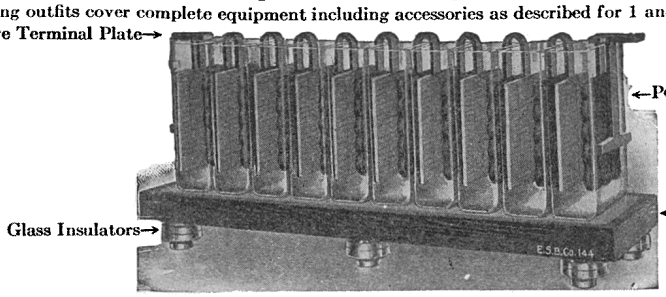
The resistance between cells is practically eliminated—this feature being an item of importance in cells of small capacity.

Individual Cells

		BT	CT	PT	ET
Manufacturers Designation					
Discharge rate in amperes	For 8 hours	¾	1½	3	4½
	For 5 hours	1	2	4¼	6½
	For 3 hours	1½	3	6	9
Normal charging rate in amperes		¾	1½	3	4½
Outside dimensions of glass jars in inches	Length	1¾	2¼	2½	2½
	Width	3¾	6¼	6	8¾
	Height	6¾	8	12	11
Weight of electrolyte required for one cell, lbs.		1	2½	4½	5½
Weight of complete cell, including electrolyte		3½	7½	13½	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.



10 Cells of Type "CT" on Sand Tray

Mfrs. Code No.	BT		CT		PT		ET	
Size of Outfit	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)
	No.	No.	No.	No.	No.	No.	No.	No.
Elements or couples	10	20	10	20	10	20	10	20
Positive terminal plate	1	2	1	2	1	2	1	2
Negative terminal plate	1	2	1	2	1	2	1	2
Glass Jars (1 extra)	12	23	12	23	12	23	12	23
Connectors Type "B"	3	5	..	..	..	..	..	..
Connectors Type "D"	..	..	3	5	3	5	3	5
Hydrometer Type "B"	1	1	1	1	..	..	..	..
Hydrometer Type "E"	..	..	..	..	1	1	1	1
Floating Mercury Thermometer	1	1	1	1	1	1	1	1
Terminal lugs	1	1	1	1	1	1	1	1
Terminal lugs	1	1	1	1	1	1	1	1
Terminal lugs	..	2	..	2	..	2	..	2
*Wood sand tray	1	2	1	2	1	2	1	2
Glass covers	12	23	12	23	12	23	12	23
Glass insulators	6	12	6	12	6	12	6	12
Terminal punching (No. P-65740)	2	4	2	4	2	4	2	4
Electrolyte lbs.	20	40	30	60	60	120	70	140
Instructions, Form No. 421R-6	1	1	1	1	1	1	1	1

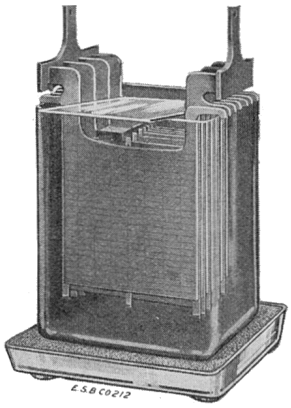
* Where the number of cells in a set does not exceed 6 either glass or wood sand trays can be furnished, but the order should cover the type desired.

Method of Ordering

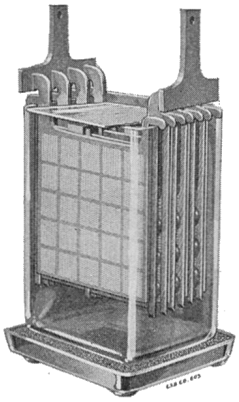
Orders for complete storage battery outfits as listed above should read as follows:
"1 complete (11 or 22) cell type '————' storage battery outfit including accessories."

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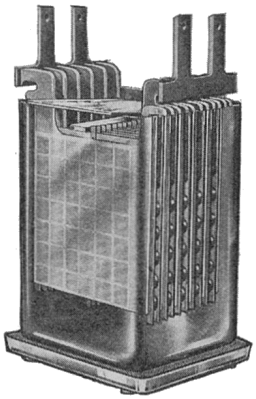
BATTERIES AND SUPPLIES



Type "D" 7



Type "E" 7



Type "F" 11

Chloride Accumulator Storage Batteries

The Types D, E and F comprise cells ranging in capacity from 2½ to 70 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.

OPEN TYPE D
Individual Cells

Mfrs. Code No.	D-3	D-5	D-7	D-9	D-11	D-13
Discharge in amps. For 8 hours	2½	5	7½	10	12½	15
Discharge in amps. For 5 hours	3½	7	10½	14	17½	21
Discharge in amps. For 3 hours	5	10	15	20	25	30
Normal charging rate in amperes	2½	5	7½	10	12½	15
Outside dimensions of glass jar, ins. Length	3⅞	5⅜	6¾	8¼	9½	11
Outside dimensions of glass jar, ins. Width	7⅜	7⅜	7⅜	7⅜	7⅜	7⅜
Outside dimensions of glass jar, ins. Height	10¼	10¼	10¼	10¼	10¼	10¼
Wt., electrolyte in glass jar, lbs.	7¾	11½	14¾	17½	20	24
Wt. of cell complete with electrolyte in glass jar, lbs.	20½	32¼	42¾	53¼	62¼	74¾
Height from bottom of jar to top of strap, ins.	15⅜	15⅜	15⅜	15⅜	15⅜	15⅜

OPEN TYPE E

Mfrs. Code No.	E5	E7	E9	E11	E13	E15
Discharge in amperes For 8 hours	10	15	20	25	30	35
Discharge in amperes For 5 hours	14	21	28	35	42	49
Discharge in amperes For 3 hours	20	30	40	50	60	70
Discharge in amperes For 1 hour	40	60	80	100	120	140
Normal charging rate in amperes	10	15	20	25	30	35
Outside dimensions of glass jar, ins. Length	5⅜	6¾	8¼	9½	11	12¼
Outside dimensions of glass jar, ins. Width	9⅛	9⅛	9⅛	9⅛	9⅛	9⅛
Outside dimensions of glass jar, ins. Height	12¾	12¾	12¾	12¾	12¾	12¾
Height of cell from bottom of glass jar to top of strap, ins.	17⅜	17⅜	17⅜	17⅜	17⅜	17⅜
Wt. of electrolyte in glass jar, lbs.	15¾	20½	25½	30¼	35¼	40
Wt. of cell complete with electrolyte in glass jar, lbs.	58	80	100¼	121½	141¾	162¾

OPEN TYPE F

In ordering elements, or parts thereof, specify "for use with Style A glass jars."

Mfrs. Code No.	F9	F11	F13	F15
Discharge in amperes For 8 hours	40	50	60	70
Discharge in amperes For 5 hours	56	70	84	98
Discharge in amperes For 3 hours	80	100	120	140
Discharge in amperes For 1 hour	160	200	240	280
Normal charging rates in amperes	40	50	60	70
Outside dimensions of Style "A" glass jars, ins. Length	8½	9¾	11	12⅜
Outside dimensions of Style "A" glass jars, ins. Width	12⅜	12⅜	12⅜	12⅜
Outside dimensions of Style "A" glass jars, ins. 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 D, E or F telephone battery, and includes the following:

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

Note 1. If battery is to be in more than one row specify the number of rows in the order.

Note 2. 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

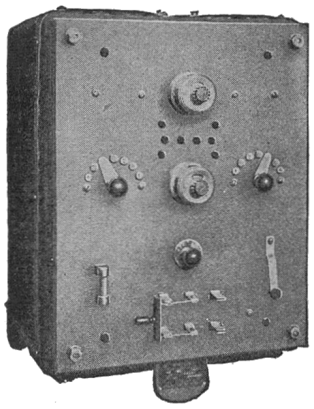
Orders for complete storage battery outfits of the above described types should read as follows:

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.

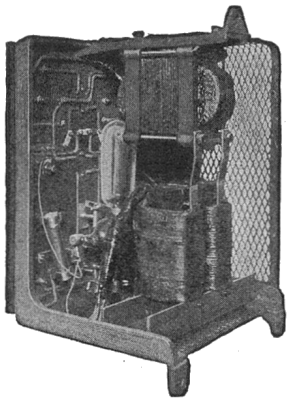
For sizes above 10 amperes on miscellaneous orders it is necessary to specify the size of wire for which the terminals are to be drilled and the number of wires for which terminals are to be provided.

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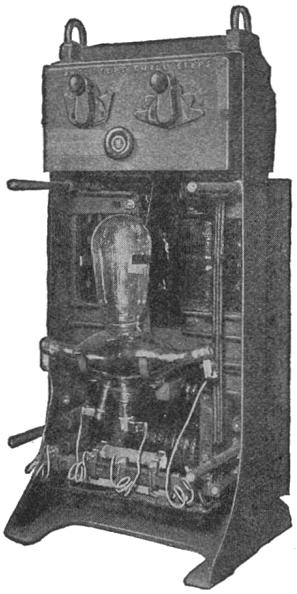
BATTERY CHARGING UNITS



10 Ampere Outfit



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



Front View of 30 Ampere Outfit—Cover Removed

Mercury Arc Rectifiers

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

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

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

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

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

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

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

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

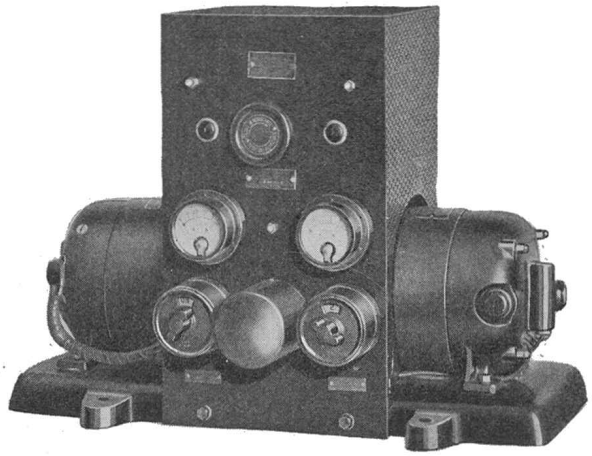
Rectifiers for 60 Cycle Circuits (Single Phase) **Overall Dimensions and Weights (Approx.)**

List No.	No. of Cells	Direct current Output		A.C. Volts Input	Breadth Ins.	Height Ins.	Depth Ins.	Approx. Wt. in Lbs.	
		Amperes	Volts					Net	Boxed
220241	8 and 11	10	16 to 30	110 or 220	16 1/4	24 3/8	16 5/16	149	240
220246	17 and 11	30	20 to 45	110 or 220	18 3/4	44 7/16	20 3/4	425	535
300305	11 and 17	50	20 to 45	110 or 220	21	56 5/16	20 3/4	870	1000

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

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BATTERY CHARGING UNITS



Battery Charging Unit

Telephone Battery Charging Units

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.

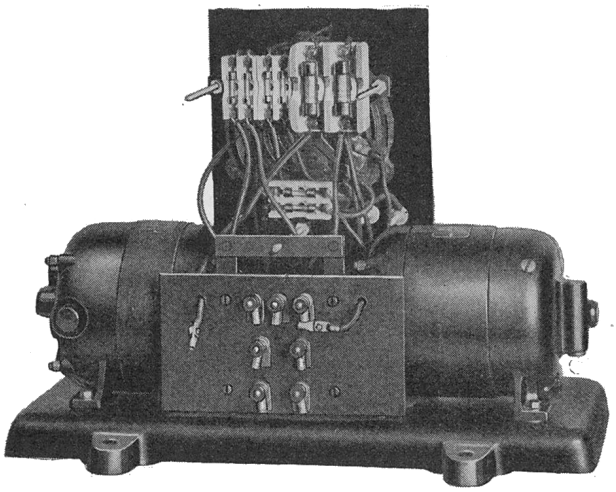
The units listed in the following table show two types, one type being equipped with a motor for operation on D.C., and the other type being equipped with a motor for operation on A.C. Either type is available for either 110 or 220 volts. The alternating current machines are for 60 cycles, single-phase 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.

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BATTERY CHARGING UNITS



Battery Charging Unit
(Rear View with Cover Removed)

Telephone Battery Charging Units—(Continued)

SIZE AND CAPACITY DATA

Storage Battery To Be Charged		Charging Unit Required					Fuses	
			A.C. 60 Cycle		D.C.		Ampere Capacity Required	
Type	8 Hour Discharge Rate Amperes	Output of Charging Unit Amperes	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 Length, Ins.	Width, Ins.	Height, Ins.	Approximate Shpg. Wt., Lbs.
1531A	2531A	3531A	4531A	22	$11\frac{7}{8}$	$15\frac{13}{16}$	175
1532A	2532A	3532A	4532A	22	$11\frac{7}{8}$	$15\frac{13}{16}$	175
1533A	2533A	3533A	4533A	22	$11\frac{7}{8}$	$15\frac{13}{16}$	175
1563A	2563A	3563A	4563A	22	$11\frac{7}{8}$	$15\frac{13}{16}$	175
1565A	2565A	3565A	4565A	22	$11\frac{7}{8}$	$15\frac{13}{16}$	175
1000A	2000A	3000A	4000A	$28\frac{3}{4}$	$14\frac{1}{2}$	$16\frac{1}{16}$	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.

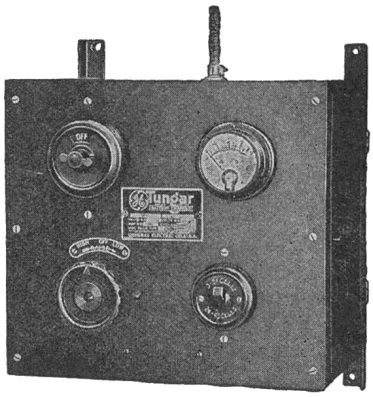
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TUNGAR BATTERY CHARGERS

The Tungars of 30 volts or higher are suitable for charging telephone batteries. Two different types of Tungars have been designed for this line of work. The first is a "noiseless" outfit. This is designed so that the batteries may be charged while connected directly to the telephone circuit without causing an objectionable noise in the receivers. The other type cannot be used in this manner but is very well suited for use with a duplicate battery system where one battery can be charged while the other is operating on the line.

The advantage of the "noiseless" Tungar is that only one set of batteries is required.

We are listing only the 60 cycle 105–125 volt chargers. The Tungar chargers can be secured in various sizes in other frequencies and voltages. For these types consult the nearest Graybar house for data and prices.



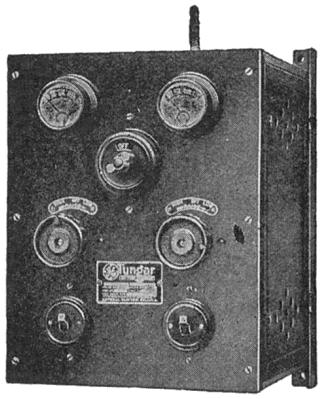
No. 9 x 643

GENERAL

The Tungar Battery Charger consists essentially of one or more Tungar Rectifier Bulbs, a transformer for supplying the filament and plate current and some means for regulating the output such as resistance or reactance.

The Tungar Bulb in its usual form contains a tungsten filament which serves as the cathode and a graphite plate or anode. In principle, it is a simple, one-way valve and therefore rectifies only one-half of the alternating current wave.

Full wave rectification is secured by means of two half-wave bulbs connected to a transformer with a split secondary.



No. 9 x 647

FULL WAVE TUNGARS (Noiseless Type) For Systems Using Single Battery

These outfits are designed to charge batteries while operating on the telephone circuit. They are all full wave Tungars and include a direct-current reactance which smooths out the charging wave sufficiently to prevent an objectional noise in the receivers.

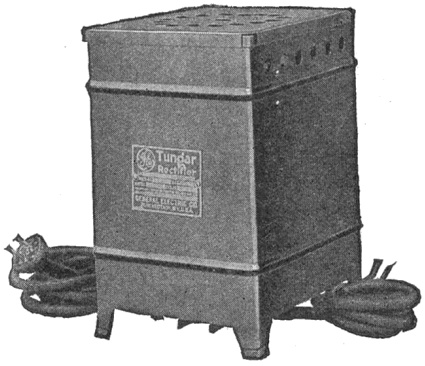
Catalog No.	D.C. Volts	D.C. Amps.	Cycles	Volts	No. of Cells Rectifier Will Charge	Renewal Bulb
244708	30	.3–.5	60	105–125	11–12	199698
3049455	19–52	1–3	60	105–125	9–24	277465
9X647	6–90	12	60	105–125	9–24	189049

COMMENTS

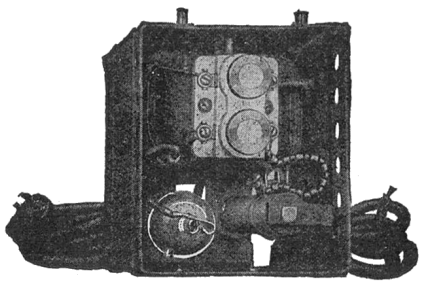
No. 244708 is the smallest outfit. It is intended for continuous trickle charging on small P.B.X.'s. An adjustable resistance in the secondary circuit permits adjusting the charging rate from .3 to .5 amperes.

No. 3049455 can be used wherever a full wave, filtered output up to 3 amperes is required. Terminal board is located inside left-hand door and contains six sets of secondary taps and permits adjustment for operation on 9 to 24 cells of battery. An ammeter provides means to indicate charging rate.

No. 9X647 is used largely by Battery Service Stations. It differs from the other two chargers of this type in that the reactance No. 3049480 is external and must be ordered separately. The output is controlled by means of two dial switches connected to 15 secondary taps. This Tungar has a nominal rating 6 to 90 volts but it is not recommended for more than 65 volts D.C. when used with the filter reactance as the output is cut down by the high inductance of the filter.



No. 204170
Outside View



No. 204170
Inside View

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HALF WAVE TUNGARS For Systems Using Duplicate Batteries and Miscellaneous Applications

In many exchanges, it is customary to have duplicate sets of storage batteries of 11 to 12 cells each. One battery is connected to the telephone circuit while the other is being charged. For this type of work the half wave charger should be selected on account of its low cost and simplicity of construction.

Catalog No.	D.C. Volts	D.C. Amps.	Cycles	Volts	Renewal Bulb	Number of Cells
3049257	120–175	.4– .8	60	115	12X825	50–66
204170	24– 30	1.25–2.5	60	115	195528	9–12
199717	40/50/60	1.25–2.5	60	115	189049	16–24
9X643	6–90	6	60	115	189049	8–24

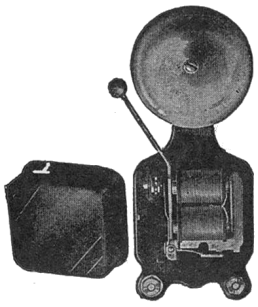
No. 3049257 is the smallest high voltage Tungar. It is used chiefly for trickle charging. No provision is made for manual control of the outfit but it is so designed that it has a high degree of inherent regulation. With battery voltage of 120 it will deliver a charging rate of .8 amperes tapering to .6 at 150 volts and .4 amperes at 175 volts.

No. 204170 has two secondary taps on the transformer permitting maximum output of 2.5 amperes at either 24 or 30 volts. An adjustable resistance of approximately 6 ohms in the set permits adjusting the charging rate from 2.5 amperes maximum down to a minimum of about .5 amperes.

No. 199717 is similar to No. 204170 but has a wider range of D.C. voltage. Three taps on the transformer secondary permit adjustment of the output of 2.5 amperes at 40, 50 or 60 volts.

No. 9X643 is similar to the 9X647 but for use on half wave and is not adaptable to filtered circuits. Both primary and secondary circuits are controlled simultaneously by a single snap switch.

BELLS FOR DIRECT CURRENT



No. 10 Type D.C. Bell

The No. 10 Type is shown in the illustration. The gong is 3 inches in diameter and the overall dimensions approximately 3½ x 6⅝ x 1 7/16 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 voltages considerably greater and less than those given as "rated voltage." All No. 10 Type Bells have platinum contacts.

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

Note. For alternating current bells see listing of Ringers and Extension Bells.

CYLINDER BELLOWS



Cylinder Bellows

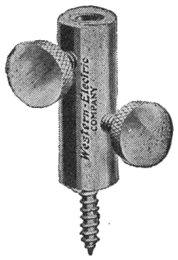
Designed for cleaning motors, generators, telephone switchboards, looms, and other machinery that cannot be reached with a cloth or brush. Constructed of composition fibre with wood mounting and will not short circuit electrical apparatus.

Made in four sizes.

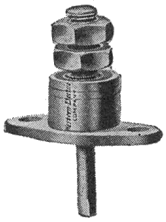
No. 1	20 inches	‖	No. 3	24¾ inches
No. 2	22⅜ inches		No. 4	25⅛ inches

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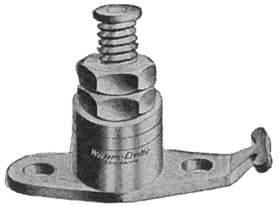
BINDING POSTS



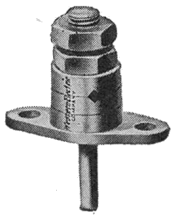
No. 1A



No. 2A



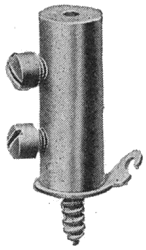
No. 2E



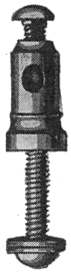
No. 3A



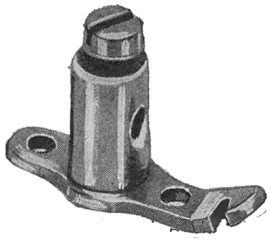
No. 37A



No. 1B



No. 16A



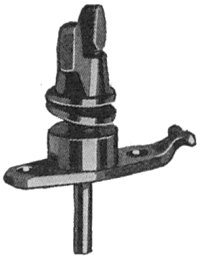
No. 20A



No. 29A



No. 30A

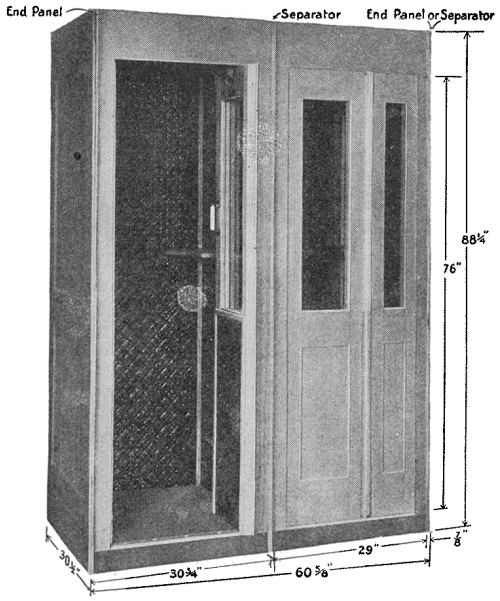


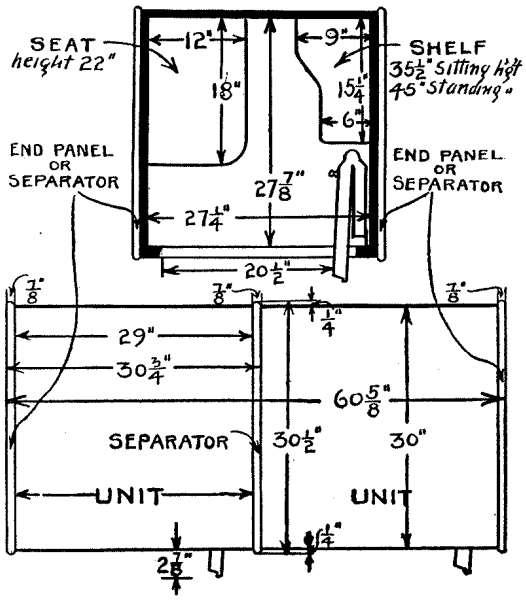
No. 44A

Code No.	Finish	Description
1A	Brass lacquered	Arranged for tubular tips. Thumbscrew connection. No soldering terminals.
1B	Tin dipped	Arranged for tubular tips. Screw connection. One front soldering terminal.
2A	Nickel	Lock nut connection. One back soldering terminal.
2C	Nickel	Similar to the No. 2A but with wing nut instead of lock nut.
2E	Brass lacquered	Lock nut connection. One front soldering terminal.
3A	Nickel	Arranged for tubular tips. Lock nut connection. One back soldering terminal.
16A	Nickel	Arranged for tubular tips. Screw connection. No soldering terminals.
20A	Nickel	Arranged for tubular tips. Screw connection. One front soldering terminal.
29A	Tinned	Used in Nos. 8 and 14 Type Cable Terminals when original binding post is broken off above the lower nut. For 10–32 thread only.
29B	Tinned	Used in Nos. 8 and 13 Type Cable Terminals and the Nos. 6 and 10 Type Connecting Blocks when the original binding post is broken off above the lower nut. For 8-32 thread only.
30A	Tinned	Screw connection. One front soldering terminal.
33D	Black	Insulated post. One back soldering terminal.
37A	Brass lacquered	Screw connection. One front soldering terminal.
44A	Nickel	Wing nut connection. One front soldering terminal.

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BOOTHS—TELEPHONE





No. 1 Folding Door Telephone Booth

No. 1 Type Folding Door Telephone Booths

The Type No. 1 Folding Door Booths are designed for either unit or group installation.

Each booth is a complete unit in itself and the construction is self-contained, assuring rigidity and perfect operation.

Finished Quartered Oak or Mahogany End Panels can be placed at the exposed ends of either the unit or the group installation. Hardwood Separators, having a rounded edge and projecting for a quarter of an inch beyond the face of the booth, are placed between units to present a pleasing and finished appearance. Should the side of the booth be located next to a wall, a Separator can be used instead of an End Panel. Finished Hardwood Backs are substituted for Softwood Backs where the rear of the booth is exposed to view—see code listing. An upper panel of glass may be inserted in the Hardwood Back if desired. Special woods or finishes can be furnished upon request.

The folding door extends only three inches beyond the face of the booth in its complete operation, making this type of booth especially desirable where space is limited. There are no locks or catches—the door opens and closes by a slight pull. The folding door is normally open between calls, giving the maximum of ventilation; a complete change of air between calls is assured, for the user must leave the door in an opened position in order to exit.

EQUIPMENT

Interior. Sides, Back, Ceiling and Lower Part of Door lined with sheet metal.

Floor. Linoleum covered.

Threshold. Protected with safety tread.

Door. Always hinged on right-hand side (facing booth).

Shelf. Furnished with each booth. Intended only as an elbow rest. Sitting height 35½ inches, standing height 45 inches.

Wiring. Space between ceiling and roof (29 inches wide, 27⅞ inches deep, and 4¼ inches high) is provided as a wiring chamber, and as a housing for electric light relay or door switch equipment.

Code No.	Material	Finish	Back	Code No.	Material	Finish	Back
1A	Mahogany	Light	Hardwood	1D	Quartered oak	Medium	Softwood
1B	Mahogany	Light	Softwood	1E	Mahogany	Dark	Hardwood
1C	Quartered oak	Medium	Hardwood	1F	Mahogany	Dark	Softwood

Wiring slot is provided full length of right-hand side.

Electric Light. Ceiling of booth is bored for electric light fixture (hole is equipped with removable plug).

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

Seat. Made of Quartered Oak or Mahogany. Furnished only when specified. Height 22 inches.

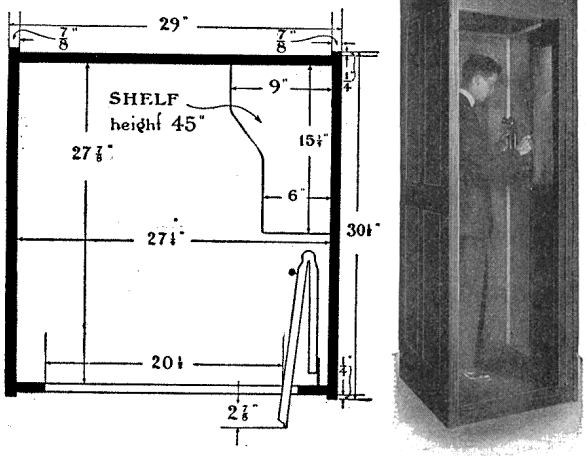
Lock. Designed especially for Folding Door Booths. Furnished only when specified.

Orders for No. 1 Booths must state how many End Panels and Separators are required. Give Code No. of Booth.

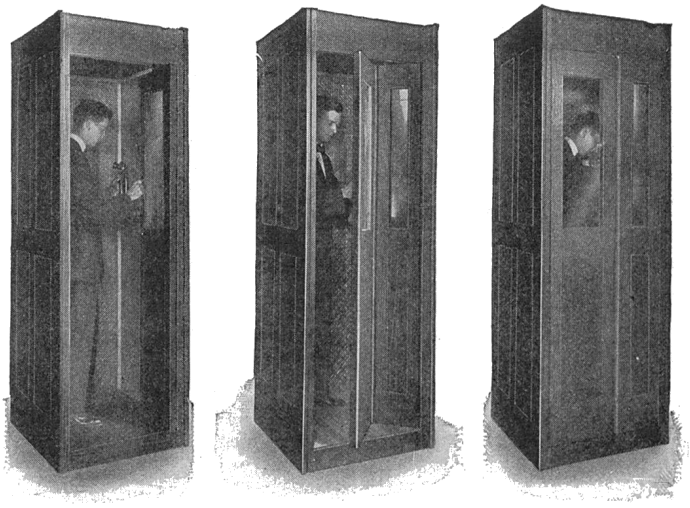
Seats, Locks and Electric Switch Equipment optional.

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BOOTHS—TELEPHONE



Overall Height, 88¼ inches



Folding Door Telephone Booths

No. 2 Type Folding Door Telephone Booths

The No. 2 Folding Door Booth is similar in design to the No. 1 Type except that it is built as a single unit. It presents a neat and pleasing appearance from all points of view.

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

1. Economy of Space. The movement of the Folding Door takes but three (3) inches of space beyond the front of the booth, making it possible to use this type of booth in narrow passageways.

2. Ventilation. The design of the Folding Door is such that the door is open at all times when the booth is not in use. This is the only practical plan for booth ventilation.

3. Protection from Injury. The point where the two leaves of the Folding Door meet is of such design as to prevent any chance of injuring the fingers or hand.

4. Maintenance. The Folding Door does not require the use of tracks in the floor, consequently eliminating the main cause of trouble formerly experienced with the booths equipped with sliding doors.

5. Non-Interference with Doors of Adjacent Booths. The Folding Door folds within the booth; consequently, there is no interference with adjacent doors when two or more booths are in compartment formation.

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

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

EQUIPMENT

Interior. Sides, back and ceiling lined with sheet metal.

Floor. Hardwood flooring.

Threshold. Protected with safety tread. **Door.** Always hinged on right-hand side (facing booth).

Shelf. Furnished with each booth. Shelf is intended only as an elbow rest.

Wiring. Space between ceiling and roof (27¼ inches wide, 27⅞ inches deep, 4¼ 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.

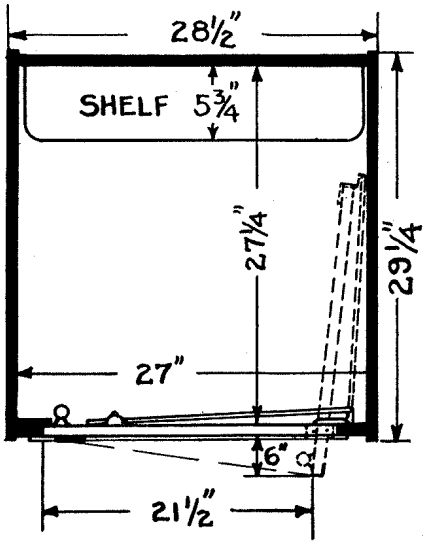
Electric Light. Ceiling of booth is bored for electric light fixture. (Hole is equipped with a removable wooden plug).

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 removable wooden plug).

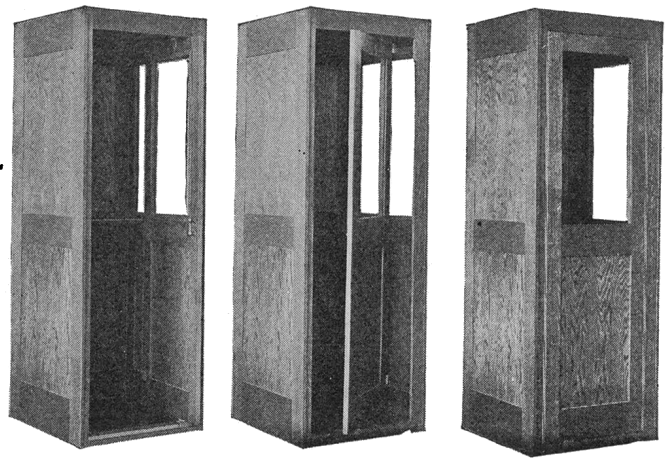
Seat. Made of oak or birch. **Lock.** Designed especially for Folding Door Booths. Furnished only when specified.

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BOOTHS—TELEPHONE



Overall Height 83½ Ins.



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

No. 3 Type Receding Door Telephone Booth

The 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.

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

Outside Dimensions (Booth assembled). 83½ inches high, 28½ inches wide and 29¼ inches deep.
Inside Dimensions. 80½ inches high, 27 inches wide and 27¼ inches deep.
Door Opening. 77½ inches high, 23 inches wide.
Door Equipment. The door is equipped with patented steel, nickel-plated hardware consisting of
1 swivel roller guide and track on top of door, and
1 sliding guide on bottom of door which operates on outside edge of tread.
2 roller hinges on back edge of door which operate on tracks fastened to side of cabinet.
1 handle for inside of door.
1 lead alundum 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.

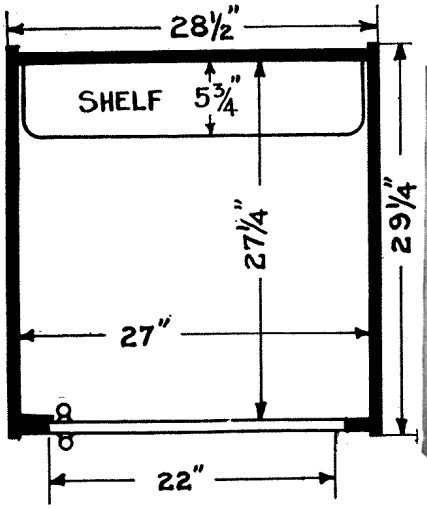
Shipping. The booths are shipped "knocked down" in a substantial crate, ready for assembly, upon receipt at destination.

Orders for this type of booth should specify the following code and descriptive information.

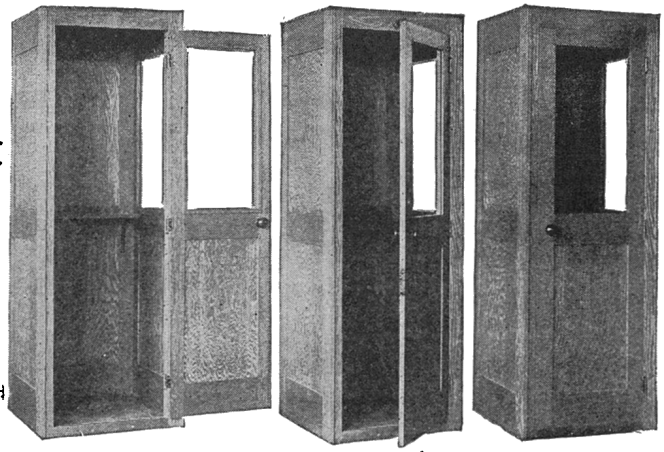
Code No.	Material	Finish	Description
3A	Plain oak	Medium oak	1 glass panel in door, and 1 glass in right side.
3B	Birch	Dark mahogany	1 glass panel in door, and 1 glass in right side.
3C	Birch	Light mahogany	1 glass panel in door, and 1 glass in right side.
3D	Plain oak	Medium oak	1 glass in door, 1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

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BOOTHS—TELEPHONE



Overall Height 83½ in.



No. 4 Booth—Open | No. 4 Booth—Semi-Closed | No. 4 Booth—Closed

No. 4A Type Telephone Booth

No. 4 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 5¾ inches wide is also supplied which affords means for mounting a desk telephone.

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

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

Door Opening. 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 alundum door tread is supplied on this booth.

Finish. The booth is thoroughly finished inside and out.

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.

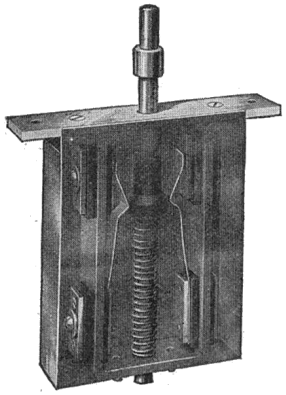
Shipping. The booth is shipped "knocked down" in a substantial crate, ready for assembly upon receipt at destination. A card giving full instructions for the assembly of the booth is packed with each unit.

Orders for this type of booth should specify the following Code and Descriptive information.

Code No.	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.

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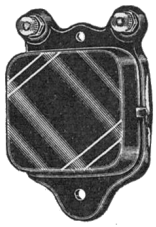
BOOTH SWITCHES



No. 1A Booth Switch

Code No.	
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.

BUZZERS FOR DIRECT CURRENT

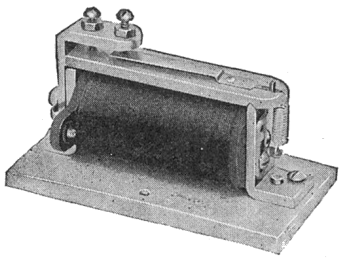


No. 10 Type D.C. Buzzer

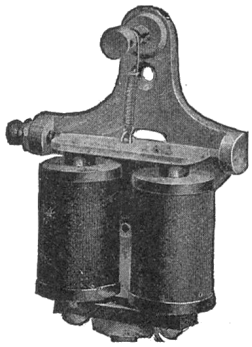
The No. 10 Type Buzzers are similar to the No. 10 Bells, but are not provided with gongs; all exposed surfaces are black with the exception of the binding posts which are finished in nickel. The approximate overall dimensions are 3⅛, 2 7/16 and 1 1/16 inches. These buzzers will operate without readjustment on voltages considerably above or below those given as "rated voltage." They have platinum contacts.

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

BUZZERS FOR ALTERNATING CURRENT



No. 4C—With Cover Removed



No. 2D

Code No.	Resistance Ohms	Type	Dimensions Inches	Principal Use
1B	2500	Polarized	3½ x 2⅞ x 1½	Telephone and Switchboard.
2A	100	Not polarized	2 29/32 x 2¼ x 2 7/32	No. 1006 Type Test Sets.
2C	1000	Not polarized	2 29/32 x 2¼ x 2 7/32	Test Sets.
2D	100	Not polarized	2 29/32 x 2¼ x 2 7/32	No. 1017 Type Test Sets.
4B	1200	Not polarized	3 11/16 x 1 15/16 x 2¼	P.B.X. Switchboards. Operates on A.C. ringing current only.
4C	1200	Not polarized	3 25/32 x 2¼ x 2 5/16	P.B.X. Switchboards. Operates on A.C. ringing current, also on 24 volts D.C. Has a dustproof cover.

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LEAD COVERED CABLE

A Development of Bell Telephone Laboratories, Incorporated, the Research Laboratories of the American Telephone and Telegraph Company and the Western Electric Company

With the present multiplicity of telephone lines and the limitations of space wherein to run them, their enclosure in pipe-like covering is a logical method.

A number of advantages follow automatically. Some maintenance costs inherent in open wire construction disappear, others go down, while the protection afforded the wires tends to make the availability of the wires for service practically continuous.

Furthermore, as ease of handling is essential to secure economy of labor, the need of flexibility in the sheathing is apparent. Lead meets these requirements and is, therefore, used sometimes alone and sometimes in an alloy.

These conditions led to the development of Lead Covered Cable, and as its advantages were recognized, it took its place in telephone plants as a necessity.

WESTERN ELECTRIC LEAD COVERED CABLE

This cable in its present form, whether for aerial use, in ducts underground, or for inside use, in its simplest and most usual form, requires for its manufacture three principal raw materials—copper for the wire or conductors; paper for their insulation and pure lead or an alloy of lead and antimony for the sheath.

CABLE ENGINEERING ESSENTIAL

Early in its manufacturing experience with Lead Covered Cable the Western Electric Company realized that such cables must be engineered, not simply built. Engineering is essential to make lead covered cable:

that will transmit currents with minimum dielectric losses;
that will prevent current in one line from interfering with the current on another.

Engineering must select the requirements for good cable and work out the methods for determining if the materials and means of manufacture measure up to the requirements. The skill of the cable-makers directly affects the quality of the cable, and that skill must be of the highest order. The cable will not meet service conditions nor last a reasonable length of time:

—if the raw material is not the most suitable;

—if the insulation of the conductor is not uniform or if the insulated conductors are not properly twisted into pairs to eliminate any audible cross talk that would interfere with the clear transmission of messages;

—if the laying of the paired conductors is not of the evenness necessary to assure flexibility and therefore economy of time and labor when handling the cable;

—if the ovens for drying out the cable are not suitable;

—if the methods for handling the cores from oven to sheathing machines do not prevent moisture entering the cable en route;

—if the design of the cable is not such as to insure ease of handling without tendency to buckle on account of too great softness.

ADVANTAGES

As a means to practically uninterrupted communication, Lead Covered Cables offer a number of conspicuous advantages, making for better service, better public relations and money economies.

Western Electric Lead Covered Cable possesses several advantages of material benefit to its users. These advantages are:

1. They make use of the most suitable designs and materials to secure and maintain the highest class of telephone transmission, as determined by many years of research work conducted by Bell Telephone Laboratories, and by constant tests in the field, in close cooperation with the largest users of telephone cable in the world.

2. The reliability of the Western Electric product is proven by the fact that more than half the telephone cable in use throughout the world is of Western Electric manufacture.

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LEAD COVERED CABLE

3. Cables are manufactured by the Western Electric as an essential part of the telephone plant which must not only give the most efficient performance possible, but must maintain this efficiency through the greatest possible number of years. To accomplish this object, every part of telephone cable is designed not only to give the electrical qualities required, but to insure a maximum of mechanical ruggedness and protection against damage. As an example of this, a given mutual capacitance can be obtained in either a soft core or a hard core cable, the hard core cable being somewhat larger in diameter and containing a larger amount of insulating paper. The former, however, is bound to be soft or "mushy" to such an extent that it has a decided tendency to buckle when bent, and it is therefore more difficult to install than the harder core cable. Western Electric cables are designed to have satisfactory mechanical characteristics.

SOME ECONOMIES OF LEAD COVERED CABLE

Cable minimizes interruptions due to storms. Even with improved methods of pole line construction and high-grade line materials, a heavy sleet storm accompanied by a severe gale is more apt to cause trouble with open wire lines than with cable. Such storms are apt to be expensive, and at times some damage is inevitable; but even at the worst, the expense for repairs will generally be less with cable. There are no tangled masses of wires to be cleared, less labor is required during reconstruction, and less material is needed for replacement of damages. Moreover, broken poles frequently do not mean a broken cable or lines in trouble.

There are other expenses than for material, expenses not so easily figured.

First of all, "lines down" means interrupted service, and interrupted service cuts off revenue.

Secondly, "lines down" means dissatisfied customers. Aside from the fact that dissatisfied customers are a liability, the telephone industry has grown and prospered because it has realized that the interests of the public must be and are the interests of the telephone industry. Wherever enough lines are concentrated to make cable economically practicable, its use should be considered.

Finally, the use of cable reduces the ordinary expense of maintenance. Overhead wires in large groups are unwieldy from a maintenance point of view. When the lines are enclosed and protected by lead covered cable, whether aerial or underground, "opens," "crosses," and "tree-grounds" are minimized.

Thus from the standpoint of economy and utility, lead covered cable is advantageous, where transmission conditions will permit its use. A variety of Western Electric Lead Covered Cables are available to meet the requirements imposed by the many ways in which it is used.

PRELIMINARIES

Before laying lead covered cable, it is only a safe and sensible precaution, unless the cable is in short lengths, to survey the proposed route of the cable to search for currents which might cause electrolysis. After a cable is laid, too, similar surveys should be made annually to locate any currents that changes in the character of the locality might have introduced. Railroad electrifications, trolley lines and rearrangements of power lines, can, any or all, be destructive agencies, if not noted and guarded against.

TYPES OF CABLE

Lead covered paper insulated cables, except for some special types mentioned later, may be divided into two general classes according to the method of installation:

1. Cables for aerial use or for underground use in ducts.

2. Submarine cables.

1. Aerial Cables and Underground Cables in Ducts

Under the usual conditions of installation of telephone cables the same type of cable may be used for aerial construction or in ducts underground. Until recently plant practices have called for somewhat higher dielectric strength for cables for aerial use. Actual experience, however, has shown that this special requirement is not warranted, and the same cable is now being furnished for either use, resulting in economies not only in cost of the cable but in smaller stocks required.

2. Submarine Cables

Paper insulated submarine telephone cable is made in several general classes to meet the varying conditions encountered. A statement of conditions to be met will bring to you information on the most suitable cable for the conditions.

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WESTERN ELECTRIC CODED PAPER INSULATED CABLES

Terminating Cables

The Western Electric Company has standardized several types of double silk and single cotton insulated cables for the terminating of paper insulated cables in the telephone exchange.

Type "FA" is the more generally used. It contains from 6 to 606 pairs, and with the exception of one tracer pair, all pairs have the same color insulation.

Type "GA" cables are made in sizes from 6 to 51 pairs, and each pair is distinguishable from every other by the color of its insulation. The type "GA" cables are used only where the color code is an advantage.

The type "UA" cables are similar to the type "GA" except the core is impregnated. The "UA" type cables are used where there would be objections to the usual method of waxing, during installation, of the exposed insulated conductors.

Types "MFA," "MGA" and "MUA" cables are similar to types "FA," "GA" and "UA" respectively except that the conductors are black enameled. These three types are for use where the humidity may be quite high for rather long periods as, for example, near the sea coast.

All six types have pure lead sheaths, as it has been found that this sheath is satisfactory for use within buildings.

Cables with wool insulated conductors have been used for terminating, but it has been found that double silk and single cotton insulation is satisfactory for this purpose, and is less expensive.

Special Cables

Special conditions often require cables with different characteristics from those which have been standardized and coded. If conditions necessitate special cable, our nearest distributor will gladly give full details and price information. Certain special types are briefly outlined below.

Composite Cables

Composite cable (composed of conductors of two or more gauges) can be furnished. The combinations of pairs utilizing the space within the lead sheath most economically, are somewhat limited, and our cable engineers will make recommendations along this line upon receipt of detailed information on the conditions to be met.

High Dielectric Strength Cables

Paper insulated telephone cables may also carry telegraph, supervisory or signal circuits. For this service, the Western Electric Company can furnish cables designed to withstand test potentials up to 1200 volts A.C. between conductors and from the conductors to the sheath. For cables paralleling high voltage lines, cables designed to withstand test potentials up to 3500 volts A.C. from the conductors to the sheath can be furnished. The higher dielectric strength gives additional insurance against interruptions of service and loss of circuits due to induced potentials from foreign sources. A specification describing in detail this type of cable will be furnished on request.

Reels

Western Electric cables are shipped on substantial wooden reels designed to withstand reasonable handling during the transportation and installation of the cables. The ends of the cables are fastened securely to the reels, an unarmored cable is protected by lags nailed around the periphery of the reel. The reels are made in a number of sizes, providing economical shipping packages for various sizes and lengths of cables. Unless the cable is very short it will be shipped on a reel 2′ 8″ wide over all. The diameter of the reel will be between about 4′ and 7′, depending upon the size and length of the cable.

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WESTERN ELECTRIC LEAD COVERED CABLE MAKING

The first step in making the cable is insulating the copper wires with paper. Machines wrap the various colored papers used to identify the groups of pairs in the cable, around the conductors in the form of a helix with the edges overlapping.

Then the wires are twisted into pairs to hold them together and for the telephonic reason that proper twisting practically eliminates the possibility of cross talk.

Next, the conductors are cabled in layers with a helical lay. This core is again wrapped with two or more wrappings of heavy paper as additional insulation from the sheath, and reeled to be dried. Before drying a test is made for "opens" and "crosses."

The core is now complete and tested. It is then dried in vacuum ovens, to expel all moisture from the core and passes through a lead press where the lead sheath is extruded around it. At this point, final testing takes place to search out "opens," "crosses," to determine electro-static capacity and conductivity standard, and to assure compliance with the specified breakdown fixed for that cable or type of cable.

And the cable is ready for the job.

Conductors

Conductors are of annealed copper of a high degree of purity. In size and number the pairs vary according to the purposes for which the cable is to be used. In the cables containing light gauge conductors extra pairs are provided. All of the extra pairs are rarely required to replace defective pairs. Therefore, some extras are available for additional circuits beyond the guaranteed number.

Around each conductor is wrapped a special quality of paper tape of suitable thickness to provide the insulation required by the purposes of the cable. This paper is manufactured especially for this purpose. It was selected after careful search for a paper having great toughness and a sufficiently high insulation resistance or dielectric strength to meet telephone cable manufacturing requirements.

Sheath

The sheath of Western Electric Telephone Cable for aerial and underground use is an alloy consisting of lead and antimony. Antimony was selected for the alloy as the result of many years' experience with cable sheath of different materials, while searching for a way to reduce the cost of lead covered cable without lowering its resistance to conditions of service. This alloy has been found to be considerably superior to pure lead sheath both for aerial use and for laying in underground conduits. Tests have also proven it to be equal for both purposes to the lead-tin alloy formerly used. If sheath composed of lead-tin alloy instead of lead-antimony is required it can be supplied.

NOTE

The transmission equivalents of cables have generally been expressed in terms of an equivalent length of standard cable by dividing attenuation constant of the cable under consideration by the attenuation constant of standard cable at 800 cycles. In this catalog the measure of the attenuation is expressed in Transmission Units per mile of cable at 1,000 cycles. The Transmission Unit is a unit recently adopted by the Bell System, and is nearly the same as the mile of standard cable. For further discussion of the Transmission Unit reference should be made to a paper entitled "The Transmission Unit and Telephone Transmission Reference Systems" by W. H. Martin, printed in the 1924 Transactions of the A. I. E. E., volume 43, page 797.

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Lead Covered Cable—Telephone Type "FA" Cable

Replaces Type "F"

For Inside Construction

Sheath. Pure Lead.

Conductors. No. 22 A.W.G., tinned, double silk and single cotton insulation. Covering on each pair colored white and red-white.

Tracer Pair. One in outer layer colored blue and white.

Insulation Resistance. Not less than 500 megohm-miles.

Conductor Resistance. Not exceeding 96 ohms per mile of cable, at 68° Fahr.

Dielectric Strength. Insulation of each conductor capable of withstanding an A.C. test potential whose maximum instantaneous value is 700 volts.

Code No. and Number of Pairs	Number of Pairs Guaranteed	Thickness of Sheath (Inches)	Mean Outside Diameter (Inches)	Approximate Weight per Foot (Pounds)	Convenient Number of Feet on Reels
FA- 6	6	.047	.34	.25	3500
FA- 11	11	.047	.41	.32	3500
FA- 16	16	.047	.47	.39	3500
FA- 26	26	.047	.56	.51	3500
FA- 51	51	.047	.73	.75	3000
FA- 76	76	.063	.89	1.19	2500
FA-101	101	.063	1.00	1.42	2500
FA-152	151	.063	1.19	1.86	1600
FA-202	201	.063	1.34	2.26	1600
FA-303	302	.094	1.69	3.85	1400
FA-404	403	.125	1.97	5.62	1100
FA-606	605	.125	2.38	7.45	700

Lead Covered Cable—Telephone Type "GA" Cable

Replaces Type "G"

For Inside Construction

Sheath. Pure Lead.

Conductors. No. 22 A.W.G., tinned, 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.

Conductor Resistance. Not exceeding 96 ohms per mile of cable at 62° Fahr.

Insulation Resistance. Not less than 500 megohm-miles.

Dielectric Strength. Insulation of each conductor capable of withstanding an A.C. test potential whose maximum instantaneous value is 700 volts. All pairs guaranteed good.

Code No. and Guaranteed Number of Pairs	Thickness of Sheath (Inches)	Mean Outside Diameter (Inches)	Approximate Weight per Foot (Pounds)	Convenient Number of Feet on Reels
GA- 6	.047	.34	.25	3500
GA-11	.047	.41	.32	3500
GA-16	.047	.47	.39	3500
GA-21	.047	.52	.45	3500
GA-26	.047	.56	.51	3500
GA-31	.047	.59	.56	3500
GA-41	.047	.67	.67	3000
GA-51	.047	.73	.75	3000

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Lead Covered Cable—Telephone

Type "TH" Cable

For Aerial or Underground Use

Principal Use. Toll entrance and long trunks.

Sheath. Lead-antimony.

Conductors. No. 16 A.W.G. single dry paper tape insulation. Blue-orange pairs alternating with green-orange pairs, except for two orange-white tracer pairs, one in the center and one in the outside layer, and a red-orange pair in each layer containing an odd number of pairs.

Mutual Capacitance. (A.C. Testing) .071 microfarad per mile of cable.

Conductor Resistance. Not exceeding 23 ohms per mile of cable, at 68° Fahr.

Insulation Resistance. Not less than 500 megohm-miles.

Dielectric Strength. Insulation of each conductor capable of withstanding a test potential of 500 volts D.C.

Attenuation. 0.80 Transmission Units per mile at 1000 cycles. All pairs guaranteed good.

Code No. and Guaranteed Number of Pairs	Thickness of Sheath (Inches)	Mean Outside Diameter (Inches)	Approximate Weight per Foot (Pounds)	Convenient Number of Feet on Reels
TH- 11	.125	.94	1.77	2000
TH- 16	.125	1.06	2.11	1500
TH- 26	.125	1.25	2.66	1500
TH- 51	.125	1.59	3.78	1200
TH-101	.125	2.16	5.80	800
TH-152	.125	2.53	7.48	600

Lead Covered Cable—Telephone

Type "TJ" Cable

For Aerial or Underground Use

Principal Use. Toll entrance and long trunks.

Sheath. Lead-antimony.

Conductors. No. 13 A.W.G. single dry paper tape insulation. Blue-white pairs alternating with green-white pairs, except for two orange-white tracer pairs, one in the center and one in the outside layer, and a red-white pair in each layer containing an odd number of pairs.

Mutual Capacitance. (A.C. Testing) .071 microfarad per mile of cable.

Conductor Resistance. Not exceeding 11¼ ohms per mile of cable, at 68° Fahr.

Insulation Resistance. Not less than 500 megohm-miles.

Dielectric Strength. Insulation of each conductor capable of withstanding a test potential of 500 volts D.C.

Attenuation. 0.57 Transmission Units per mile at 1000 cycles. All pairs guaranteed good.

Code No. and Guaranteed Number of Pairs	Thickness of Sheath (Inches)	Mean Outside Diameter (Inches)	Approximate Weight per Foot (Pounds)	Convenient Number of Feet on Reels
TJ-11	.125	1.19	2.45	1500
TJ-16	.125	1.34	2.94	1200
TJ-26	.125	1.66	3.91	1200
TJ-51	.125	2.19	5.85	900
TJ-76	.125	2.63	7.62	600

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Lead Covered Cable—Telephone

Type "UA" Cable

Replaces Type "U"

For Inside Construction

The core of Type "UA" Cable is impregnated

Sheath. Pure Lead.

Conductors. No. 22 A.W.G., tinned, 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.

Conductor Resistance. Not exceeding 96 ohms per mile of cable, at 68° Fahr.

Insulation Resistance. Not less than 500 megohm-miles.

Dielectric Strength. Insulation of each conductor capable of withstanding an A.C. test potential whose maximum instantaneous value is 700 volts. All pairs guaranteed good.

Code No. and Guaranteed Number of Pairs	Thickness of Sheath (Inches)	Mean Outside Diameter (Inches)	Approximate Weight per Foot (Pounds)	Convenient Number of Feet on Reels
UA- 6	.047	.34	.25	3500
UA-11	.047	.41	.32	3500
UA-16	.047	.47	.39	3500
UA-21	.047	.52	.45	3500
UA-26	.047	.56	.51	3500
UA-31	.047	.59	.56	3500
UA-41	.047	.67	.67	3000
UA-51	.047	.73	.75	3000

Lead Covered Cable—Telephone

Type "APA" Cable—No. 22 A.W.G.

Replaces Type "NR" for Aerial or Underground Construction

Sheath. Lead-antimony.

Conductors. No. 22 A.W.G., double dry paper tape insulation, colors on each wire and its mate for all pairs in each size of cable Red and White.

Mutual Capacitance. (A.C. Testing) .095 microfarad per mile of cable.

Conductor Resistance. Not greater than 92 ohms per mile of cable at 68° Fahr.

Insulation Resistance. Not less than 500 megohm-miles.

Dielectric Strength. Insulation of each conductor capable of withstanding a test potential of 500 volts D.C.

Attenuation. 1.8 Transmission Units per mile at 1000 cycles.

Code No. and Number of Pairs	Number of Pairs Guaranteed	Thickness of Sheath (Inches)	Mean Outside Diameter (Inches)	Approximate Weight per Foot (Pounds)	Convenient Number of Feet on Reels
APA- 6	5	.070	.39	.38	3500
APA- 11	10	.070	.45	.47	3500
APA- 16	15	.070	.52	.56	3500
APA- 21	20	.070	.55	.62	3500
APA- 26	25	.070	.58	.67	3500
APA- 31	30	.070	.64	.77	3000
APA- 41	40	.075	.71	.94	3000
APA- 51	50	.075	.78	1.06	2500
APA- 61	60	.075	.81	1.14	2500
APA- 76	75	.080	.91	1.39	2500
APA-101	100	.080	1.00	1.62	2500
APA-152	150	.090	1.21	2.28	1600
APA-177	175	.090	1.27	2.48	1600
APA-202	200	.095	1.38	2.84	1500
APA-253	250	.095	1.50	3.27	1500
APA-303	300	.105	1.65	3.94	1400
APA-404	400	.105	1.87	4.78	1100
APA-606	600	.125	2.31	7.12	800

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Lead Covered Cable—Telephone Type "ARA"—No. 22 A.W.G.

Replaces Type "NR" for Aerial or Underground Construction

Sheath. Lead-antimony.

Conductors. No. 22 A.W.G., single dry paper insulation colored Red and White.

Mutual Capacitance. (A.C. Testing) .095 microfarad per mile of cable.

Conductor Resistance. Not exceeding 92 ohms per mile of cable at 68° Fahr.

Insulation Resistance. Not less than 500 megohm-miles.

Dielectric Strength. Insulation of each conductor capable of withstanding a test with a D.C. potential of 500 volts.

Attenuation. 1.8 Transmission Units per mile at 1000 cycles.

Code No. and Number of Pairs	Number of Pairs Guaranteed	Thickness of Sheath (Inches)	Mean Outside Diameter (Inches)	Approximate Weight per Foot (Pounds)	Convenient Number of Feet on Reels
ARA- 6	5	.070	.36	.34	3500
ARA- 11	10	.070	.45	.47	3500
ARA- 16	15	.070	.48	.52	3500
ARA- 21	20	.070	.52	.58	3500
ARA- 26	25	.070	.58	.67	3500
ARA- 31	30	.070	.61	.73	3000
ARA- 41	40	.075	.68	.89	3000
ARA- 51	50	.075	.74	1.01	3000
ARA- 61	60	.075	.78	1.09	2500
ARA- 76	75	.080	.88	1.34	2500
ARA-101	100	.080	.97	1.57	2500
ARA-152	150	.085	1.17	2.13	1600
ARA-177	175	.090	1.24	2.42	1600
ARA-202	200	.090	1.31	2.62	1600
ARA-253	250	.095	1.44	3.14	1500
ARA-303	300	.105	1.59	3.81	1400
ARA-404	400	.105	1.80	4.62	1200
ARA-606	600	.115	2.20	6.49	1100

Lead Covered Cable—Telephone Type "ASM" Cable—No. 24 A.W.G.

Replaces Types "NM" and "SM" for Aerial or Underground Construction

Principal Use. Short Subscriber's Lines.

Sheath. Lead-antimony.

Conductors. No. 24 A.W.G., single dry paper tape insulation, with color groups depending upon size.

Mutual Capacitance. (A.C. Testing) .085 microfarad per mile of cable.

Conductor Resistance. Not exceeding 145 ohms per mile of cable, at 68° Fahr.

Insulation Resistance. Not less than 500 megohm-miles.

Dielectric Strength. Insulation of each conductor capable of withstanding an A.C. test potential whose maximum instantaneous value is 500 volts.

Attenuation. 2.2 Transmission Units per mile at 1000 cycles.

Code No. and Number of Pairs	Number of Pairs Guaranteed	Thickness of Sheath (Inches)	Mean Outside Diameter (Inches)	Approximate Weight per Foot (Pounds)	Convenient Number of Feet on Reels
ASM- 11	10	0.070	0.39	0.38	3500
ASM- 16	15	0.070	0.44	0.45	3500
ASM- 26	25	0.070	0.52	0.56	3500
ASM- 51	50	0.070	0.64	0.77	3000
ASM- 76	75	0.075	0.76	1.02	2500
ASM- 101	100	0.075	0.85	1.20	2500
ASM- 152	150	0.080	1.00	1.59	2500
ASM- 202	200	0.080	1.14	1.91	1800
ASM- 303	300	0.085	1.36	2.56	1600
ASM- 404	400	0.090	1.56	3.22	1400
ASM- 606	600	0.105	1.90	4.69	1100
ASM- 909	900	0.105	2.21	6.06	900
ASM-1212	1200	0.115	2.61	7.97	650

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Lead Covered Cable—Telephone

Type "BSA" Cable—NO. 22 A.W.G.

Replaces Types "ANA" and "ASA" for Aerial or Underground Construction

Principal Use. Subscriber's Lines.
Sheath. Lead-antimony.
Conductors. No. 22 A.W.G., single dry paper insulation, with color groups depending on size.
Mutual Capacitance. (A.C. Testing) .090 microfarad per mile of cable.
Conductor Resistance. Not exceeding 92 ohms per mile of cable at 68° Fahr.
Insulation Resistance. Not less than 500 megohm-miles.
Dielectric Strength. Insulation of each conductor capable of withstanding an A.C. test potential whose maximum instantaneous value is 500 volts.
Attenuation. 1.8 Transmission Units per mile at 1000 cycles.

Code No. and Number of Pairs	Number of Pairs Guaranteed	Thickness of Sheath (Inches)	Mean Outside Diameter (Inches)	Approximate Weight per Foot (Pounds)	Convenient Number of Feet on Reels
BSA- 11	10	0.070	0.44	0.45	3500
BSA- 16	15	0.070	0.48	0.52	3500
BSA- 26	25	0.070	0.58	0.67	3500
BSA- 51	50	0.070	0.73	0.95	3000
BSA- 76	75	0.075	0.87	1.27	2500
BSA-101	100	0.080	0.99	1.58	2500
BSA-152	150	0.080	1.16	2.03	1600
BSA-202	200	0.085	1.33	2.55	1600
BSA-303	300	0.095	1.60	3.58	1400
BSA-404	400	0.095	1.78	4.28	1200
BSA-455	450	0.105	1.90	4.93	1100
BSA-606	600	0.105	2.15	6.02	900
BSA-909	900	0.115	2.61	8.50	650

Lead Covered Cable—Telephone

TYPE "CNB" Cable

Replaces Type "BNB"

For Aerial or Underground Use

Principal Use. Trunk and Long Subscriber Lines.
Sheath. Lead-antimony.
Conductors. No. 19 A.W.G., single dry paper tape insulation, with color groups depending upon size.
Mutual capacitance. (A.C. Testing) .090 microfarad per mile of cable.
Conductor Resistance. Not exceeding 46 ohms per mile of cable, at 68° Fahr.
Insulation Resistance. Not less than 500 megohm-miles.
Dielectric Strength. Insulation of each conductor capable of withstanding an A.C. test potential whose maximum instantaneous value is 700 volts.
Attenuation. 1.3 Transmission Units per mile at 1000 cycles.

Code No. and Number of Pairs	Number of Pairs Guaranteed	Thickness of Sheath (Inches)	Mean Outside Diameter (Inches)	Approximate Weight per Foot (Pounds)	Convenient Number of Feet on Reels
CNB- 6	5	.070	.44	.45	3500
CNB- 11	10	.070	.53	.60	3500
CNB- 16	15	.070	.61	.72	3500
CNB- 26	25	.070	.72	.93	3000
CNB- 51	50	.075	.95	1.46	2500
CNB- 76	75	.080	1.14	1.98	1800
CNB-101	100	.085	1.30	2.48	1600
CNB-152	150	.090	1.56	3.37	1400
CNB-202	200	.095	1.78	4.25	1200
CNB-303	300	.105	2.15	5.98	900
CNB-404	400	.115	2.48	7.77	700
CNB-455	450	.115	2.61	8.46	650

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Lead Covered Cable—Telephone
Type "MFA" Cable

For Inside Construction

Sheath. Pure Lead.

Conductors. No. 22 A.W.G., tinned, black enamel, double silk and single cotton insulation. Covering on each pair colored white and red-white.

Tracer Pair. One in outer layer colored blue and white.

Insulation Resistance. Not less than 500 megohm-miles.

Conductor Resistance. Not exceeding 105 ohms per mile of cable, at 68° Fahr.

Dielectric Strength. Insulation of each conductor capable of withstanding an A.C. test potential whose maximum instantaneous value is 700 volts.

Code No. and Number of Pairs	Number of Pairs Guaranteed	Thickness of Sheath (Inches)	Mean Outside Diameter (Inches)	Approximate Weight per Foot (Pounds)	Convenient Number of Feet on Reels
MFA- 6	6	.047	.34	.25	3500
MFA- 11	11	.047	.41	.32	3500
MFA- 16	16	.047	.47	.39	3500
MFA- 26	26	.047	.56	.51	3500
MFA- 51	51	.047	.73	.75	3000
MFA- 76	76	.063	.89	1.19	2500
MFA-101	101	.063	1.00	1.42	2500
MFA-152	151	.063	1.19	1.86	1600
MFA-202	201	.063	1.34	2.26	1600
MFA-303	302	.094	1.69	3.85	1400
MFA-404	403	.125	1.97	5.62	1100
MFA-606	605	.125	2.38	7.45	700

Lead Covered Cable—Telephone
Type "MGA" Cable

For Inside Construction

Sheath. Pure Lead.

Conductors. No. 22 A.W.G., tinned, black enamel, 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.

Conductor Resistance. Not exceeding 105 ohms per mile of cable, at 68° Fahr.

Insulation Resistance. Not less than 500 megohm-miles.

Dielectric Strength. Insulation of each conductor capable of withstanding an A.C. test potential whose maximum instantaneous value is 700 volts. All pairs guaranteed good.

Code No. and Guaranteed Number of Pairs	Thickness of Sheath (Inches)	Mean Outside Diameter (Inches)	Approximate Weight per Foot (Pounds)	Convenient Number of Feet on Reels
MGA- 6	.047	.34	.25	3500
MGA-11	.047	.41	.32	3500
MGA-16	.047	.47	.39	3500
MGA-21	.047	.52	.45	3500
MGA-26	.047	.56	.51	3500
MGA-31	.047	.59	.56	3500
MGA-41	.047	.67	.67	3000
MGA-51	.047	.73	.75	3000

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Lead Covered Cable—Telephone

Type "MUA" Cable

For Inside Construction

The Core of Type MUA Cable is Impregnated

Sheath. Pure Lead.

Conductors. No. 22 A.W.G., tinned, black enamel, 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.

Conductor Resistance. Not exceeding 105 ohms per mile of cable, at 68° Fahr.

Insulation Resistance. Not less than 500 megohm-miles.

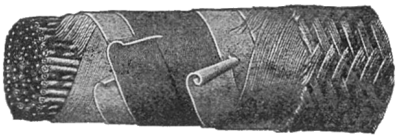
Dielectric Strength. Insulation of each conductor capable of withstanding an A.C. test potential whose maximum instantaneous value is 700 volts. All pairs guaranteed good.

Code No. and Guaranteed Number of Pairs	Thickness of Sheath (Inches)	Mean Outside Diameter (Inches)	Approximate Weight per Foot (Pounds)	Convenient Number of Feet on Reels
MUA- 6	.047	.34	.25	3500
MUA-11	.047	.41	.32	3500
MUA-16	.047	.47	.39	3500
MUA-21	.047	.52	.45	3500
MUA-26	.047	.56	.51	3500
MUA-31	.047	.59	.56	3500
MUA-41	.047	.67	.67	3000
MUA-51	.047	.73	.75	3000

CABLE—SWITCHBOARD

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.

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



No. 6084

1. The 1000 and 1100 coded series in which the conductors are provided with a double silk and single cotton insulation.

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

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

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

DRY CORE—LEAD TAPED—BRAIDED—BLACK ENAMELED CONDUCTORS

Code No.	No. of Pairs B. & S. Gauge	No. of Singles B. & S. Gauge	Approximate Dimensions (In Inches)
	Double Silk and Single Cotton Insulation		
1016	20–No. 22	20–No. 22	$25/32 \times 7/16$
1024	20–No. 22		$11/16 \times 11/32$
1035	25–No. 22		$3/4 \times 13/32$
1050	10–No. 22	10–No. 22	$19/32 \times 11/32$
1062	30–No. 22		$25/32 \times 7/16$
1070	40–No. 22		$7/8 \times 15/32$
*1074		20–No. 22	$3/8$ diam.
1079	10–No. 22		$1/2 \times 5/16$
1115	20–No. 19	20–No. 22	$15/16 \times 7/16$
1116	20–No. 19		$7/8 \times 3/8$
1117	20–No. 19 20–No. 22		$31/32 \times 1/2$
1121	10–No. 19 10–No. 22	10–No. 22	$3/4 \times 7/16$
1125	10–No. 19		$9/16 \times 11/32$
1126	10–No. 19 10–No. 22		$3/4 \times 3/8$

* Round shaped cables. All other cables are oval shaped.

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CABLE—SWITCHBOARD—(Continued)

DRY CORE—LEAD TAPED—BRAIDED—BLACK ENAMELED CONDUCTORS

Code No.	No. of Pairs B. & S. Gauge	No. of Singles B. & S. Gauge	Approximate Dimensions (In Inches)
	Double Silk and Single Cotton Insulation—Continued		
1127	10–No. 19	10–No. 22	21/32 x 3/8
1186	3–No. 16		13/32 x 5/16
1187	6–No. 16		9/16 x 11/32
1188	8–No. 16		5/8 x 3/8
1200	6–No. 19		7/16 x 9/32
1216	10–No. 16		25/32 x 7/16
	Double Cotton Insulation		
6016	20–No. 22	20–No. 22	25/32 x 25/64
6024	20–No. 22		11/16 x 11/32
6035	25–No. 22		3/4 x 13/32
6050	10–No. 22	10–No. 22	19/32 x 11/32
6060	36–No. 22		13/16 x 15/32
6062	30–No. 22		25/32 x 7/16
*6066	50–No. 22		3/4 Diam.
*6069	100–No. 22		1 1/8 Diam.
6070	40–No. 22		7/8 x 15/32
*6072		10–No. 19	11/32 Diam.
*6074		20–No. 22	3/8 Diam.
6079	10–No. 22		1/2 x 5/16
6084	20–No. 22	20–No. 22	1 11/32 x 11/32
6087	16–No. 22		21/32 x 11/32
6097	64–No. 22		1 1/16 x 5/8
6098	64–No. 22	32–No. 22	1 1/4 x 3/4
6100	40–No. 24		9/16 x 11/16
6102	40–No. 24	20–No. 24	1/2 x 13/16
6103	20–No. 24		3/8 x 9/16
6106	40–No. 22	20–No. 22	1 x 9/16
6107	39–No. 22	19–No. 22 4–No. 16	1 1/32 x 9/16
6115	20–No. 19	20–No. 22	7/16 x 15/16
6116	20–No. 19		3/8 x 7/8
6117	20–No. 19 20–No. 22		1/2 x 31/32
6119	50–No. 19		3/4 x 1 1/16
6121	10–No. 19 10–No. 22	10–No. 22	7/16 x 3/4
*6122	10–No. 22 1–No. 14		7/16 Diam.
*6123	20–No. 22 1–No. 14		7/32 Diam.
*6124	30–No. 22 1–No. 14		5/8 Diam.
6125	10–No. 19		11/32 x 9/16
6126	10–No. 19 10–No. 22		3/8 x 3/4
6127	10–No. 19	10–No. 22	3/8 x 21/32
*6128	40–No. 18		13/16 Diam.
*6166	3–No. 20		17/64 Diam.
*6179	6–No. 20		23/64 Diam.
*6180	8–No. 20		27/64 Diam.
6182	6–No. 22		7/16 x 9/32
6183	20–No. 22	10–No. 22	3/4 x 13/32
6184	10–No. 19 20–No. 22		1/2 x 27/32
6189	20–No. 19 20–No. 22	20–No. 22	9/16 x 1
6191	30–No. 22	30–No. 22	23/32 x 1/2
6193	15–No. 22	15–No. 22	3/8 x 25/32
6236	20–No. 24	20–No. 24	3/4 x 3/8

* Round shaped cables. All other cables are oval shaped.

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CABLE—SWITCHBOARD—(Continued)

Inter-phone Cable

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

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

Code No.	Conductors No. 22	(B. & S. Gauge) No. 18	Covering	Approximate Outside Diam. Inches
185B	4 singles		Fireproofed braid	1/4
161B	8 singles		Fireproofed braid	5/16
161B	8 singles		Lead sheath	5/16
142B	8 singles		Green cotton braid	5/16
162B	12 singles		Fireproofed braid	11/32
162B	12 singles		Lead sheath	3/8
164B	6 singles	2 pair	Fireproofed braid	13/32
164B	6 singles	2 pair	Lead sheath	13/32
134B	6 pair	2 pair	Fireproofed braid	13/32
134B	6 pair	2 pair	Lead sheath	7/32
155B	6 pair	2 pair	Green cotton braid	13/32
141B	12 pair	2 pair	Fireproofed braid	7/16
141B	12 pair	2 pair	Lead sheath	1/2
156B	12 pair	2 pair	Green cotton braid	7/16
157B	16 pair	2 pair	Fireproofed braid	17/32
157B	16 pair	2 pair	Lead sheath	9/16
158B	20 pair	2 pair	Fireproofed braid	9/16
158B	20 pair	2 pair	Lead sheath	19/32
136B	24 pair	2 pair	Fireproofed braid	19/32
136B	24 pair	2 pair	Lead sheath	5/8
140B	31 pair	2 pair	Fireproofed braid	5/8
140B	31 pair	2 pair	Lead sheath	11/16

Switchboard Cables

WAXED CORE—NOT LEAD TAPED—BLACK ENAMELED CONDUCTORS

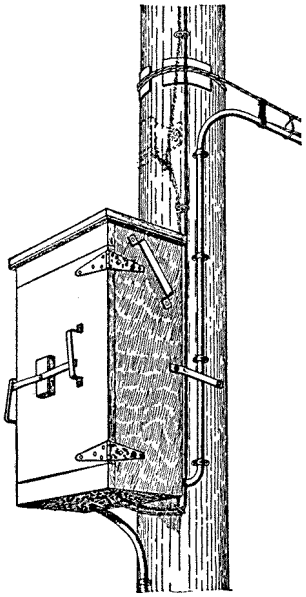
The following cables are different from the others in the 6000 series in that they have waxed cores instead of dry cores and are not protected by the leaded tape. The construction is somewhat different in that instead of pairs of singles they have in some of the types triples and quads. The various combinations, as in the other types 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 (Inches)
6143	20–No. 22			Oval	11/32 x 11/16
6144	30–No. 22			Oval	7/16 x 25/32
6145	50–No. 22			Round	3/4 Diam.
6146	100–No. 22			Round	1 1/8 Diam.
6147	40–No. 22			Oval	15/32 x 7/8
6177	55–No. 22			Round	7/8 Diam.
6208	3–No. 20	2–No. 20	3 Triples 20	Round	7/16 Diam.
6209	3–No. 20	2–No. 20	4 Quads 20	Round	31/64 Diam.
6210	3–No. 20		1 Quad 20 2 Triples 20	Round	27/64 Diam.
6211	5–No. 20	1–No. 20	1 Quad 20 2 Triples 20	Round	15/32 Diam.
6212	9–No. 20	2–No. 20		Round	29/64 Diam.
6213	12–No. 20	2–No. 20		Round	1/2 Diam.
6214	9–No. 20			Round	7/16 Diam.
6223	5–No. 20			Round	21/64 Diam.

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CABLE TERMINALS

General



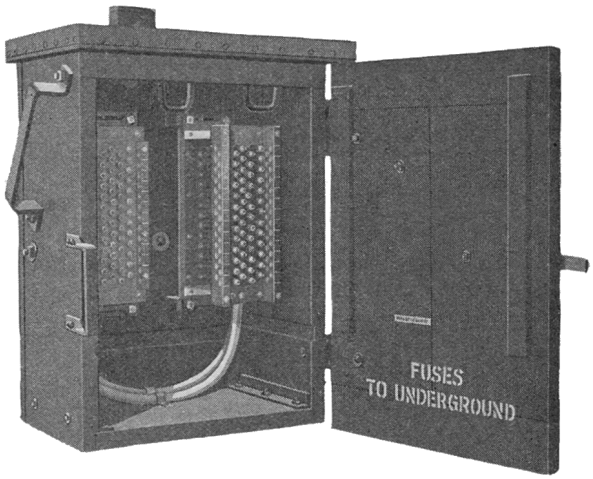
"B" Type Cable Terminal

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.

Type "B" Cable Terminals (Protected)



B-26 Cable Terminal

"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.

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CABLE TERMINALS

Type "B" Cable Terminals (Protected)—(Continued)

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 cables 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 may be ordered as separate items and are listed and described under their proper headings.

Type "BB" Cable Terminals

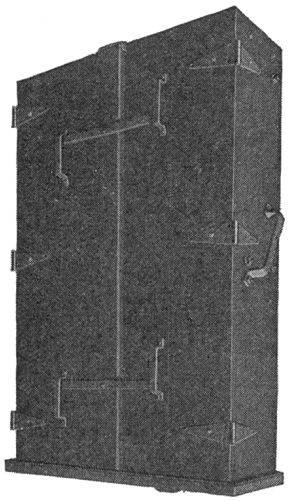
The Type "BB" Cable Terminal was designed for use in cross-connecting long sections of aerial cable and at points where aerial cables branch. They consist of a Cable Terminal Box and Binding Post Chambers and are arranged with a splicing chamber at the bottom of the box for splices.

Code No.	Capacity (Pairs)	Includes: Cable Terminal Box No.	Includes: Equipped With
BB-26	26	BB-26	1 B-26A and 1 BB-26A Binding Post Chambers
BB-51	51	BB-51	1 B-51A and 1 BB-51A Binding Post Chambers
BB-76	76	BB-76	1 B-76A and 1 BB-76A Binding Post Chambers
BB-101	101	BB-101	1 B-101A and 1 BB-101A Binding Post Chambers
BB-152	152	BB-152	2 B-76B and 2 BB-76B Binding Post Chambers
BB-202	202	BB-202	2 B-101B and 2 BB-101B Binding Post Chambers

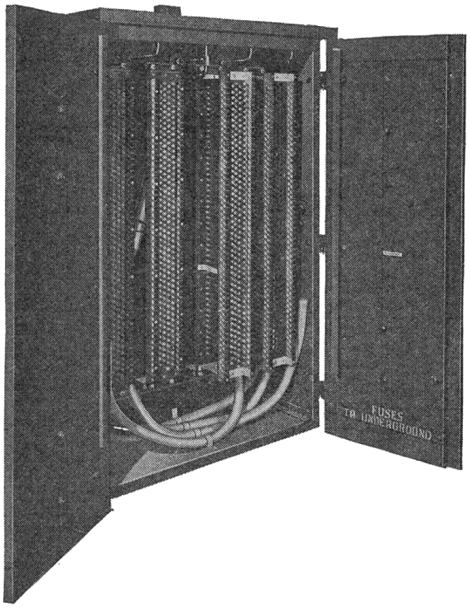
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CABLE TERMINALS

Type "B" Cable Terminals



B202 Cable Terminal



B202 Cable Terminal

The B-26 Cable Terminal will terminate both a 26 pair underground cable and a 26 pair aerial cable and provides for cross-connection. The other sizes have similar capacity ratings.

Pole seats may be used with the two smaller sizes of "B" Cable Terminals and these together with platforms for the large terminals are listed elsewhere.

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

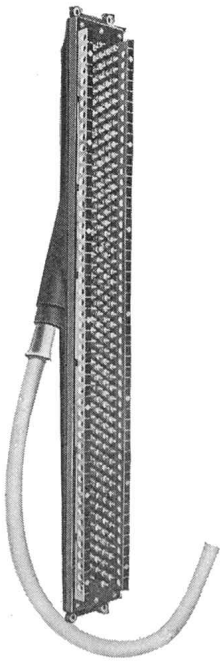
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CABLE TERMINALS

Type "B" Binding Post Chambers

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

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



B-101 "B" Binding Post Chamber

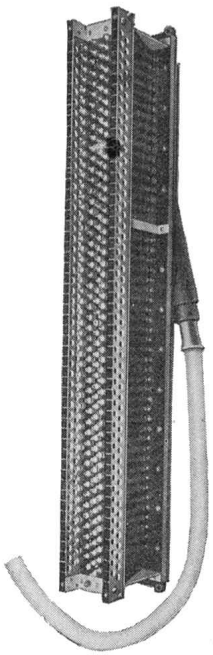
"B" Fuse Chambers

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 effects 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 potheaded.

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.



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

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CABLE TERMINALS

Type "B" Cable Terminal Boxes

Code No.	Used with Type "B" Cable Terminals	Dimensions (Inches) Height	Width	Depth
B-26	B-26	28 1/32	21 3/4	15 5/16
B-51	B-51	36 31/32	22 3/4	15 5/16
B-76	B-76	45 7/32	22 3/4	15 5/16
B-101	B-101	54 13/32	22 3/4	15 5/16
B-152	B-152	46 7/32	36 3/4	15 5/16
B-202	B-202	55 7/32	36 3/4	15 5/16
B-304	B-304	91 1/2	38 1/4	15 5/16
B-404	B-404	109 1/4	38 1/4	15 5/16

Type "BB" Cable Terminal Boxes

Code No.	Used with Type "BB" Cable Terminals	Approximate Dimensions (Inches) Height	Width	Depth
BB-26	BB-26	28 1/32	21 3/4	15 5/16
BB-51	BB-51	36 31/32	22 3/4	15 5/16
BB-76	BB-76	45 1/32	22 3/4	15 5/16
BB-101	BB-101	54 5/32	22 3/4	15 5/16
BB-152	BB-152	46 7/32	36 3/4	15 5/16
BB-202	BB-202	55 5/32	36 3/4	15 5/16
BB-304	BB-304	91 5/16	38 1/4	15 15/16
BB-404	BB-404	109 13/16	38 1/4	15 15/16

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 143-A-5.

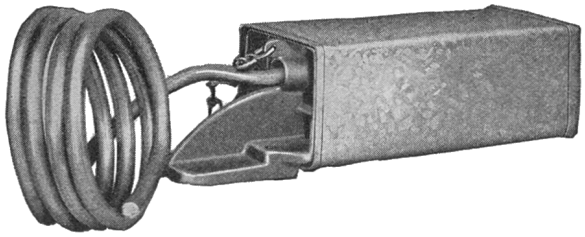
For 304 or 404 pair Cable Terminals order "B" Cable Balcony per Drawing 143-A-4.

Pole Seats

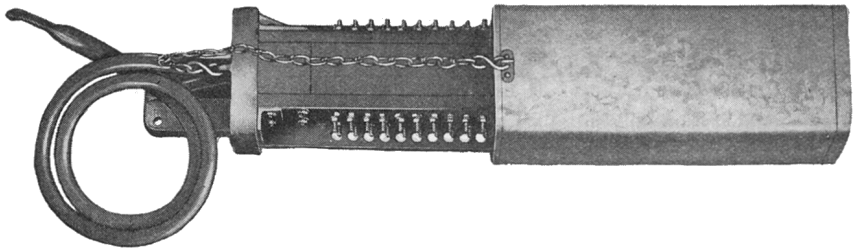
Special Pole Seats for use with the 26 and 51 pair sizes of "B" Cable Terminal Boxes may be obtained. Specifying Pole Seats per Drawing 135A-97.

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CABLE TERMINALS



C-26 Cable Terminal (Cover in place)



C-26 Cable Terminal (Cover Partially Removed)

"C" Type Cable Terminal (Unprotected)

This type cable terminal is intended for use in terminating lead covered cable and consists of a wooden sealing chamber, which is mounted on a cast iron base and provided with a galvanized steel cover. The end of the cable stubs and the wires which lead to the terminals are located in the sealing chamber which is filled with impregnating compound.

The C10 and C16 Cable Terminals are furnished with cable stubs 6½, 8½, 10½ or 12½ feet long. The 6½ foot length will be furnished unless otherwise specified on the order.

The C26 Cable Terminal is furnished with cable stubs 7, 9, 10½ or 12½ feet long. The 7 foot length will be furnished unless otherwise specified on the order.

Entirely replaces the No. 8 Type Cable Terminal.

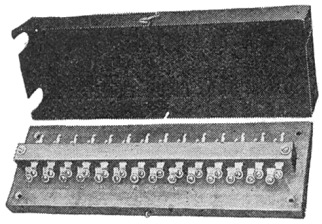
Code No.	Capacity Pairs	Replaces	Approximate Dimensions (Inches)
C10	10	8A	4⅛ x 5 3/16 x 12¾
C16	16	8B, 8D*	4⅛ x 5 3/16 x 14⅝
C26	26	8C, 8E*	4 7/16 x 5 11/16 x 17¾

* Two C16 Cable Terminals replace one 8D Cable Terminal.
Two C26 Cable Terminals replace one 8E Cable Terminal.

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CABLE TERMINALS

No. 12 Type Cable Terminals (Unprotected)



No. 12A. Cable Terminal

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 (Inches)
12A	13	$11\frac{61}{64} \times 4\frac{3}{64} \times 1\frac{51}{64}$
12B	23	$11\frac{61}{64} \times 4\frac{3}{64} \times 2\frac{51}{64}$
12C	33	$11\frac{61}{64} \times 4\frac{3}{64} \times 3\frac{51}{64}$

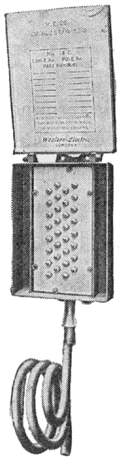
No. 14 Type Cable Terminals (Unprotected)

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.



Closed



Open

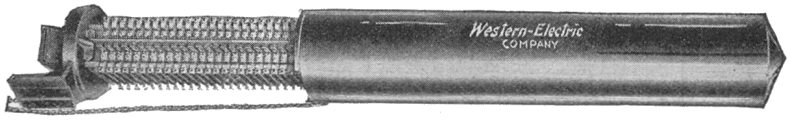
No. 14C—Cable Terminal

Code No.	Capacity Pairs	Length Including Nipples	Width of Cover (Inches)
14B	11	$10\frac{3}{32}$	$7\frac{7}{16}$
14C	16	$12\frac{21}{32}$	$7\frac{7}{16}$
14D	26	$17\frac{23}{32}$	$7\frac{7}{16}$

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CABLE TERMINALS

No. 18 Type Cable Terminals (Protected)



No. 18E Cable Terminal, Open



No. 18E Cable Terminal, Closed

This is a protected terminal for open wire distribution from lead covered 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 pot-headed within the terminal unless otherwise specified.

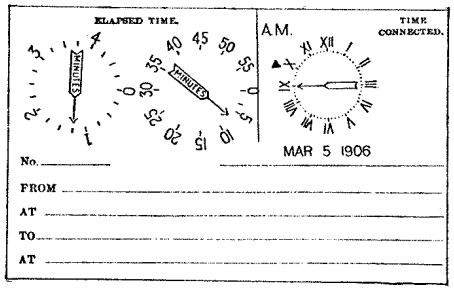
Code No.	Capacity (Pairs)	Length (Inches)	Diameter of Hood (Inches)
18A	10	$19\frac{9}{32}$	$8\frac{9}{16}$
18B	15	$22\frac{1}{32}$	$8\frac{9}{16}$
18C	25	$28\frac{29}{32}$	$8\frac{9}{16}$
18D	30	$33\frac{1}{32}$	$8\frac{9}{16}$
18E	50	$46\frac{25}{32}$	$8\frac{9}{16}$
18F	60	$53\frac{21}{32}$	$8\frac{9}{16}$

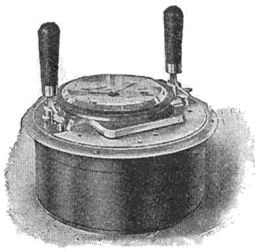
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CALCULAGRAPHS AND TIME RECORDERS



Style A
On Pedestal





Style C

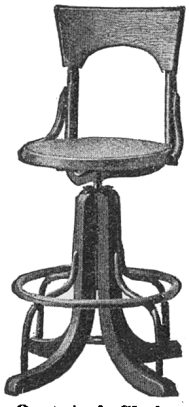
CALCULAGRAPHS

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.

Each model is supplied in two 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 keyshelf.

Model No.	Description
6	Style A or C (state which is desired)
6X	Style A 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).



Operator's Chair

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.

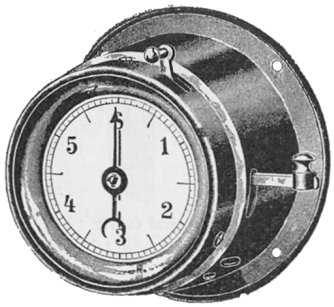
The heights given below indicate the distance of the seat from the floor when it is in the lowest position.

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

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

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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.

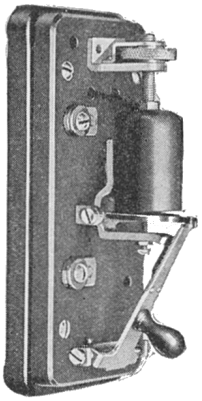
The lever at the top is used when starting and stopping the timing of the call, which may be continuous or a total of several periods. The lever at the right-hand side of the device returns the hand to zero. In the model listed below, a bell is automatically rung when the hand passes the three-minute 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
99½	Signals at 3 and 6 minutes

CIRCUIT BREAKERS

Code No.	Description
2A	A small overload circuit breaker with 2½ x 5⅝ inch slate base, to be mounted vertically. The adjusting nut varies the current value at which it will operate. It will safely carry .2 ampere 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

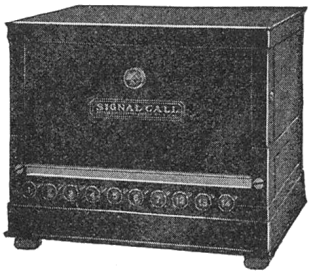
1A Electric Clock

The 1A Electric Clock is arranged to mount in a switchboard keyshelf in a vertical position and gives time in hours, minutes and tenths of minutes. Is equipped with a black finished cover having a celluloid window. Is operated electrically by means of a master clock on 24 volts.

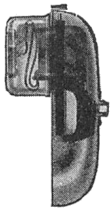
Approximate Resistance (Ohms)	Operating (Ampere)	Non-Operating (Ampere)
500	.028	.020

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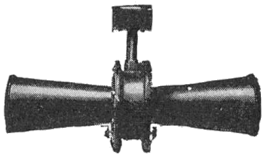
GRAYBAR
CODE SIGNALING SYSTEMS



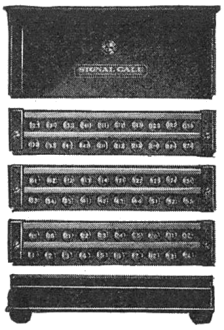
**10 Call
Signal Call Unit**



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



Duplex Horn Signal



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

Signal Call

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

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

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

Two—Wanted on the nearest branch telephone.
Twenty-one—Come to General Manager's office.
Twenty-two—Wanted in the press room, etc., etc.

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

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

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

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

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

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

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

Voltages—24, 110 or 220 A.C. or D.C.

Size—10 and 20 call—7¾ inches long by 7⅛ inches deep by 6⅜ inches high; 40 call—7⅞ inches high; 60 call—9⅜ inches high.

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

SIGNALS

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

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

All coils are form wound and moisture proof.

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

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

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

Voltages—24, 110, 220 A.C. and D.C.

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

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

Complete instructions for installing furnished with each system.

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COIN COLLECTORS

Electrically Operated—For Central Battery Service Only

No. 7 Type Coin Collector

The No. 7 Type Coin Collector uses only nickels and is arranged for prepayment service. The case is made of heavy sheet steel and has a durable black japan finish. The other exposed metal parts are nickel plated. The housing and the coin box door are furnished with different locks requiring different keys. A burglar alarm switch will be provided if specified in the order. This switch 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.

Coin Collectors of this type may be arranged for post-payment service. When used in this service the Central Office Operator is signalled by removing the receiver from the hook instead of by depositing a coin in the coin slot as in prepayment service. In prepayment service the coin is held under control by the operator and may be deposited in the coin box or refunded as circumstances warrant thus saving the time lost by the operator in waiting for the coin to be deposited before completing the connection as is necessary when the post-payment plan is used.



No. 7J

Code No.	For	Dimensions, Inches		
		Length	Width	Depth
7J	Nickels	$8\frac{3}{16}$	$5\frac{5}{8}$	$4\frac{7}{8}$
7K	Nickels	$11\frac{9}{16}$	$5\frac{13}{16}$	$4\frac{59}{64}$

No. 50 Type Coin Collectors

The No. 50 Type Coin Collector is a prepayment, multicoin collector arranged for wall mounting. It may, however, be mounted on a shelf by means of a No. 139A Backboard. The collector is finished in black except the coin gauge and the coin return escutcheon. The case compartment is of pressed steel and is furnished with a burglar alarm switch which is operated by the compartment lock. This switch may be arranged to operate an alarm bell or buzzer located adjacent to the coin collector.

Three different coins may be used in this type of coin collector, Nickels, Dimes and Quarters. As each coin is put in the slot a distinctive gong signal is given which is audible to the operator. The coins are held in the coin hopper and may be deposited or refunded at will. This feature makes it possible to use the prepayment plan thus saving the time lost by the operator in waiting for the coin to be deposited before completing the connection as is necessary when the post-payment plan is used.



No. 50G Equipped With 50C Apparatus Blank

Code No.		Arranged for	Dimensions, Inches
50G	(Equipped with 50C Apparatus Blank)	Nickels Dimes Quarters	$18\frac{1}{4}$ x 7 x 6

METHOD OF ORDERING NO. 50G COIN COLLECTORS

For Manual Service

No. 50G Coin Collector equipped with:
- No. 2A Coin Receptacle or (non-locking)
- No. 6001A Coin Receptacle (self-locking)
- No. 50C Apparatus Blank
- No. 323 Transmitter
- No. 143 Receiver
- No. 521 Receiver Cord

For Machine Switching Service

No. 50G Coin Collector equipped with:
- No. 2 Type Dial
- No. 595B Cord
- No. 2A Coin Receptacle or (non-locking)
- No. 6001A Coin Receptacle (self-locking)

No. 323 Transmitter

No. 143 Receiver

No. 521 Receiver Cord.

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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	Approximate Size
7	Wall Telephone	Nickels, Dimes and Quarters	9 x 4½ x 3

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

8A	Wall Telephone	Nickels	7 x 3⅜ x 1⅛

This pay station will not be provided with a mounting bracket unless specifically so ordered. See next item.

BRACKET FOR NO. 8A PAY STATION

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

11	Wall Telephone	Nickels, Dimes and Quarters	9 x 4½ x 3

A mounting plate is included with this pay station for mounting it at the side of a telephone, as shown in the cut.

13A	Desk Telephone	Nickels	9½ x 3½ x 3¼

This is equipped with two clamps of such size as to fit the stem of a standard desk telephone. In ordering, specify the type and make of desk telephone with which it is intended for use.

14	Desk Telephone	Nickels, Dimes and Quarters	11 x 4½ x 3½

Fittings will be furnished with this pay station to permit of attachment to standard types of desk telephones. In ordering, specify the type and make of desk telephone with which it is intended for use.

20	Desk Telephone	Nickels, Dimes and Quarters	10¾ x 4¼ x 3¼

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.

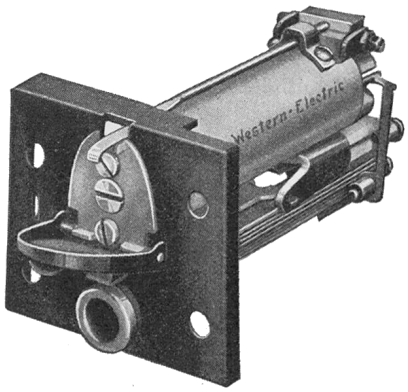
The above code numbers cover pay station boxes only and do not include telephone instruments.

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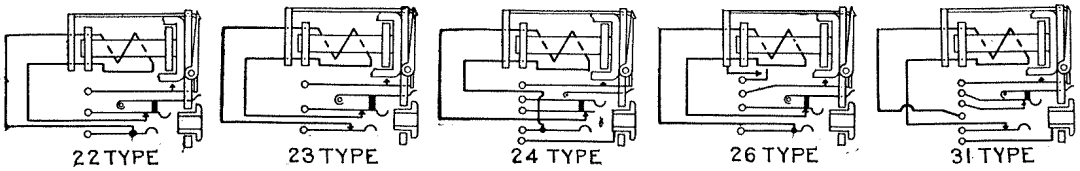
COMBINED JACKS AND SIGNALS

Shutter Type

Code No.	Approximate Resistance (Ohms)	Used with Plug No.	Description
2C	240	47	Equipped with night bell contact which is closed when target 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 coil winding is disconnected from the line.
4C	240	110	Has night bell contact same as No. 2 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.
7C	240	47	Intended for use with non-multiple magneto party lines where selective central office signalling is desired. One side of signal winding 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.



No. 22 Type on No. 92B Mounting Signal Operated



The Shutter Type combined jack and signal is used as a magneto line signal in switchboards where it is desirable to have the jack closely associated with its signal. This arrangement increases the ease and rapidity of operation. The signal is electrically operated and restored mechanically when the plug is inserted in the jack by the operator.

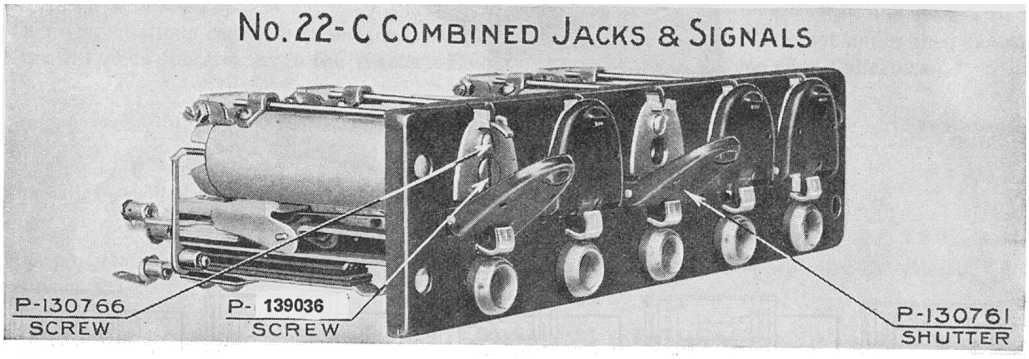
Code No.	Approximate Resistance (Ohms)	Used with Plug No.	Description	Ordinarily Used with Mountings No.
22C	350	47	Equipped with night bell contact, which is closed when shutter is in operated position. Has single cut-off jack and is intended for use with Non-Multiple Magneto Switchboards. When plug is inserted, one end of coil winding is disconnected from the line.	89B or 92B

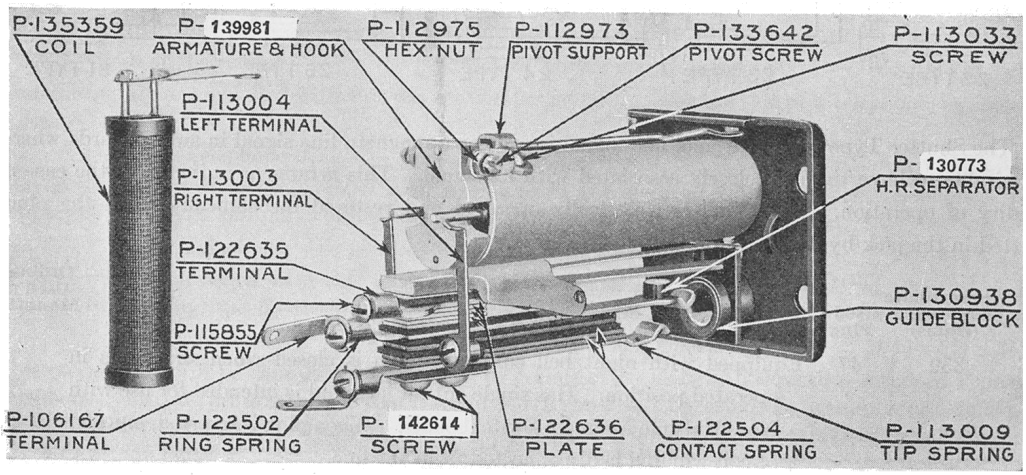
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COMBINED JACKS AND SIGNALS

Shutter Type

Code No.	Approximate Resistance (Ohms)	Used with Plug No.	Description	Ordinarily Used with Mountings No.
23C	350	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 89D or 92B
24C	350	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
26C	350	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
31C	350	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





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W. E. SUPERIOR COMPOUND

This compound has an asphaltic base and is used for filling pot heads, cable terminals, etc. It may be obtained in 1, 5, and 10 pound cartons.

CONDENSERS

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

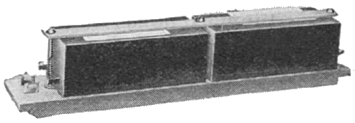
1. High and Constant Insulation Resistance. Not only are the tinfoil and paper units treated with a high grade paraffin wax, but the case in which the units are assembled is entirely filled with waterproofing compound and sealed, thus effectively preventing the entrance of moisture.

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

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

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

Condensers—Mounted Type



No. 33A

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

Code No.	Condensers Used	Capacity Each	Overall Dimensions (Inches)
128-A	1 No. 21-CB	0.85	6⅞ x 7 1/16 x 2 3/16
33-A	2 No. 21-L	2.0	10¾ x 1⅞ x 2⅜
33-B	1 No. 21-L	2.0	10¾ x 1⅞ x 2⅜
33-C	2 No. 21-BW	1.0	10¾ x 1⅞ x 1 11/16
33-D	1 No. 21-BW	1.0	10¾ x 1⅞ x 1 11/16
33-E	2 No. 21-N	0.5 & 1.0	10¾ x 1⅞ x 1⅝
33-F	1 No. 21-AS	0.5	10¾ x 1⅞ x 1 5/16
33-G	2 No. 21-AD	1.0 & 1.0	10¾ x 1⅞ x 2⅜
33-H	4 No. 21-L	2.0	10¾ x 1⅞ x 4⅛
33-L	2 No. 21-AS	0.5	10¾ x 1⅞ x 1 5/16

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

The overall dimensions of the mounted condensers listed below are the same as those given for the No. 33-B 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
33-QD	2 No. 21-QD	2.10	2.14
33-QE	2 No. 21-QE	2.12	2.16
33-QF	2 No. 21-QF	2.14	2.18
33-QG	2 No. 21-QG	2.16	2.20
33-QH	2 No. 21-QH	2.18	2.22

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CONDENSERS—(Continued)

Condensers—Mounting Plate Type

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

The No. 89 Type Condensers are arranged to mount on 1⅛ in. horizontal and 1¾ in. vertical centers.

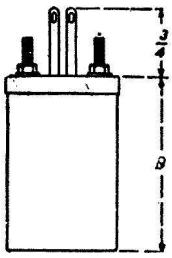


Fig. 3

The No. 90 Type Condensers are arranged to mount on 1¾ in. horizontal and vertical centers.

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

Code No.	Capacity M.F. Max.	Capacity M.F. Min.	Dimensions "B" See Fig. 3
89B	.031 & .031	.019 & .019	$2\frac{15}{32}$
89E	0.338	0.25	$2\frac{15}{32}$
90B	2.70	2.0	$4\frac{17}{32}$

DESCRIPTION

59A A twenty unit condenser arranged to mount on a mounting plate.

Each unit is tested to withstand a 500 volt direct current breakdown voltage.

The capacity of each unit in microfarads is maximum .031–minimum .019.

The overall dimensions are $4\frac{55}{64}$" x $3\frac{37}{64}$" x $1\frac{1}{4}$".

Condensers—Unmounted

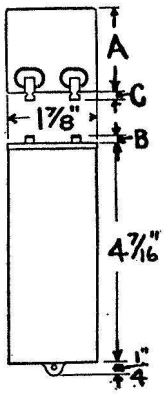
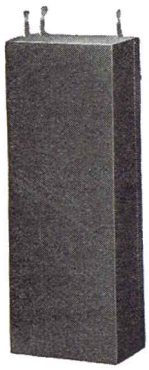


Fig. 1
Bent Terminals


No. 21D


No. 21J

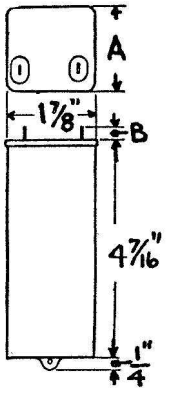
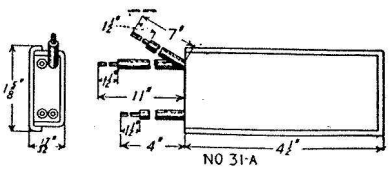


Fig. 2
Straight Terminals



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CONDENSERS—(Continued)

Code No.	Capacity Microfarads	Fig. No.	Dimensions (Inches) A	B	C	Voltage Tested On	Use
21D	2.0	1	1 31/32	1/8	5/32	500 D.C.	Telephone sets
21E	2.0	2	1 5/8	1 1/32	—	500 D.C.	General
21F	1.0	1	31/32	5/32	1/8	500 D.C.	Telephone sets
21H	0.1	1	31/32	5/32	1/8	1200 A.C.	Interrupters
21J	0.3 & 0.3	2	31/32	1 1/32	—	500 A.C.	Railway sets
21K	1.0	2	29/32	5/16	—	500 D.C.	General
21L	2.0	2	1 21/32	1 1/32	—	500 D.C.	Coil racks
21N	1.0 & 0.5	2	29/32	7/32	—	500 D.C.	Coil racks
21R	0.1	2	13/32	3/8	—	500 D.C.	General
21S	0.125, 0.25 & 0.5	2	31/32	1 3/32	—	500 D.C.	Railway sets
21U	0.05	2	31/32	5/16	—	1200 A.C.	Railway sets
21W	0.8	1	31/32	5/32	5/16	350 D.C.	Magneto receiving
21Y	0.25	1	1	5/32	7/32	1200 A.C.	Telegraph
21AA	1.0	1	1 21/32	5/32	7/32	1000 A.C.	Railway sets
21AB	0.125, 0.25 & 0.5	2	1	1 3/32	—	1000 A.C.	Telegraph
21AC	0.5	2	17/32	1 5/32	—	500 D.C.	General
21AD	1.0 & 1.0	2	1 21/32	1 1/32	—	500 D.C.	Railway sets
21AK	0.5	1	31/32	1 1/32	1/8	500 D.C.	4 Terminals
21AL	0.25	1	31/32	5/32	1/8	1000 A.C.	Telegraph
21AS	0.5	2	19/32	7/16	—	500 D.C.	General
21BA	0.01	1	31/32	7/32	1/8	1000 A.C.	General
21BW	1.0	2	31/32	5/16	—	500 D.C.	General
21CB	0.85	2	1 21/32	1 1/32	—	1000 A.C.	Railway
21QD	2.10	2	1 21/32	23/64	—	500 D.C.	Composited circuits
31A	0.05	2	17/32	4	—	500 D.C.	General (see cut)
57A	2.0	2	1 39/64	23/64	—	500 D.C.	Relay racks
57B	1.0	2	31/32	23/64	—	500 D.C.	Relay racks
57AF	0.85	2	1 21/32	23/64	—	1000 D.C.	Relay racks

DESCRIPTION

118A For use as a shunt across a double contact switch consisting of two contacts in series.
Provided with two flexible rubber covered leads 6 inches long.
Capacity in microfarads—Maximum .338—Minimum .25.
Tested to withstand a breakdown voltage of 800 volts A.C.
Overall dimensions 2½" x 2¼" x 1 17/32".

CONDENSER STRAPS

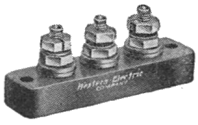
P-43065 A straight galvanized iron strap, overall dimensions 4 13/16 x ½ inches.

P-43121 A galvanized iron clamp, overall dimensions 5 5/16 x 9/16 inches.

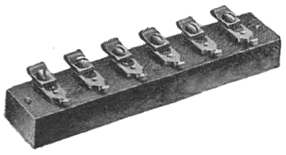
P-48022 A straight galvanized iron strap for mounting two condensers, overall dimensions 9 5/8 x ½ inches.

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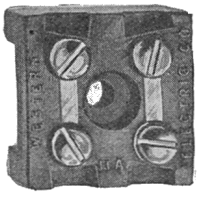
CONNECTING BLOCKS



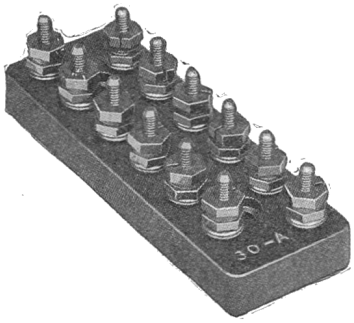
No. 1A



No. 8A

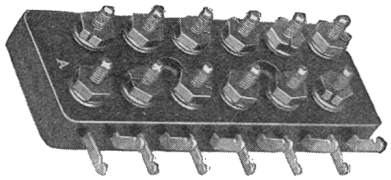


No. 11A



No. 30A

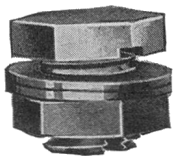
Code No.	No. of Connectors	Type of Connector	Size of Base, Ins. Length	Width	Thickness	Material Base
1A	3	.....	$2\frac{17}{32}$	$\frac{21}{32}$	$\frac{13}{32}$	Composition
8A	6	One screw and cord tip terminal on each connector.....	5	1	$\frac{5}{8}$	Ebonized wood
11A	2	Two screw terminals on each connector	$1\frac{1}{8}$	$1\frac{5}{32}$	$\frac{9}{16}$	Composition
11B	2		$1\frac{1}{8}$	$1\frac{5}{32}$	$\frac{9}{16}$	Composition
	(The No. 11B is the same as No. 11A, except that it is equipped with a black finished metal cover.)					
12C	3	Two screw terminals on each connector	$1\frac{15}{16}$	$1\frac{3}{8}$	$\frac{9}{16}$	Composition
12D	3		$1\frac{11}{16}$	$1\frac{3}{8}$	$\frac{9}{16}$	Composition
	(The No. 12D is the same as the No. 12C except that it is equipped with a black finished metal cover.)					
18A	15	For use with No. 209 Type Relays. Adapted to mount on mounting plates of No. 823 or similar Type...	$2\frac{31}{64}$	$2\frac{1}{32}$	$1\frac{25}{32}$	.....
18B	8	Same as 18A except for use with No. 215 Type Relays.....	$2\frac{31}{64}$	$2\frac{1}{32}$	$1\frac{25}{32}$	.....
26B	4	For use with No. 218B Relays. Adapted to mount on mounting plates $\frac{7}{32}$" thick.....	$3\frac{1}{8}$	$\frac{17}{32}$	$2\frac{11}{16}$	.....
30A	12	Binding posts have lock nuts, with posts spun over to prevent loss of lock nuts.....	$4\frac{3}{16}$	$1\frac{1}{2}$	$\frac{1}{2}$	Composition
30B	22		$7\frac{5}{16}$	$1\frac{1}{2}$	$\frac{1}{2}$	Composition
30C	32		$10\frac{7}{16}$	$1\frac{1}{2}$	$\frac{1}{2}$	Composition
30D	52		$16\frac{11}{16}$	$1\frac{1}{2}$	$\frac{1}{2}$	Composition



No. 31A

Code No.	No. of Connectors	Type of Connector	Size of Base, Ins. Length	Width	Thickness	Material Base
31A	12	Each connector has one lock nut binding post and one soldering terminal, brought out on the side.....	$4\frac{3}{16}$	$1\frac{1}{2}$	$\frac{1}{2}$	Composition
31B	22		$7\frac{5}{16}$	$1\frac{1}{2}$	$\frac{1}{2}$	Composition
31C	32		$10\frac{7}{16}$	$1\frac{1}{2}$	$\frac{1}{2}$	Composition
31D	52		$16\frac{11}{16}$	$1\frac{1}{2}$	$\frac{1}{2}$	Composition

CONNECTORS (BRIDGING TEST)



No. 3
Test Connector

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

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CORDS

General

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

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

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

Switchboard Cords

CONSTRUCTION

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

1. Six tinsel threads, each consisting of a metal ribbon wound around a strong cotton thread, are twisted together to form a strand. The tinsel thread used is of special manufacture and made under the Western Electric Company's own rigid specifications. The characteristic most strongly emphasized is freedom from noise after long service.

2. Three of the above strands are twisted together to form a conductor. It will be noted, therefore, that each conductor contains eighteen threads. The flexibility of these strands is remarkable.

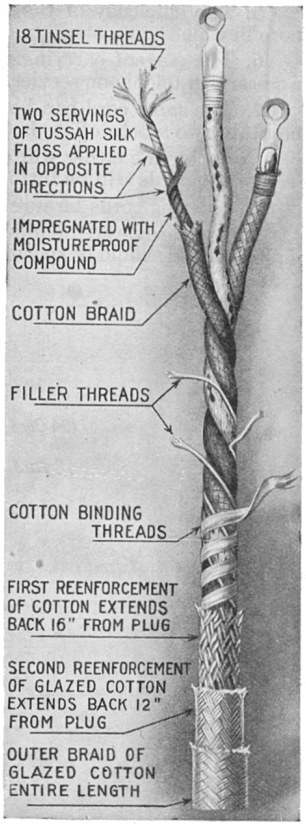
3. Each conductor is covered with two heavy servings (wrappings) of Tussah Floss Silk for the purpose of insulation.

4. These silk insulated conductors are then impregnated with an asphaltic moisture proofing compound. This compound is flexible, does not harden with age, and minimizes corrosion.

5. After this moisture proofing is applied each conductor is further insulated and protected by means of a heavy cotton braiding.

6. Two or three of these conductors are then twisted together to form the body of the cord.

7. In order that the external surface of the cord may be smooth, the spaces between the twisted conductors are filled with cotton twine.



Steps In the Construction of a Western Electric Tinsel Switchboard Cord

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.

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CORDS

Switchboard Cords—Continued

ADVANTAGES

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

1. The life is longer than any other cord manufactured.

2. The moisture-proofing feature makes their use possible in damp and humid climates for long periods without the necessity of making frequent changes.

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

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

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

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

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

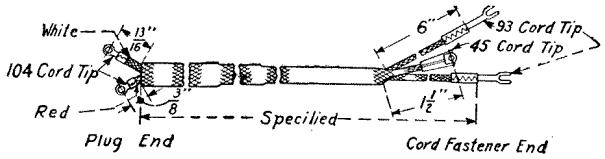
7. The same cord can be used interchangeably for either toll or local service. It is not necessary to maintain two stocks of cords.

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

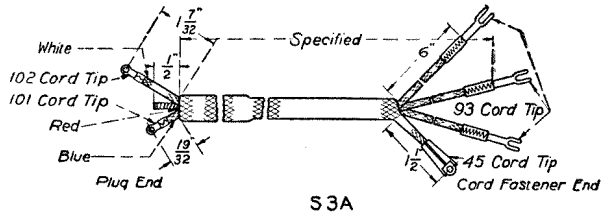
In ordering cords be sure to specify length, observing standard stock lengths as listed.

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

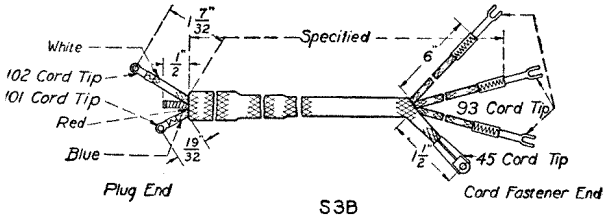
Switchboard Cords



S2A



S3A



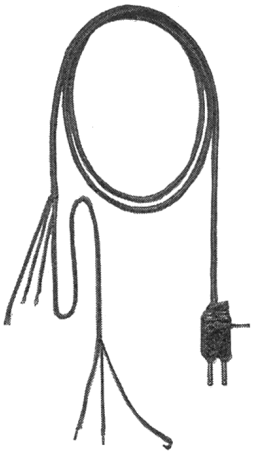
S3B

Code No.	Replaces	Conductors	Plug No.	Outer Braid	Cord Tips: Plug End	Cord Tips: Fastener End	Standard Lengths
S1A	511	1	116	White	45	75 and 8	4 ft., 6 ft. 3 in.
S2A	493	2	27, 32, 47, 53, 55	White	38	45 and 93	6¼ ft., 4 ft., 8 ft.
S2B	635	2	110	White	47	93 and 45	6¼ ft., 4 ft., 8 ft.
S3A	447	3	109	White	47	93 and 45	6 ft. 3 in., 8 ft.
S3B	448	3	110	White	47	93 and 45	6 ft. 3 in., 4 ft., 5 ft., 8 ft.

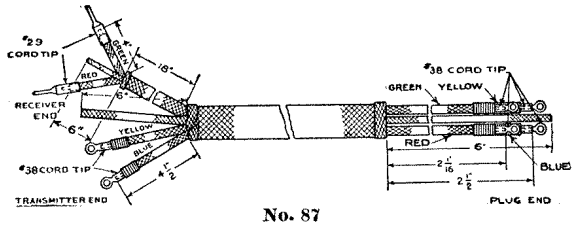
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CORDS

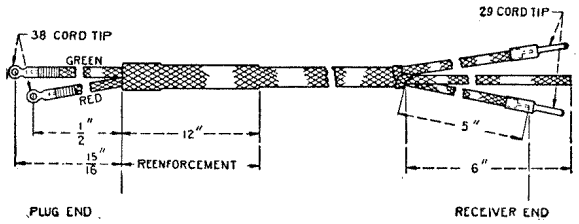
Switchboard Cords—Continued



No. 87 Cord with
No. 137 Plug



No. 87



No. 369

OPERATORS' TELEPHONE CORDS

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

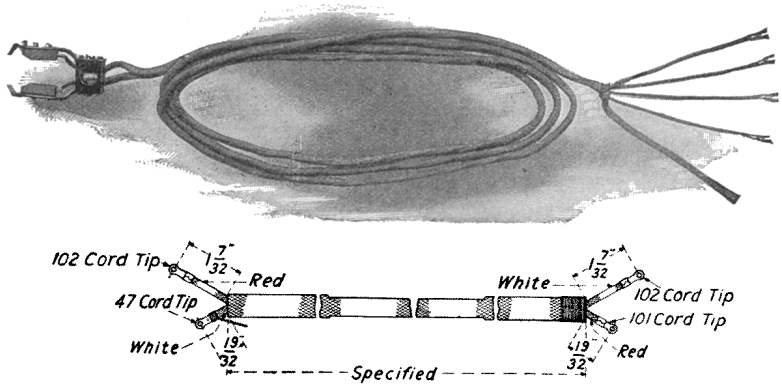
Standard tinsel cords with cotton and brown silk insulation.

Code No.	Use	Conductors	For W.E. Plug No.	Cord Tips—Plug End	Cord Tips—Set End	Standard Lengths
11	Head receiver on multiple magneto switchboards	3	...	29	62	5 ft. 2 in.
87	Head receiver and breast transmitter	4	137	38 & 77	38 & 29	4 ft. 6 ft. 10 ft.
254	No. 128 Receiver on Nos. 9 and 105 Switchboards	2	137	29	38 & 77	4 ft. 1 in. 5 ft. 7 in.
330	Transmitter cord on PBX switchboards	1	...	56	62	6 ft. 5 ft.
369	No. 128 Receiver on No. 1200 Type Switchboards	2	136	38	29	5 ft. 7 in.
437	Suspended type switchboard transmitters	1	...	29	103	6 ft.

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CORDS

Miscellaneous Central Office Cords



Code No.	Replaces	Use	Conductors	For W.E. Plug	Outer Braid	Cord Tips: Plug End	Cord Tips: Set End	Standard Lengths
510		Patching	1	2 No. 116	White	2 No. 75	—	2 ft.
855		Patching	2	2 No. 241	White	4 No. 47	—	3 ft.
P2A	516	Patching	2	2 No. 47	Red	4 No. 38	—	1 ft. 2 ft. 3 ft. 4 ft. 6 ft.
P2B	515	Patching	2	2 No. 110	Green	4 No. 47	—	
P2G		Patching	2	2 No. 109	White	4 No. 47	—	10 ft.
P3A		Line busy	3	2 No. 110	Brown	5 No. 47	—	3 ft.
P4A	659	Patching	4	2 No. 154	White	8 No. 38	—	1 ft. 2 ft. 3 ft. 4 ft. 6 ft.
P4B		Patching	4	2 No. 152	Black	2 No. 38 2 No. 77	—	10 ft.
W1A W1C	524	For service observing Test cord for checking message register cross connections in step-by-step system	1 1	No. 144 1 No. 116	Green Green	1 No. 59 1 No. 75	— —	20 ft. 20 ft.
W2D	557	Test cord for local test desks	2	—	Green	2 No. 92 2 No. 50	—	19 ft. 6 in.
W2F	570	Test cord for local test desks	2	1 No. 47	Green	2 No. 38 2 No. 50	—	9½ ft.
W2J	657	Testing toll circuits	2	1 No. 110	Green	2 No. 47 2 No. 29	—	9½ ft.

Code No.	Replaces	Use	Conductors	For W.E. Plug No.	Cord Tips: Plug End	Cord Tips: Set End	Standard Lengths
539		Wire chief and chief operator's head receiver	2	148	38	29	5½ ft. 4 ft.
D4D	529	Receiver cord on Nos. 20 and 40AH Deskstands in exchange	2	148	38	29	5½ ft. 4 ft.
L2A		No. 528 Receiver on PBX switchboards	2		38	80	4 ft. 5 ft. 6 in.
L3C	538	Head receivers on multiple magneto switchboards	3	148	104	29	5 ft. 6 in.
L4D	748	Headset and transmitter cord on Nos. 550C and 600 PBX Switchboards	4	137	77	29 & 76	4 ft. 6 ft. 10 ft.
L4E	848	Head receiver and breast transmitter	4	137	38 & 77	80	4 ft. 6 ft. 10 ft.

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CORDS

Telephone Set Cords

STANDARD TINSEL CORDS

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

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

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

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

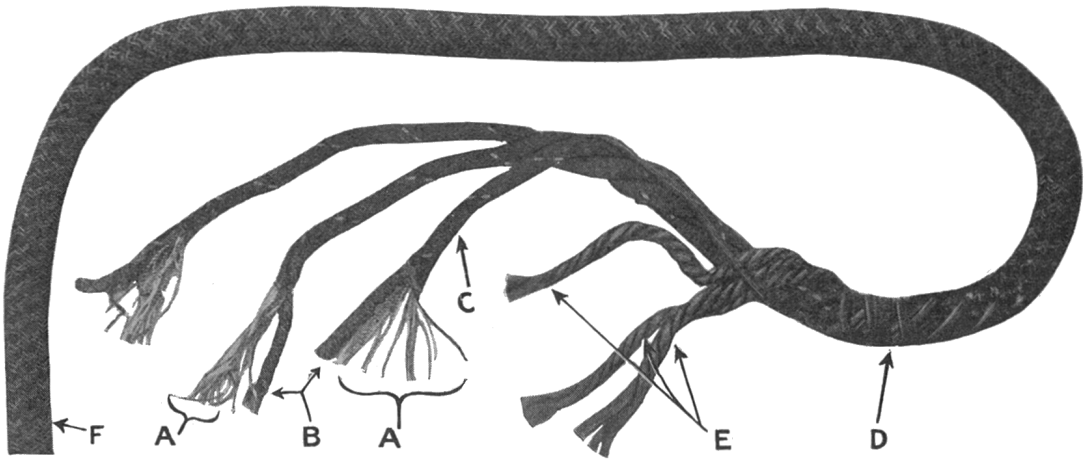
The worsted cord has its individual conductors insulated with a serving of cotton, a braiding of cotton and a braiding of worsted. The required number of conductors are then covered with a final braiding of brown worsted.

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

MOISTURE-PROOFED CORDS

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

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



Construction of a Typical Three Conductor Moisture-proofed Telephone Cord

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

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

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

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

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

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

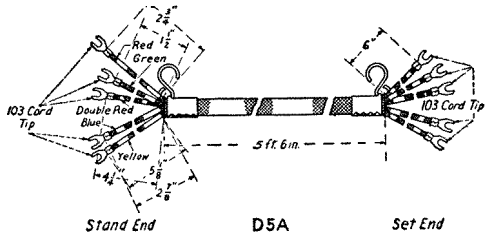
WATER-PROOFED CORDS

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

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CORDS

Deskstand Connecting Cords



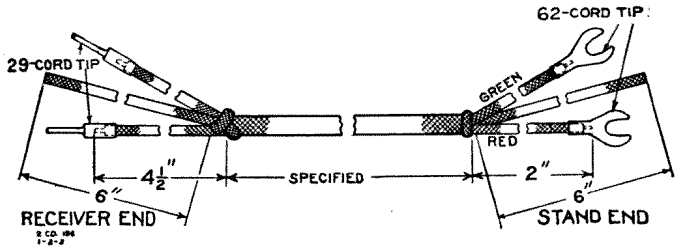
Code No.	Replaces	Type	Deskstands Used with	Conductors	Cord Tips: Stand End	Cord Tips: Set End	Tracer Colors	Standard Lengths
287		Moistureproof	20CH & CN	6	62	62	Red, Green, Dbl. Red, Blue, Yellow, White	5½ ft.
D4H	543	Waterproof	20BS-BU-CF, 40BS-BU-CF	4	62	62	.....	5½ ft.
D5A		Moistureproof	40R-CN, 51C-CN	5	103	103	Red, Green, Dbl. Red, Blue, Yellow	5½ ft.
D5C	718	Moistureproof	20 & 40BU	5	103	103	Red, Green, Dbl. Red, Blue, Yellow	5½ ft.
355		Tinsel silk	20CH & CN in No. 1 Residence System	5	62	62	Red, Green, Dbl. Red, Blue, Yellow	5½ ft.
D3A		Moistureproof	51AL-CM-CN, 52AB	3	62	62	Yellow, White, Green	5½ ft.
D4D	529	Moistureproof	20 & 40AH	4	92	55	Green, Yellow, White, Dbl. Yellow	6 ft.
D8A		Moistureproof	50G	8	85	92	Green, White, Red, Blue, Dbl. Yellow, Dbl. Blue, Dbl. Red, Yellow	5½ ft.

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CORDS

Deskstand Receiver Cords

(DOUBLE CONDUCTOR)



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

Code No.	Type	Deskstand Used with	Cord Tips: Receiver End	Cord Tips: Stand End	Tracer Colors	Standard Lengths
196	Tinsel silk	40CN	29	62	Green / Red	2½ ft. / 3 ft.
549	Tinsel silk	40CF	29	62	Green / Red	2½ ft.
549B	Tinsel silk	50 Type	29	85	Green / White	2½ ft.
554	Tinsel silk	20AA / 20AB	69	103	Green / Red	2½ ft.
571	Tinsel silk	20 when 190W Rec. is used	69	103	.....	5½ ft.

Code No.	Replaces	Type	Deskstand Used with	Cord Tips: Receiver End	Cord Tips: Stand End	Tracer Colors	Standard Lengths
R2S	528	Tinsel silk	20AH / 40AH	29	103	Yellow / Green	2½ ft.
R2W	345	Tinsel silk	20R / 40R	29	103	Green / Red	2½ ft.
R2Y	412	Tinsel silk	20U-CN / 40U-CN	103	103	Green / Red	2½ ft.
R2AB		Tinsel silk	20CJ / 41CJ / 20CN / 40CN	29	103	Green / Red	2½ ft.

Deskstand Transmitter Cords

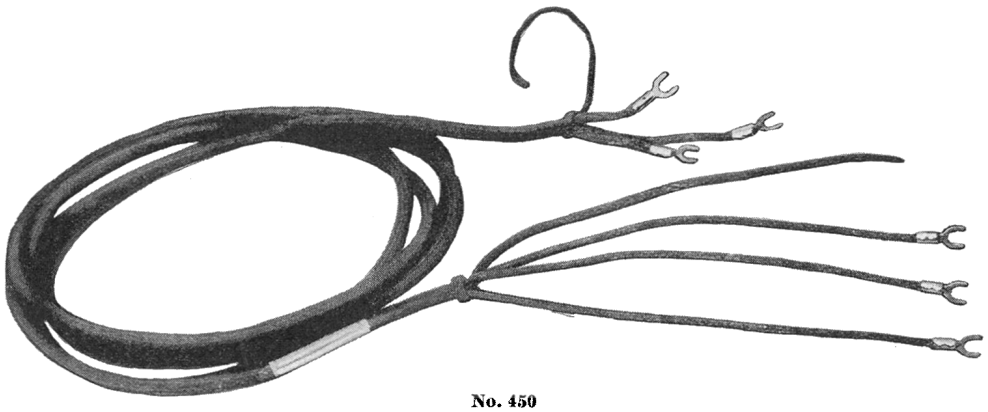
(SINGLE CONDUCTOR)

Code No.	Replaces	Type	Deskstand Used with	Cord Tips: Transmitter End	Cord Tips: Set End	Tracer Colors	Standard Lengths
329		Tinsel silk	40AH	56	62	Red	9⅞ in.
330		Tinsel silk	40AH	56	62	.....	6 ft. / 5 ft.
423		Moistureproof	20 Type	61	92	.....	9½ in.
426		Moistureproof	20 Type	97	92	Yellow	9⅞ in.
427		Moistureproof	42AB-BR / 20AL-PC	97	92	Dbl. Yellow	9⅞ in.
T1A	547	Tinsel silk	40R-U-CN / 41CJ, 44BG	98	103	Dbl. Yellow	9⅞ in.

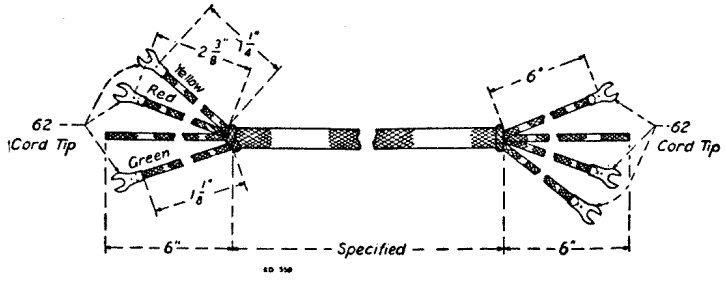
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CORDS

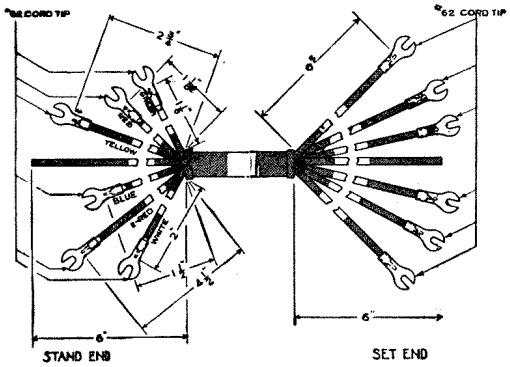
Telephone Arm Connecting Cords



No. 450



No. 550



No. 287

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

Code No.	Type	Telephone Arm Used with	Cord Tips: Trans. End	Cord Tips: Set End	Tracer Colors	Conductors	Standard Lengths
287	Moistureproof	405	62	62	Red, Green, Yellow, Blue, Dbl. Red, White	6	5½ ft., 8 ft., 10 ft.
409	Moistureproof	48D	92	92	Red, Yellow, Green	3	6 ft.
416	Moistureproof	20E	92	92	Red, Yellow, Green	3	6 ft.
450	1–No. 550, 1–No. 549, 2–T1A	40P	..	..	.....	..	5½ ft.
461	Waterproof	20	62	29	Red, Green, Yellow	3	5½ ft.
550	Moistureproof	40P	103	103	Red, Yellow, Green	3	5½ ft.
D3A	Moistureproof	20CC	62	62	Red, Yellow, Green	3	5½ ft., 8 ft., 11 ft., 15 ft., 25 ft.

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CORDS

Telephone Arm Receiver Cords

(DOUBLE CONDUCTOR)

Code No.	Replaces	Type Cord	Telephone Arm Used with	Cord Tips: Receiver End	Cord Tips: Set End	Tracer Colors	Standard Lengths
196		Tinsel silk	40BS, 48B	29	62	Green, Red	2½ ft., 3 ft.
549		Tinsel silk	40P	29	62	Green, White	2½ ft.
554		Tinsel silk	20C, D, 48DA, DB, DC, & DD with 186 Receiver	69	103	Green, Red	2½ ft.
R2A		Tinsel silk	20CC	92	92	Green, White	2½ ft.

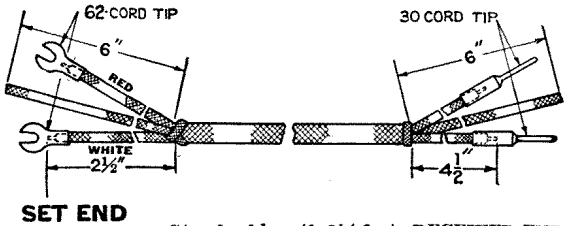
Telephone Arm Transmitter Cords

(SINGLE CONDUCTOR)

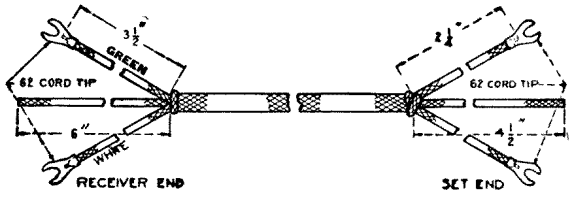
				Cord Tips: Trans. End	Cord Tips: Set End		
423		Tinsel silk	48	61	92	.....	9⅞ in.
426		Tinsel silk	20E & 48D	97	92	Yellow	9⅞ in.
427		Moistureproof	20E & 48D	97	92	Dbl. Yellow	9⅞ in.
437		Tinsel silk	52	29	103	.....	6 ft.
T1A	547	Tinsel silk	20CC, 40P, S, 48B	98	103	Dbl. Yellow	9⅞ in.

Wall Telephone Receiver Cords

(DOUBLE CONDUCTOR)



Standard length 2½ feet RECEIVER END
No. 92



No. 384

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

Code No.	Type	Used with	Cord Tips: Rec. End	Cord Tips: Set End	Tracer Colors	Standard Lengths
10	Tinsel silk	Exposed binding post receivers	29	62	Red, Green	2½ ft., 5½ ft.
357	Waterproof	1320A Telephone Set	29	29	.....	Specified
383	Waterproof	336 and 337 Subscriber Sets	62	62	White, Green	10½ in.
384	Waterproof	No. 1336 Mine Telephones	62	62	White, Green	10½ in.
408	Moistureproof	Headband receivers	29 & 76	62	White, Green	2½ ft.
446	Moistureproof	1317W-AD, 1305AC, 1293AD-AK Telephone Sets	29 & 76	62	.....	2½ ft.

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CORDS

Wall Telephone Receiver Cords—Continued

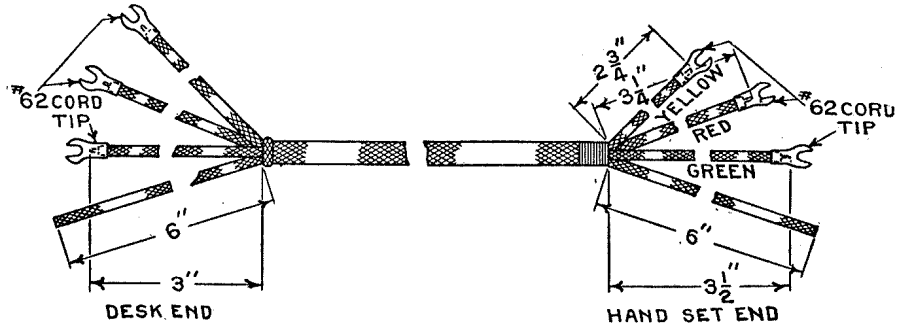
Code No.	Replaces	Type	Used with	Cord Tips Rec. End	Cord Tips Set End	Tracer Colors	Standard Lengths
521		Tinsel worsted	Concealed binding post receivers	105	105	White Green	2½ ft.
R2G	92	Tinsel worsted	1317 Type	62	62	White Green	2½ ft.
R2AD		Waterproof	1536E Tel. Set	..	..	Black White	12½ in.
R2AJ		Waterproof	1526A & B Tel. Sets	80	105	.....	3 ft.

Wall Telephone Transmitter Cords

(SINGLE CONDUCTOR)

Code No.	Replaces	Type	Used with	Cord Tips Trans. End	Cord Tips Set End	Tracer Colors	Standard Lengths
385		Moistureproof	Mine Telephones, etc.	56	62	.....	7 in.
T1A	547	Tinsel silk	Insulated Transmitters	93	103	Dbl. Yellow	9⅞ in.

Handset and Handset Mounting Connecting Cords



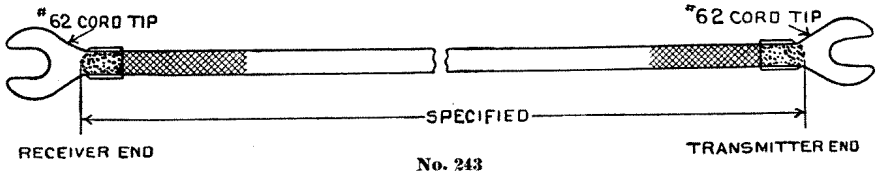
No. 422

Code No.	Type	Used with	Con-ductors	Cord Tips Handset End	Cord Tips Mtg. End	Cord Tips Set End	Tracer Colors	Standard Lengths
318	Tinsel silk	1002AC Handset	3	56	...	92	Red Green Yellow	4½ ft.
366	Tinsel silk	1001C Handset	3	62	...	62	Red Green Yellow	6 ft.
422	Waterproof	1001H Handset	3	62	...	62	Red Green Yellow	6 ft.
574	Waterproof	1001A Handset	1	62	...	Spec.	.....	5 ft. 3 ft.
D3H	Moistureproof	B1 Handset Mtg.	3	...	103	103	Red Green Yellow	5½ ft.
H3B	Moistureproof	D-87415 Handset	3	100	103	...	Red White Black	4 ft. 7 ft. 10 ft.
H4A	Waterproof	No. 1D Handset Handle	4	62	...	62	Red Blue White Yellow	4 ft.

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CORDS

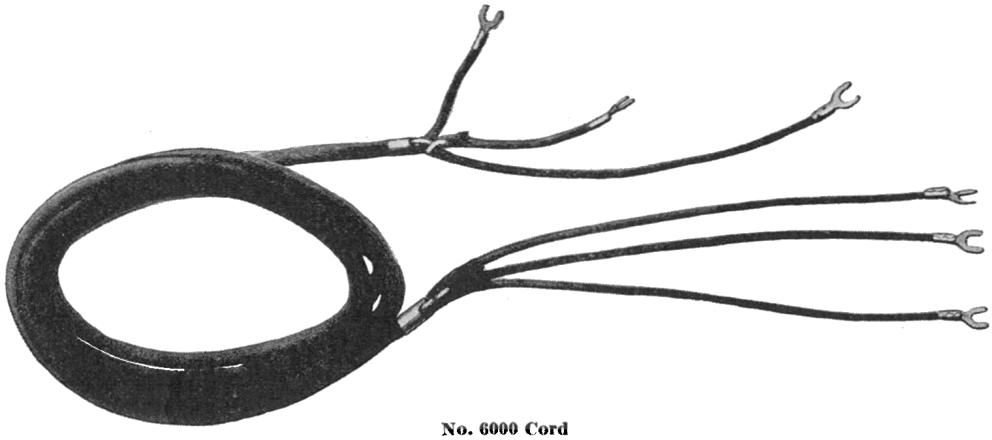
Handset Transmitter Cords



No. 243

Code No.	Type	Used with	Conductors	Cord Tips — Trans. End	Cord Tips — Set End	Tracer Colors	Standard Lengths
243	Tinsel silk	1001A Handset	1	62	62	..	8 in.
336	Tinsel silk	1002AC Handset	1	56	Loop	Red	4½ in.
415	Tinsel silk	1002AC Handset	1	56	56	..	9½ in.

Combination Cords



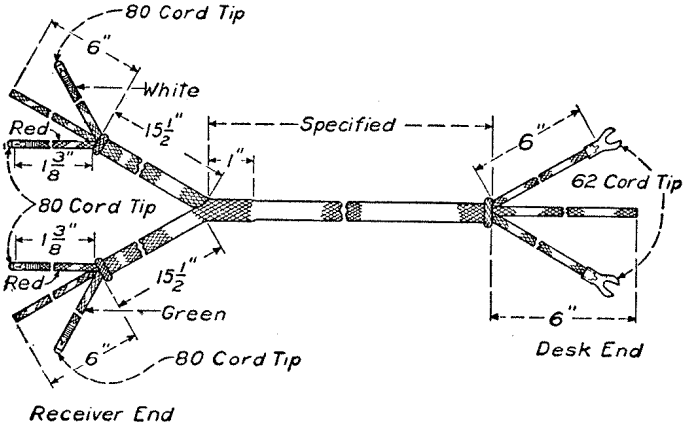
No. 6000 Cord

Code No.	Consists of	Deskstands Used with
450	1—No. 550—5½ ft. 1—No. 549—2½ ft. 2—T1A—9⅞ in.	40AL
6000	1—D3A—5½ ft. 1—D3B—9 in. 1—R2A—2½ ft. 1—T1A—9⅞ in.	51AL and CN
6002	1—D5A—5½ ft. 1—D5B—9 in. 1—R2A—2½ ft. 1—T1A—9⅞ in.	51C and 51CN
6003	1—547B—9⅞ in. 1—D4A—11 in. 1—7A—5½ ft. 1—R2L—2½ ft.	50F
6005	2—547B—9⅞ in. 1—549B—2½ ft. 1—770B—11 in. 1—D8A—5½ ft.	50G
6007	1—D3A—5½ ft. 1—D3B—9 in. 1—R2J—2½ ft. 1—T1A—9⅞ in.	52AB
6008	1—D3C—5½ ft. 1—D3B—9 in. 1—92B—2½ ft. 1—T1A—9⅞ in.	51AL
6009	1—D3A—5½ ft. 1—R2A—2½ ft. 2—T1A—9⅞ in.	20AL, CM, PC, 40AL and CM
6011	1—D4B—5½ ft. 1—R2A—2½ ft. 2—T1A—9⅞ in.	20AL, BS, BU, CF, 40AL, BS, BU, CF
6012	1—D5C—5½ ft. 1—R2A—2½ ft. 2—T1A—9⅞ in.	20 and 40BU
6014	1—D5A—5½ ft. 1—R2A—2½ ft. 2—T1A—9⅞ in.	20 and 40CN
6015	1—D4D—6 ft. 1—R2S—2½ ft. 1—329—9⅞ in.	20AH and 40AH
6016	1—R2AB—5½ ft. 2—T1A—9⅞ in.	20CJ and 41CJ
6022	1—D3H—5½ ft. 1—M1E—5½ in. 1—M1E—4½ in.	B1 Handset Mtg.

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CORDS

Miscellaneous Test Set and Telephone Cords



No. 696

Code No.	Type	Used with	Conductors	Cord Tips: Rec. End	Cord Tips: Set End	Tracer Colors	Standard Lengths
523	Waterproof	Receiver Cord with No. 1 & 17 Type Test Sets	2	30 & 76	30	Red, White	2 ft.
537	Waterproof	Receiver Cord with 19A Test Set	2	30	30	Red, White	4 ft.
540	Moistureproof	To connect Dry Cells	1	..	..	.....	Specify
572	Waterproof	Receiver Cord with special 189W Receiver on 1017 Type Test Set	2	78	30	.....	2 ft.
574	Waterproof	Test Cord with 1001A Handset	1	62	Frankel	.....	5 ft., 3 ft.
584	Waterproof	Receiver Cord to connect two No. 528 Receivers in series. No. 19 Type Test Set	2	80	30	Red, Green	4 ft. 3 in.
696	Tinsel silk	For connecting two No. 528BW Receivers in series	2	80	62	Green, White	4 ft. 3 in.
736	Waterproof	No. 17 Type Test Sets on Open wire lines	2	62	62	.....	6 ft.
744	Waterproof	For testing lines at connecting boxes	2	30 & 38	Frankel	.....	2½ ft.
747	Waterproof	No. 528 Receiver on No. 19C Test Set	2	80	30	Red, White	4 ft.
763	Tinsel silk	1002 Type Headsets	2	80	..	Red, White	3½ ft.
765	Stranded cotton	Part of 6000A and D Dial Mtgs.	5	87	91	Red, Green, White, Blue, Yellow	2¾ in.
862	Tinsel silk	Receiver Cord on 540AW Receiver	2	92	29	.....	10 ft.
D5B	Stranded cotton	Connect switch & base in 51C & CN Desk-stands	5	87 & 86	97 & 86	Black, Red, Blue, Dbl. Red, Dbl. Blue	9 in.
P3C	Moistureproof	No. 35 Test Set	3	47	47	Red, White, Blue	10 ft.

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CORD ACCESSORIES

Cord Fasteners



No. 9

Code No.	Description
9	This cord fastener is made of tinned brass. The screw end is spun over. Used on cord shelves with all types of switchboard cords.

Cord Hooks



No. 3



No. 5



No. 7A, 3 per strip

Code No.	Description
3	Bright iron wire screw hook, overall length $1\frac{5}{8}$″.
5	Brass: overall length $1\frac{1}{16}$″.
6	Brass screw hook similar to No. 5 except that the hook end is bent out.

NO. 7 TYPE

The No. 7 Type Cord Hook is designed for placement on the rear edge of cord shelves and consists of a flat brass strip $\frac{1}{16}$″ thick x $\frac{3}{4}$″ wide. The hooks are punched out and formed on various spacings as listed below:

The mounting holes are located $\frac{3}{16}$″ from the top and bottom edge alternately at convenient distances from each other according to the length of the strip. When only two holes per strip are ordered the mounting holes are located one above the other. Furnished complete with mounting screws.

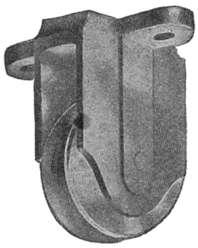
These hooks are furnished with any number of hooks per strip from 2 to 32 and the number of hooks per strip desired must be specified in the order.

Code No.	Spacing of Hooks (Inches)	Maximum Number of Hooks per Strip	To Obtain Overall Length in Inches
7A	$\frac{27}{32}$	14	Multiply number of hooks per strip by spacing and subtract $\frac{1}{16}$″.
7C	$\frac{3}{4}$	16	Multiply number of hooks per strip by spacing and subtract $\frac{1}{16}$″.

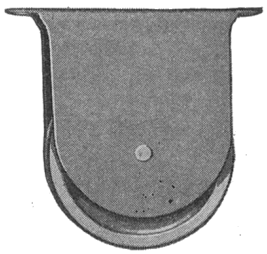
NO. 9 TYPE

This is a black finished metal hook used for holding patching cords and operator's telephone sets when not in use. Overall dimensions $3\frac{1}{2}$ x $3\frac{13}{32}$ x $\frac{3}{4}$ inches.

CORD PULLEYS



No. 106



No. 112 Cord Pulley

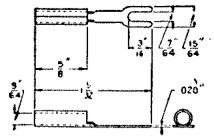
Note. Both types listed may be used for switchboard or telephone cords.

Code No.	Description
106	Brass frame supporting a brass wheel $\frac{9}{32}$″ wide. The wheel rim surface is a sharp groove. The mounting lugs are at the side of the frame. Overall dimensions $1\frac{3}{16}$ x $\frac{7}{8}$ x $1\frac{1}{2}$″.
112	Steel frame supporting a brass wheel $\frac{1}{4}$″ wide. The rim of the wheel is a round groove. The steel frame is galvanized and the mounting lugs are at the ends. Overall dimensions $2\frac{5}{16}$ x $2\frac{3}{32}$ x $2\frac{5}{64}$″.

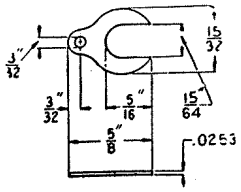
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CORD TIPS

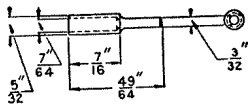
All Cord Tips are Made of Brass



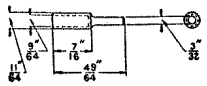
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Tinned



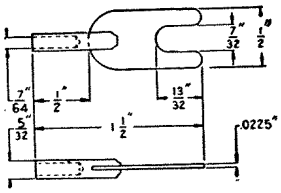
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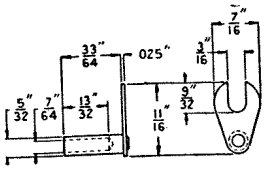
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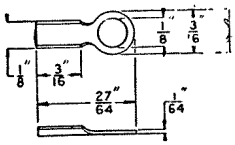
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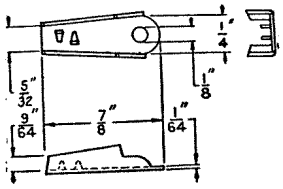
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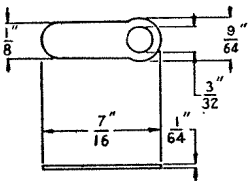
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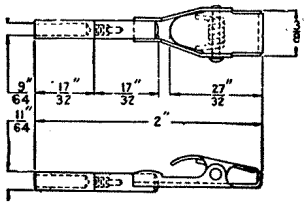
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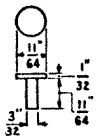
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Brass



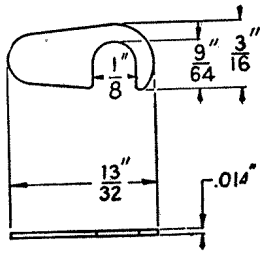
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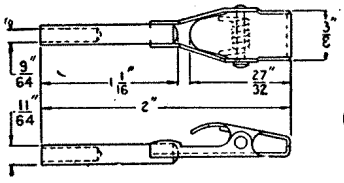
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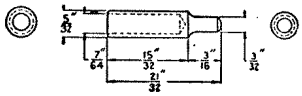
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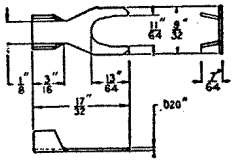
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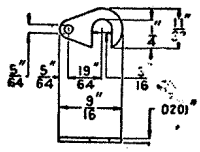
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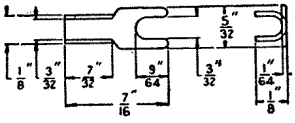
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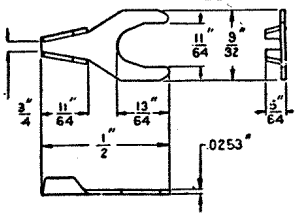
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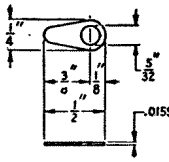
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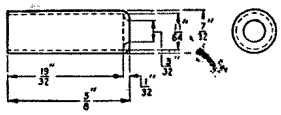
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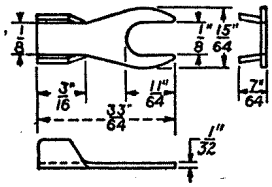
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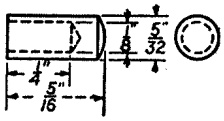
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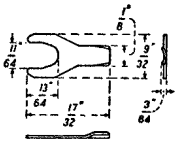
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Rubber



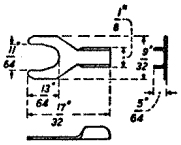
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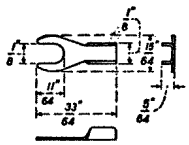
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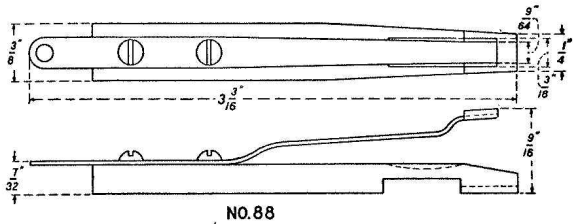
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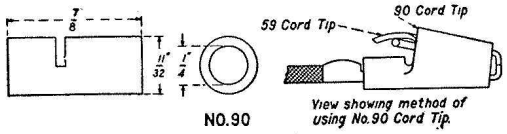
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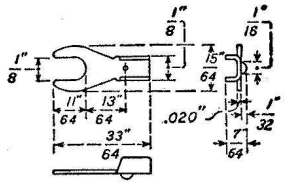
CORD TIPS



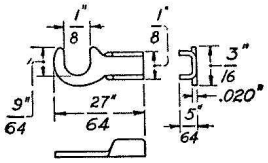
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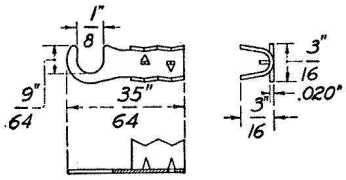
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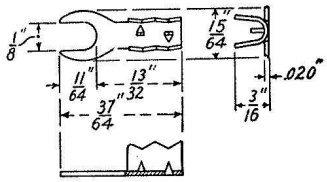
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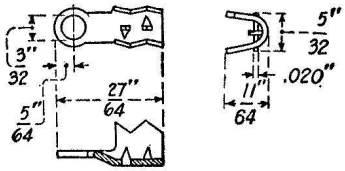
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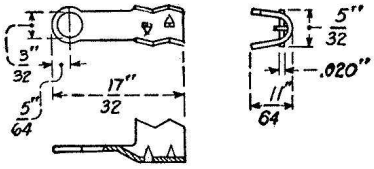
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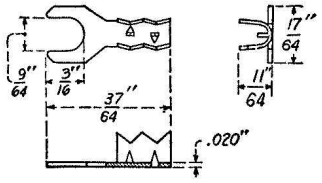
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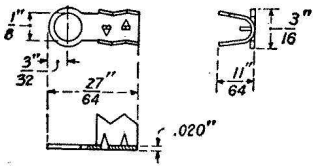
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NO. 102

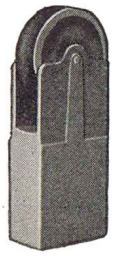


NO.103



NO.104

CORD WEIGHTS



No. 117



No. 118



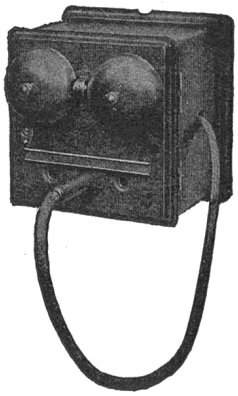
No. 119

Code No.	Description	Use
117	18 oz. single pulley brass weight. Pulley wheel $1\frac{1}{32}$" wide. Overall dimensions $\frac{5}{8}$ x $2\frac{5}{16}$ x 4 inches.	General
118	$29\frac{1}{2}$ oz. double pulley iron weight, galvanized finish. Pulley wheel $\frac{1}{4}$" wide; wheel space $2\frac{3}{4}$" centers. Overall dimensions $1\frac{3}{32}$ x $4\frac{11}{16}$ x $7\frac{37}{64}$ inches.	In switchboards when double length cord is required.
119	$9\frac{1}{2}$ oz. single pulley, cast iron weight, galvanized finish. Pulley wheel $\frac{1}{4}$" wide. Overall dimensions $\frac{7}{16}$ x $2\frac{5}{16}$ x $4\frac{7}{16}$ inches. Replaces the No. 116 Cord Weight.	Used in Nos. 1240, 1962, 1948 and other types of switchboards.
120	$12\frac{1}{2}$ oz. single pulley, cast iron weight. Pulley wheel $\frac{1}{4}$ inch. Overall dimensions $\frac{7}{16}$ x $2\frac{5}{8}$ x $4\frac{23}{32}$ inches.	Same as No. 119.

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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, 7½" square and depth through bells, approximately 6 inches. Woodwork, oak, gongs, black.

Code No.	Description
319E	1020 ohm ringers
319F	1620 ohm ringers
319G	2500 ohm ringers

DESIGNATION STRIPS



Wood Type with Metal Face



Wood Type with Rubber Face



Wood Type with Celluloid Face



Metal Face

WOODEN TYPE WITH METAL FACE

These consist of a wooden mounting strip with a black finished No. 8 Type Designation Strip attached to the face and are for use in designating outgoing trunk jacks, etc.

Code No.	Width of Face, Ins.	Length		Used with	
		Overall	Face	Jack Mountings	No. Plates
1C 1G*	7/16 3/8	9 13/16	9 3/16	Nos. 1, 2, 3, 21, 22, 34, 36, 46, 47, 62, 63, 75, 77, 84, 85	
6F	3/8	8 3/32	7 23/32	Nos. 18, 19, 20, 83, 102, 113	
10E	7/16	11 3/16	10½	Nos. 4, 5, 6, 7, 8, 35, 37, 45, 89, 115	
51A	1	11 9/16	11 3/16	Nos. 108, 109, 110, 112	
62A	1	9 13/16	9 3/16	Nos. 1, 2, 3, 21, 22, 34, 46, 47, 62, 63, 75, 77, 84, 85, 114, 141, 142, 143, 144	

* Has a 1/16" Holly Strip mounted on top. The width of face as given above includes the holly strip.

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DESIGNATION STRIPS—Continued

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.	Width of Face Ins.	Length Overall	Length Face	Used with Jack Mountings	Used with No. Plates
7A 7B	7/16 1/2	9 13/16	9 3/16	Nos. 1, 2, 3, 21, 22, 34, 36, 46, 47, 62, 63, 75, 77, 84, 85	
24A	7/16	11 1/8	10 1/2	Nos. 6, 7, 8, 35, 37, 45, 89, 115, 116	
55A 55B	7/16 1/2	11 9/16	11 3/16	Nos. 108, 109, 110, 112	

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.

14A	3/8	8 3/32	7 23/32	Nos. 18, 19, 20, 83, 102, 113, 155	Nos. 6, 30 or 60
50A	7/16	11 9/16	11 3/16	Nos. 108, 109, 110, 112	Nos. 4, 31, 32 or 59

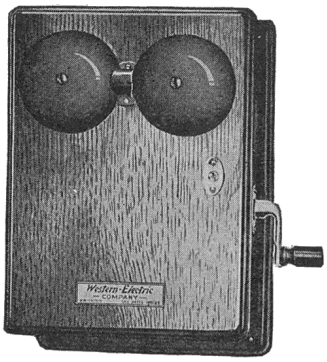
METAL TYPE

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

The No. 90-A is intended to mount on Nos. 184 and 185 Jack Mountings and No. 262 Lamp Socket Mountings and is arranged to accommodate a designation cord for each pair of jacks or lamps.

Code No.	Width, Ins.	Length
8G	7/16	Specified
8H	3/8	Specified
8K	5/8	6 1/8″
8L	7/16	Specified
8M	3/8	Specified
8P	7/16	22 13/16″
8R	7/16	27 5/16″
8U	5/8	Specified
43B	39/64	1 1/2″
43C	39/64	1 1/4″
43D	3/4	1 1/4″
90A	7/16	15 1/16″

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Nos. 300 and 315 Type Desk Set Boxes

DESK SET BOXES—MAGNETO

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

The Nos. 300 and 315 type Desk Set Boxes may be used with the following apparatus or its equivalent:

1040AL Desk Stand
1020CC Transmitter Arm
1048 Type Transmitter Arms
1001C and H Hand Sets
1002AC Hand Set

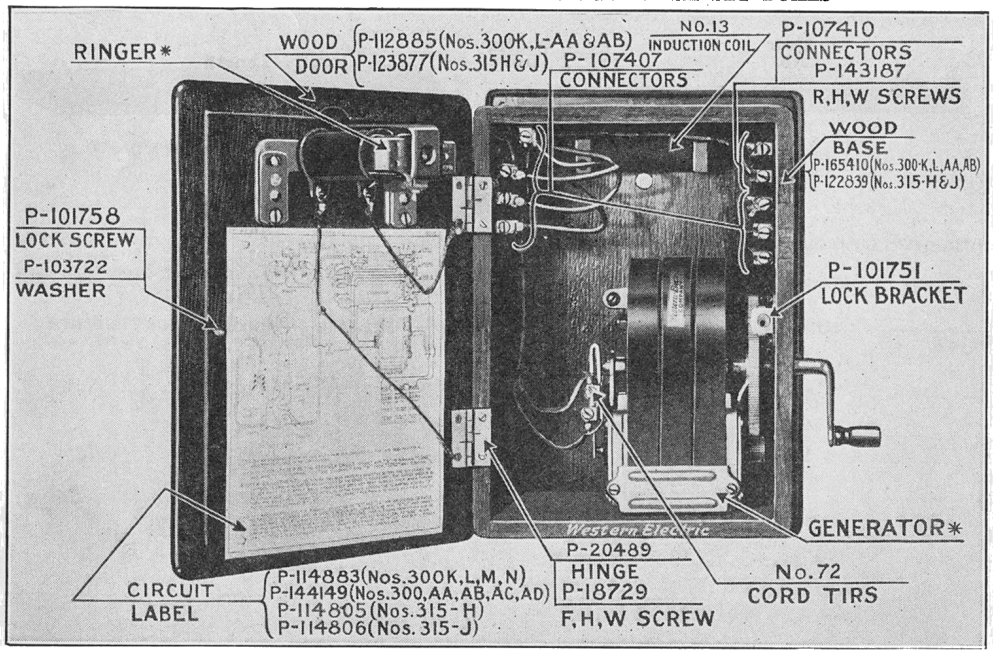
These desk set boxes form a part of the Nos. 6003 and 6004 Type Telephones described elsewhere.

No. 300 and No. 315 Type Desk Set Boxes

Code No.	Composed of: Generator No.	Composed of: Ringer No.	Resistance	Condenser No.	For Ringing Service	Used on Lines as Regards Load
NO. 300 TYPE WITH NO. 48 TYPE GENERATORS						
300K	48A	51BG	2500	....	Code	Heavily
300L	48A	51FG	1600	....	Code	Medium
300M	48A	51FG	1600	21W	Code	Medium
300N	48A	51BG	2500	21W	Code	Heavily
NO. 300 TYPE WITH NO. 50 TYPE GENERATORS						
300AA	50A	51BG	2500	....	Code	Heavily
300AB	50A	51FG	1600	....	Code	Medium
NO. 315 TYPE WITH NO. 22 TYPE GENERATORS						
315E	22E	52AG	1000–3000	....	Code	Lightly
315H	22A	51AG	1020	....	Code	Lightly
315J	22E	49BG	2500	....	Four Party Selective	Lightly

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

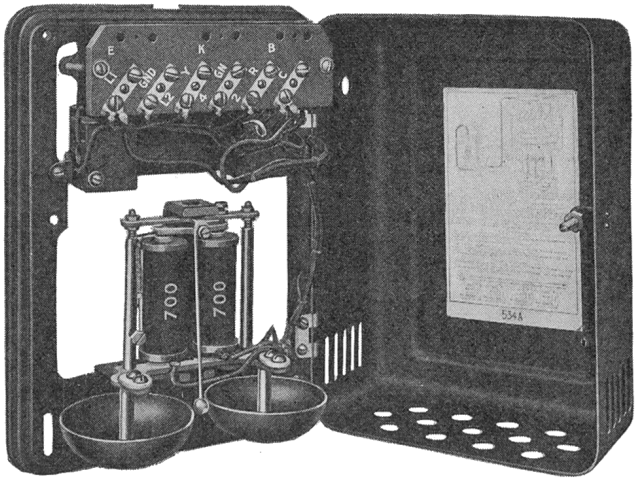
REPLACEMENT PARTS FOR Nos. 300 AND 315 TYPE DESK SET BOXES



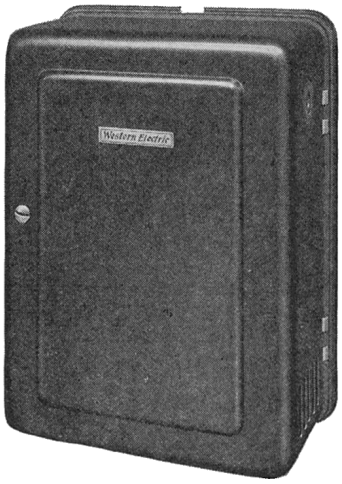
* **Note.** The ringer, generator, etc., are given in the above code number listings and their repair parts are shown elsewhere under their respective headings.

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DESK SET BOXES—CENTRAL BATTERY



No. 534 Desk Set Box—Open



No. 534 Desk Set Box—Closed

Central Battery—No. 534 Type

The No. 534 Type Desk Set Boxes, in conjunction with No. 1040 Type Desk Stands, are coded as No. 6054 Type Telephones.

The telephone service for which these desk set boxes are used is described under the No. 6054 Type Telephones.

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

Nos. 1020CC, 1048AA, AB and AC Telephone (Transmitter) Arms.
Nos. 1001C and H and 1002AC Hand Sets.

INDUCTION COIL TYPES

Code No.	Used with Desk Stand	Desk Set Box Contains: Ringer No.	Resistance	Condenser	Induction Coil	For Service
534A	1040AL	8AG	1400	21BW	46B	Single and two-party selective A.C.
534AR	1040AL	42AG	1000 & 3000	21BW	46B	Four-party selective. P.C. also equipped with No. 85J Relay.

HARMONIC RINGING TYPES

Code No.	Used with Desk Stand	Desk Set Box Contains: Ringer No.	Resistance	Condenser	Induction Coil	For Service
534E	1040AL	41SG	33⅓ cycles	21F	46B	4 or 8 party harmonic
534F	1040AL	41TG	50 cycles	21F	46B	
534G	1040AL	41UG	66⅔ cycles	21F	46B	
534H	1040AL	41RG	16⅔ cycles	21F	46B	

LOCAL BATTERY TALKING TYPE

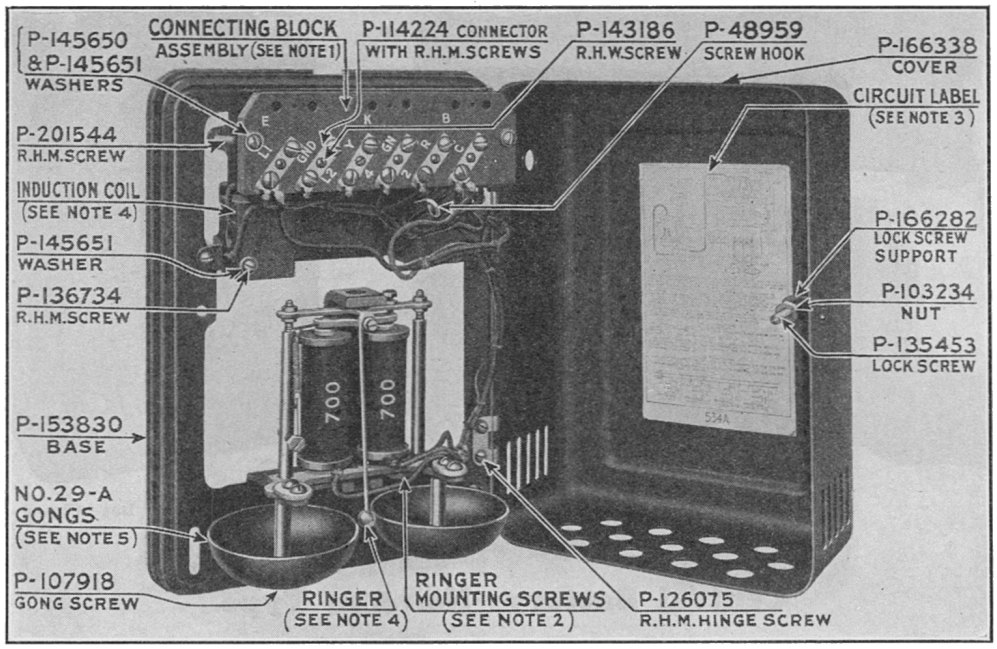
534Y	1040AL	8AG	1400	21BW	13	Local Battery Talking Central Battery Ringing

EXTENSION TYPES

534C	1040AL	No Ringer		21BW	46B	Used as an extension set to an adjacent telephone
534D	None	8AG	1400	21BW	. . .	Used as an extension bell

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DESK SET BOXES



Replacement Parts for No. 534 Type Desk Set Boxes

Replacement Parts For No. 534 Type Desk Set Boxes

NOTE 1. Connecting Block Assembly for:

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

NOTE 2. Ringer Mounting Screws for:

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

NOTE 3. Circuit Label for:

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

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

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

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DESK STANDS

Deskstands—Central and Local Battery Types



No. 1040AL Deskstand

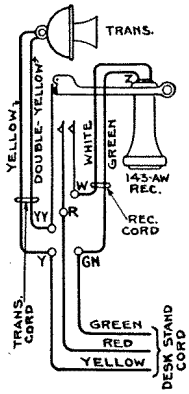
These are Bower-barff finished steel deskstands and are in the simplest form that deskstands have ever been produced. There are but three principal units exclusive of the transmitter and receiver, namely, the terminal plate and switchhook assembly, the base and stem assembly, and the base plate assembly.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

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

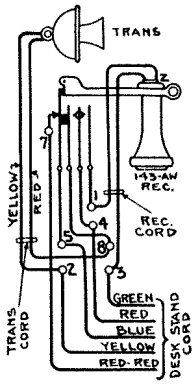
The contact springs are nickel silver backed with stop springs.

All current carrying parts are insulated from the frame.

Because of the simplicity of design and the high quality of the apparatus and material used the cost of maintaining Western Electric deskstands is practically nothing.



No. 1040AL



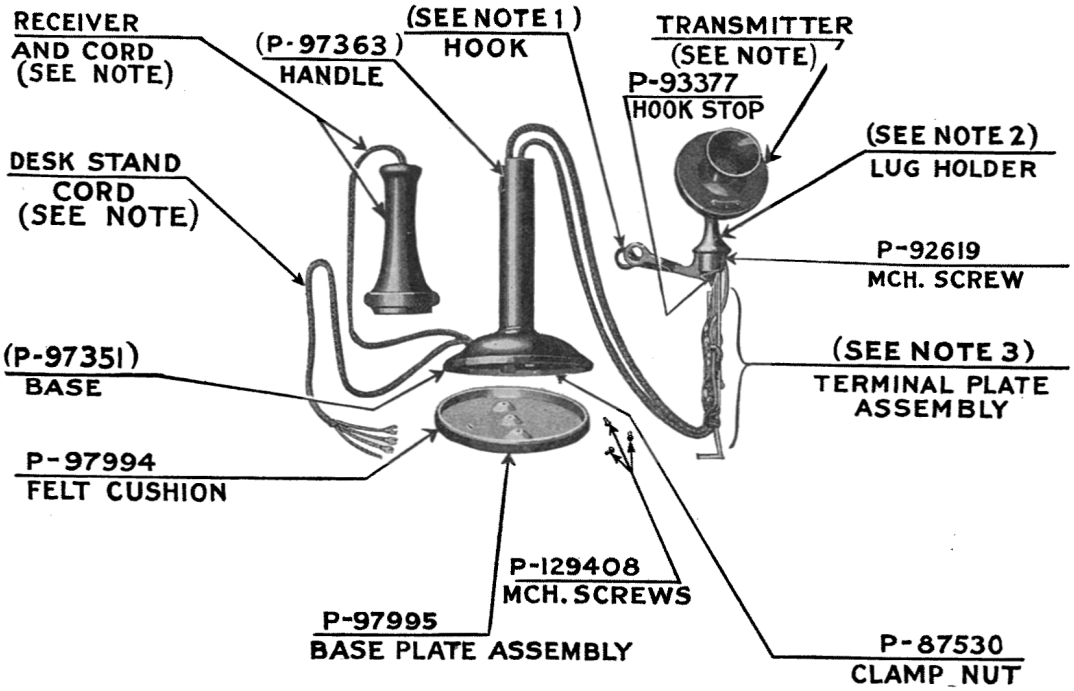
No. 1140CN

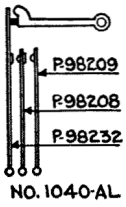
Code No.	Consist of: Deskstand	Transmitter	Receiver	Cords: Rec.	Trans.	Deskstand	Use
				450 Combination			
1040-AL	40-AL	323BW	143	549 2½ ft. long	2 T1A 9⅞ ins. long	550 5½ ft. long	Standard deskstand for central battery and local battery service.
1140-CN	40-CN	323-BW	143	R2Y 2½ ft. long	2 T1A 9⅞ ins. long	D5A 6½ ft. long	Special service requiring a back contact deskstand. No. 1 Residence System.

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DESK STANDS

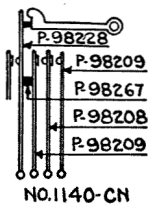
Desk Stands—Replacement Parts





NO. 1040-AL

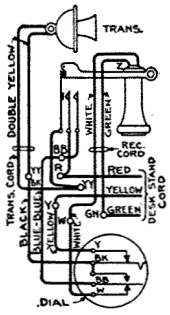
Note. The receiver, transmitter, etc., are given in the code number listings of the deskstands. (Page 77.)



NO. 1140-CN

Desk Stands—Machine Switching


No. 1051AL



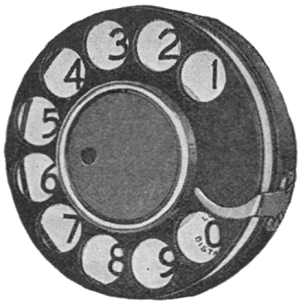
No. 1051AL

Code No.	Finish	Consist of: Deskstand	Transmitter	Receiver	Cord	Dial
1051-AL	Bower Barff	51-AL	323-BW	143	6000	As Specified

	Note 1	Note 2	Note 3
Code No.	Hook	Lugholder	Terminal Plate Assembly
1040-AL	P-97343	P-97377	P-98247
1040-CN	P-97347	P-97392	.....
1051-AL	P-98883	P-204014	.....

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DIALS—MACHINE SWITCHING



No. 2AA Calling Dial

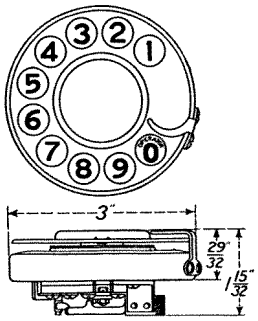
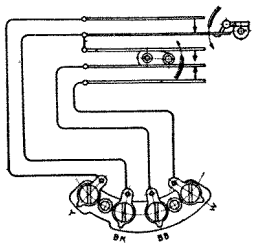
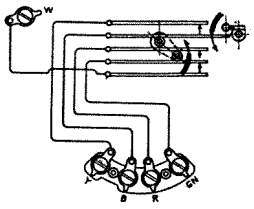


Diagram Nos. 2AA and 2EA Dial



Wiring of Nos. 2AA and 2AB Dials



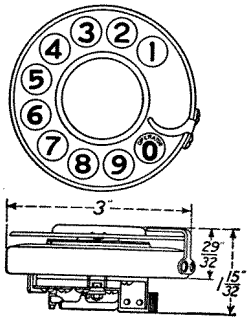
Wiring of No. 2EA Dial

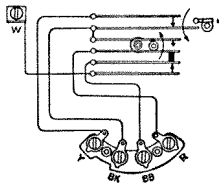
Western Electric dials are reliable in operation and are designed to operate between very close speed limits.

These dials are designed to mount on Western Electric machine switching, deskstands, handset mountings, and wall type telephones, also in Western Electric dial mountings.

The No. 2AA Dial is intended for use at telephone stations, private branch exchange switchboards and repairmen's handsets.

The No. 2EA Dial is intended for use on switchmen's desks, trouble desks, and local test desks of manual offices for connecting with machine switching offices. These differ from the Nos. 2AA and 2AB Dials in that a wire from each of the five contact springs is brought out to an individual terminal. The Nos. 2HA and HE Dials are for use at telephone stations in the "B" Type Handset Mounting.





No. 2HA Dial



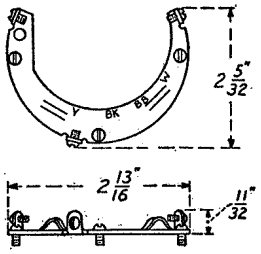
No. 2AA Dial Set—Exploded View

Code Nos.	Number Plate	Color of Characters—Numerals	Color of Characters—Letters
2AA	132A	Black	Black
2EA	132A	Black	Black
2HA	132A	Black	Black
2HE	132E	Black	*Red

* Word "operator" written in black.

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DIAL ADAPTERS

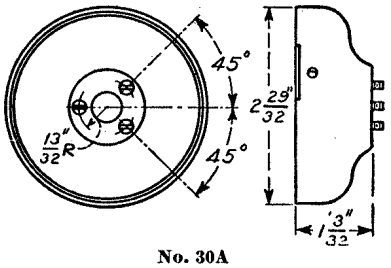


No. 52A

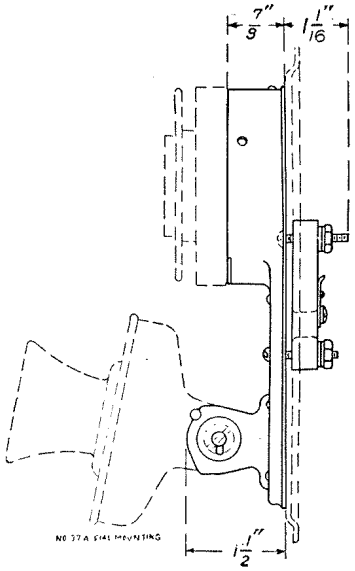
Dial adapters do not form a part of the dial mountings and must be ordered as separate items as follows:

Code No.	Use and Description
52A	For use with the No. 2AA Dial. 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 Mountings



No. 30A



No. 37A

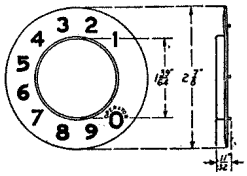
These dial mountings in connection with the No. 52 Type Dial Adapter are designed for mounting Western Electric No. 2 Type Dials.

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.	Three machine screws are furnished. Wood screws can be substituted if desired.
37A	Intended to mount a No. 323BW Transmitter and a No. 2A Type Dial to which a No. 52A Dial Adapter has been attached.	A black finished metal mounting used to convert manual telephone sets of the No. 1533 Type for machine switching service. Cable connecting block and mounting screws are furnished.
6000D	At unattended pay stations and busy one position PBX switchboards. Consists of one No. 34D Dial Mounting, one No. 25B Connecting Block, and one No. 765 Cord.	When equipped with No. 52A Dial Adapter provides means for connecting to the contact springs of a No. 34 Type Dial Mounting. The connecting block is intended to be permanently attached to the apparatus in which the dial mounting is used.
6000E	At attended pay stations and busy one position PBX switchboards. Consists of one No. 34E Dial Mounting, one No. 25B Connecting Block, and one No. 65 Cord.	

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Dial Number Plates



No. 132A

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

Code No.	Color of Characters	
	Numerals	Letters
132A	Black	Black

147-B NUMBER PLATE

Consists of an annular number plate equipped with three studs for mounting on a 56-A Dial Adapter. The letters and characters are similar to those on the 132-B Number Plate. The outside diameter is approximately 4⅜″ and the thickness over the studs is approximately 9/32″.

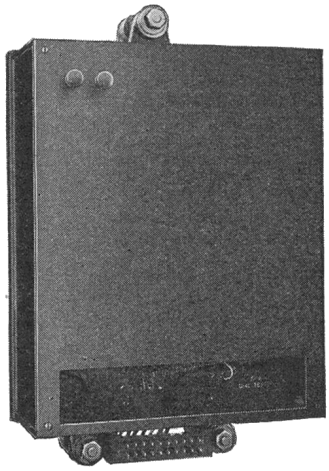
Intended for use with a 56-A Dial Adapter and a No. 2 Type Dial on a No. 50 Type Coin Collector in dial systems.

Dial Opening—Apparatus Blanks

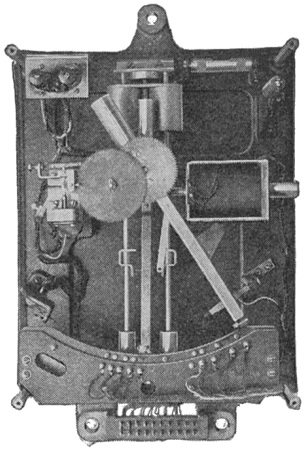
The following apparatus blanks as described under the heading "Apparatus Blanks" are used to cover unequipped dial positions in various types of apparatus.

Nos. 50B, 50C, 50D, 50E, 50H

51A Dial Tester



With Cover



With Cover Removed

NO. 51A DIAL TESTER

A pendulum type dial tester used for checking the pulse rate of dials. It is enclosed in a metal cover having a window for observing the contact arm when checking the speed and decrement loss of the pendulum. It will check the speed of dials having the following limits.

Test Limits	Readjustment Limits
16 and 20 pulses per second	17 and 19 pulses per second
8 and 11 pulses per second	9½ and 10½ pulses per second

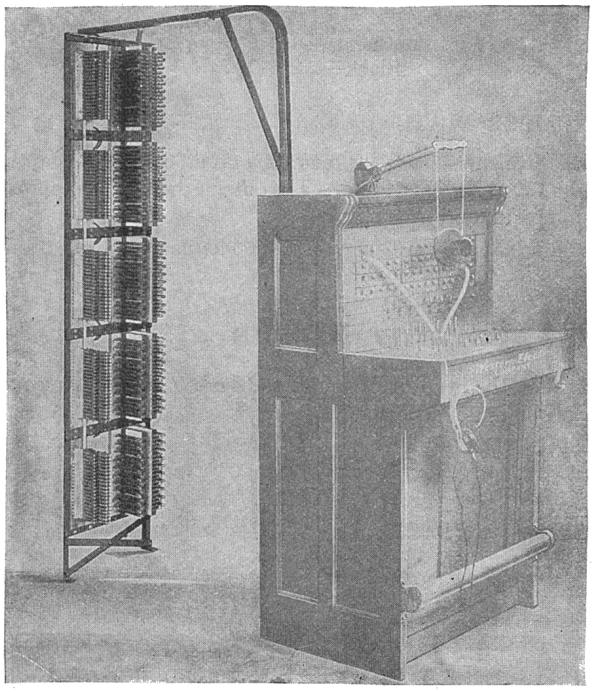
This dial tester is arranged to mount on wall or framework and is equipped with two spirit levels for setting it in a true perpendicular position on the sub-base.

It operates on 48 volts D.C. and either manually or remotely controlled circuits and passes a tone indication for the normal, sub-normal or above normal rates of dial speed to the test man or subscriber station.

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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 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.

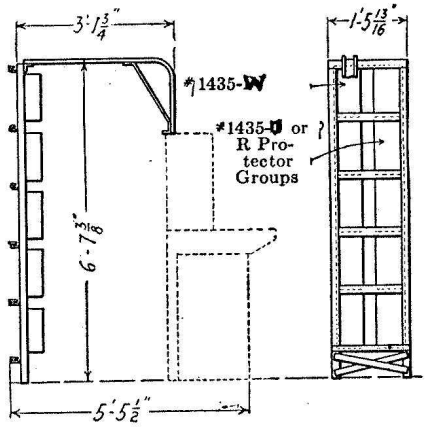
5. Minimum Floor Space. Due to their compact design, these frames occupy very little floor space.

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

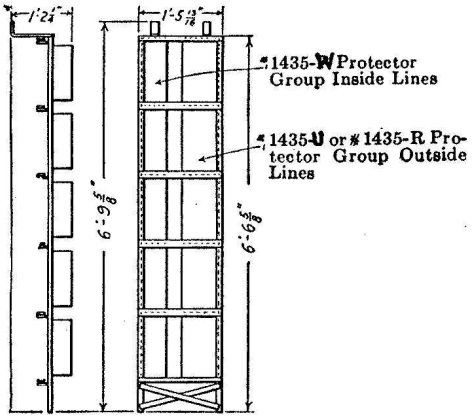
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DISTRIBUTING FRAMES

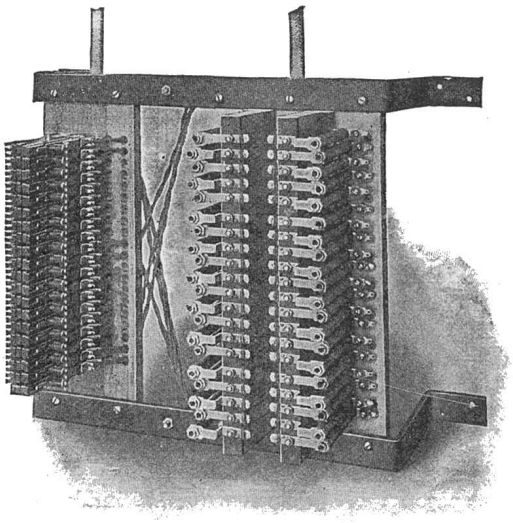
NOS. 1430 and 1420 TYPES—Continued



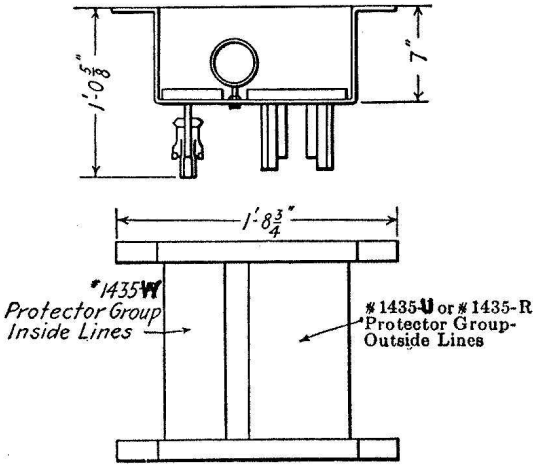
No. 1430F Distributing Frame



1420B Distributing Frame



No. 1431A 20 Line Main



NOS. 1431A 20 LINE FRAME

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

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

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

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

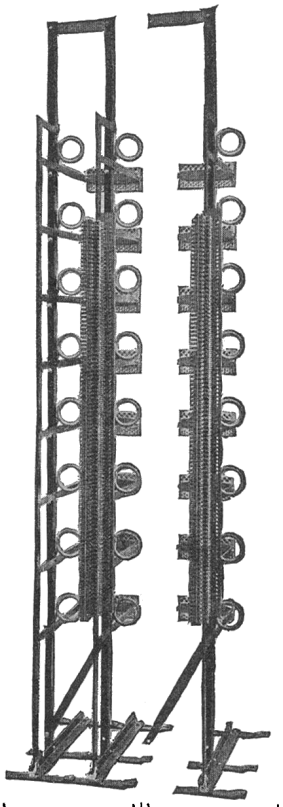
In ordering this frame specify the protector groups desired. (See description of protector groups.)

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

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DISTRIBUTING FRAMES

NO. 1425 TYPE



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

As many 100 line units as desired may be installed.

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

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

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.

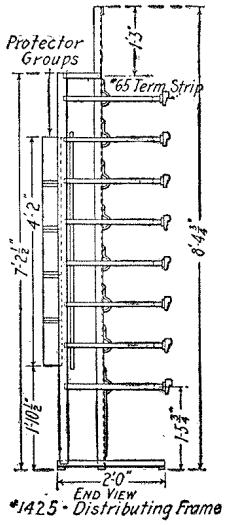
Construction. This frame is rigidly constructed of steel angles and bar iron, and is made up in units of one vertical each, three verticals of this frame being shown in the accompanying illustration.

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.



*1425 - Distributing Frame

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.

For Example:

1. 1425C Frame provides space for 100 protectors (or 100 inside lines) and no outside lines.

2. 1425C Frames provide space for 200 protectors (or 200 inside lines—*see note) and 160 outside lines.

3. 1425C Frames provide space for 300 protectors (or 300 inside lines—* see note) and 320 outside lines.

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

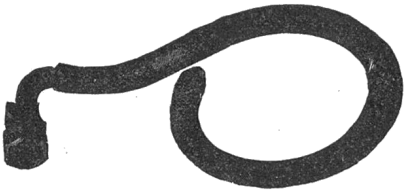
INFORMATION

Code No.	Protector Groups Used — "Vertical Side" Inside Lines	"Horizontal Side" Outside Lines
*1425C	Magneto or central battery lines—No. 1435T Misc. inside circuits—No. 53 Terminal Strip	No. 65 Terminal Strips

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

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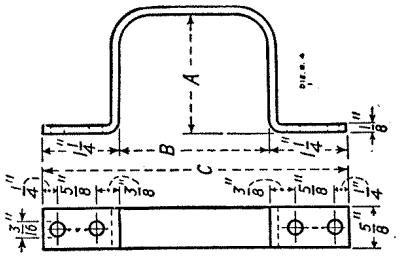
DISTRIBUTOR RINGS



No. 1



No. 3



No. 4

Code No.	Dimensions—Inches—Outside	Inside
1	3 7/8	2 7/8
2	4 7/8	3 7/8
3	4	3

Description and Use

Steel with hard rubber covering for distributing frames.

Code No.	Dimensions—Inches—A	B	C
4A	1 7/8	2 3/8	4 7/8
4B	2 7/8	3 5/8	6 1/8
4C	2 7/8	5 5/8	8 1/8
6A	—	—	—
7A	—	—	—

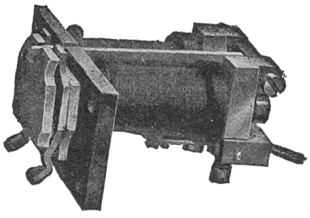
Description and Use

Steel with black finish for No. 23 Cable Terminals.

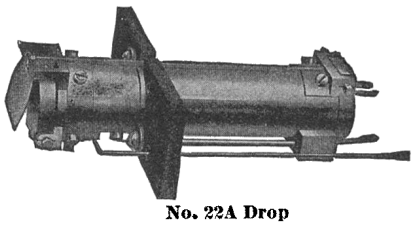
Metal hook covered with black insulating material for step-by-step machine switching selector frames with distributing terminal assemblies.

Steel with black finish for holding cross-connecting wires on high type step-by-step selector frames.

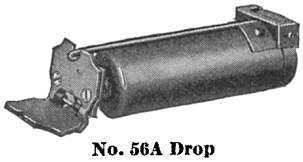
DROPS



No. 4A Drop



No. 22A Drop



No. 56A Drop

The No. 4 Type Drops are equipped with two electromagnet spools each.

The Nos. 22, 35 and 56 Types are single spool drops with tubular iron shelves and are cross-talk proof.

The Nos. 4, 35 and 56 Drops must be restored manually.

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

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

All drops will operate on alternating ringing current.

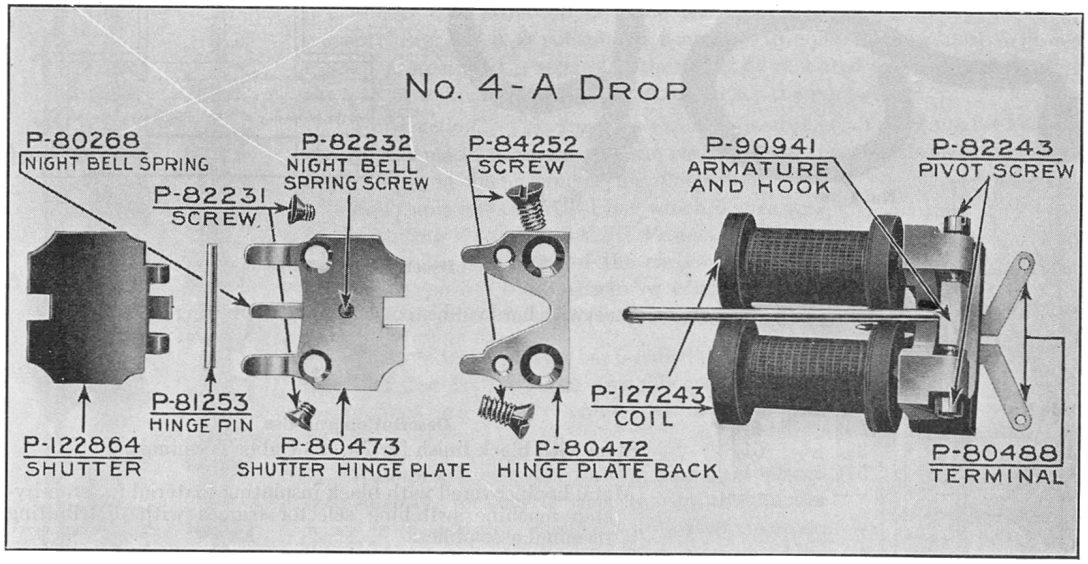
All drops are equipped with night bell contacts. These contacts remain closed until the drop is restored.

Code No.	No. of Windings	Approximate Resistance (Ohms)		Finish of Shutters	Mounting Centers (Inches)	Overall Dimensions—(Inches)—High	Wide	Deep	Used with Drop Mountings
4A	1	90		Black	1 3/8	(1 1/64	1 5/16	2 3/8)	2, 57, 58, 60, 65, 68
4C	1	1000		Black	1 3/8				
22A	2	700	Line	Aluminum	1 3/8	1 11/32	1 1/2	5 9/32	
		45	Restoring						
35A	2	285		Black	1 1/4	(1 1/64	1 3/16	3 37/64)	2, 57, 58, 60, 64, 68, 83, 84, 87
35C	2	10.5	Inner	Black	1 1/4				
		11.3	Outer						
56A	1	525		Black	1	(3 1/32	3 1/32	3 37/64)	2, 53, 56, 57, 58, 64, 68, 69, 83, 84
56B	1	670		Black	1				
56M	1	20		Black	1				

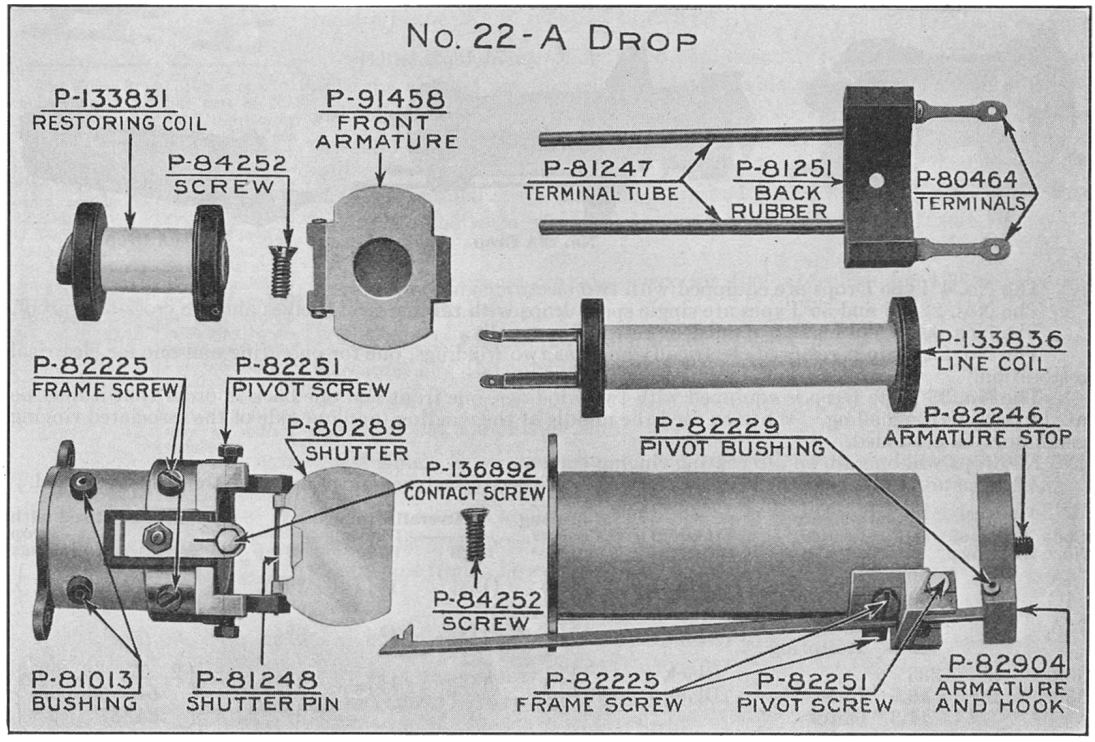
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DROPS

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



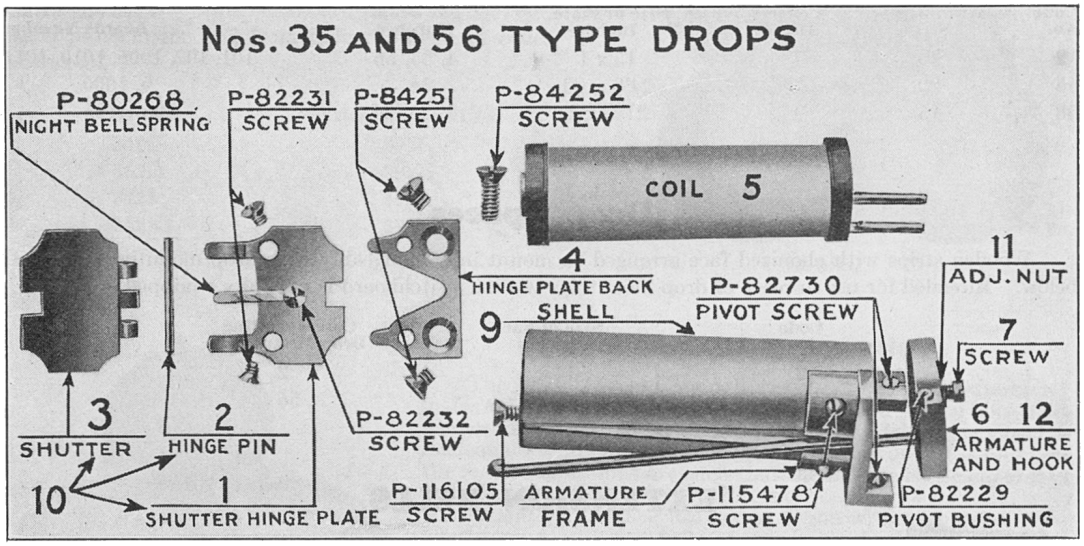
Note. Coil for 4C Drop—P-127245. Armature for 4A and 4C Drops P-81273



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DROPS

Replacement Parts for Nos. 35 and 56 Type Drops



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

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

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DROP MOUNTINGS



No. 58 Drop Mounting

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

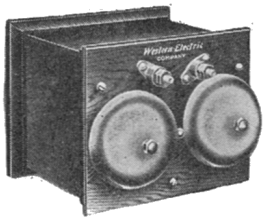
Code No.	Number per Strip	Centers Inches	Size of Plate Inches	For Drops Number	Used on Switchboards Number
2	10	1 3/8	15 x 1	4, 35, 56	101, 102, 1006, 1010, 1011
56	20	1 1/8	24 9/16 x 1	56	9, 1800
58	15	1 3/8	21 3/4 x 1	4, 35, 56	105, 1005

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
2	15 x 1	2
7	24 9/16 x 2 5/32	56

EXTENSION BELLS



Nos. 43 & 127 Type Extension Bells

FOR ALTERNATING, PULSATING AND HARMONIC CURRENT

These extension bells are intended for auxiliary use in connection with wall, desk and telephone arm telephones or for use instead of regular ringers furnished in the 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 Inches	Operating Current
43F	6A	1400	29A	5 5/8 x 5 7/8 x 4 5/8	AC biased to prevent tapping.
43AC	55A	1000	29A	6 1/2 x 5 49/64 x 4 7/8	
43AD	55B	2500	29A	6 1/2 x 5 49/64 x 4 7/8	

NO. 127 TYPE

These extension bells consist of a ringer mounted on the cover of a box. Approximate overall dimensions 6 1/2" wide x 5 7/8" high x 4 7/8" deep. The standard finish is golden oak.

Code No.	Ringer	Approx. Resistance Ohms	Gongs	Condensers	Operating Current
127A	6A	*1400	29A	21F	AC biased to prevent tapping.
127E	38A	1020	26A	—	AC not biased.
127F	38B	2500	26A	—	AC not biased.
127G	38F	1620	26A	—	AC not biased.

* The No. 6A 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. Each set is equipped with No. 2A Binding Posts for making line connections.

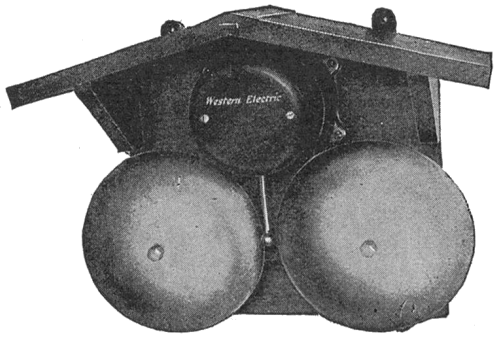
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EXTENSION BELLS

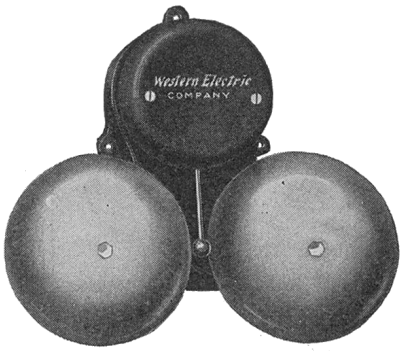
NO. 342 TYPE—LOUD RINGING

These extension bells consist of the No. 392 Type Extension Bells, described below, 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



No. 342G



No. 392 Type

NO. 392 TYPE—LOUD RINGING

The No. 392 Loud Ringing Extension Bell is 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 mf. 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.

1—21D Condenser
1—Condenser Strap P-43065
2—Condenser Mounting Screws P-122026

The Nos. 392-A, B, G and H Extension Bells will be equipped with a biasing arrangement if specified in order.

Code No.	Approx. Resistance Ohms	Diameter of Gongs Inches	Operating Current
392A	1000	6 (28A)	AC not biased.
392B	2500	6 (28A)	AC not biased.
392D	2500	6 (28A)	Pulsating biased.
392E	1600	6 (28A)	AC not biased.
392J	1000	6 (28A)	AC biased to prevent tapping.
392G	1000	8 (23A)	AC not biased.
392H	2500	8 (23A)	AC not biased.

NOS. 392 AND 342 TYPE EXTENSION BELLS—BIASING ATTACHMENTS

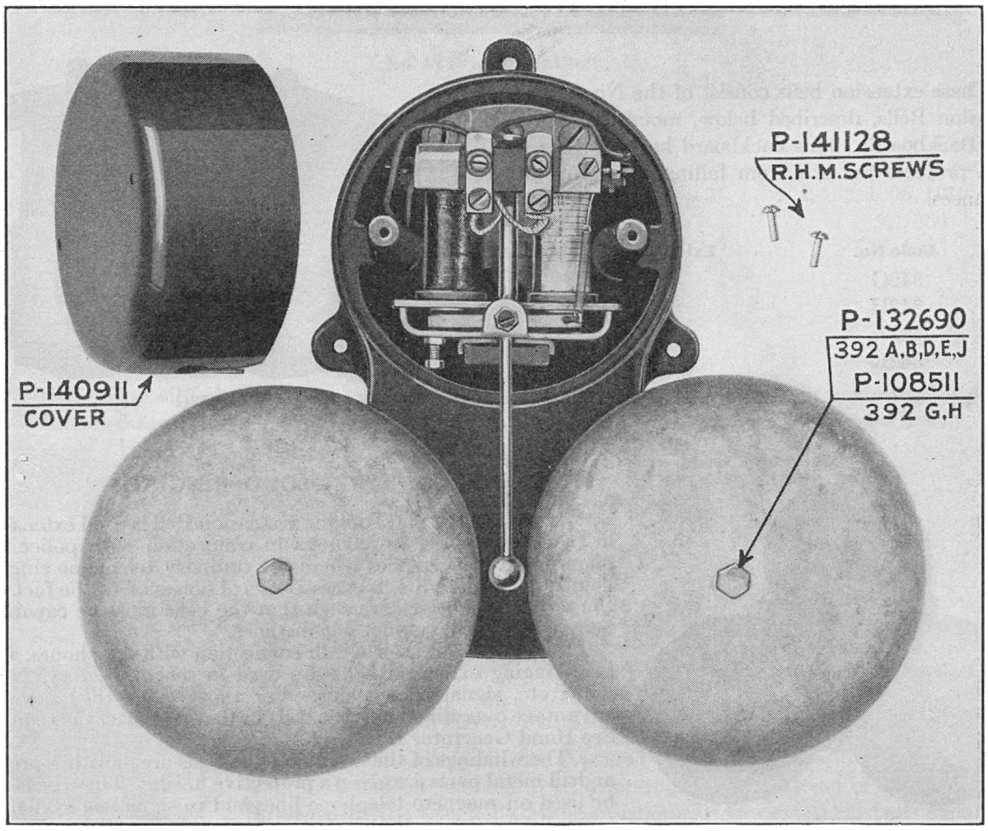
The Nos. 392 and 342 Type Extension Bells which are furnished unbiased may be equipped with the biasing attachment listed below thereby making them suitable for use on pulsating current. A screw driver and pliers are the only tools required for installing this attachment.

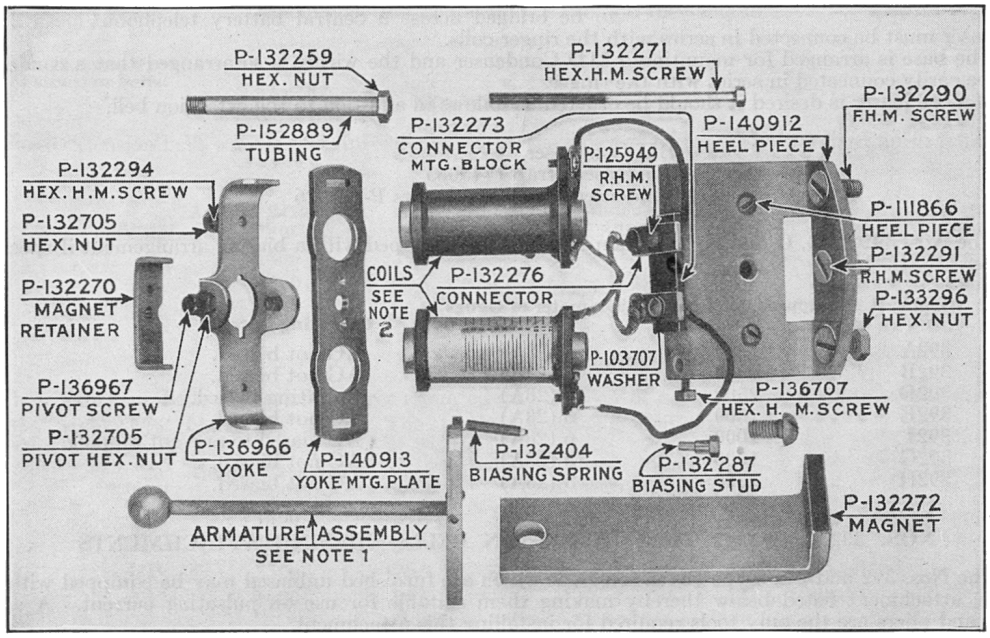
Code No.	
D-76014	Biasing attachment for Nos. 392 and 342 Type Extension Bells.

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EXTENSION BELLS

Replacement Parts for No. 392 Extension Bells





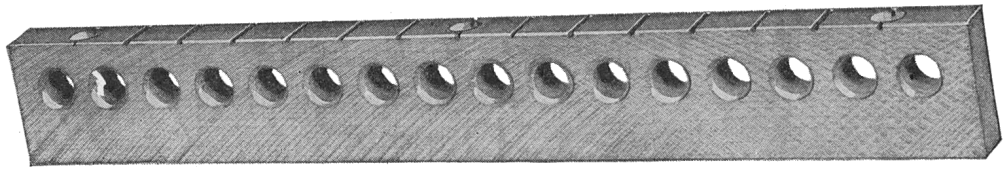
Coil and Armature Parts

Note 1. Armature assembly:	392A P-140919	392B P-140919	392D P-140919	392E P-140919	392G P-140917	392H P-140917	392J P-140919
Note 2. Ringer Coils:	P-145236	P-145237	P-145237	P-145238	P-145236	P-145237	P-145236

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FANNING STRIPS AND FUSES

Fanning Strips



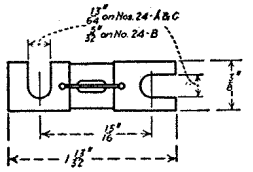
No. 15A

Made from well seasoned maple. The overall dimensions are $1\frac{5}{16}$ 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.	Replaces	Capacity Pairs	Length Ins.	Used with Connecting Block	Protector
10		13	$22\frac{5}{8}$	.....	1079
15A	2 and 7	16	$10\frac{7}{16}$	30C and 31C	....
15B	4, 9	26	$16\frac{11}{16}$	30D and 31D	....

FUSES

Non-Alarm Type





No. 24 Type Fuse

These phenol fuses will mount on 1 inch centers by means of Fuse Posts or individual porcelain mounting as in the No. 62D Protector. The overall dimensions are: length $1\frac{13}{32}$ inch, width $\frac{3}{8}$ inch. The current carrying capacities and operating current values are given in the table below.

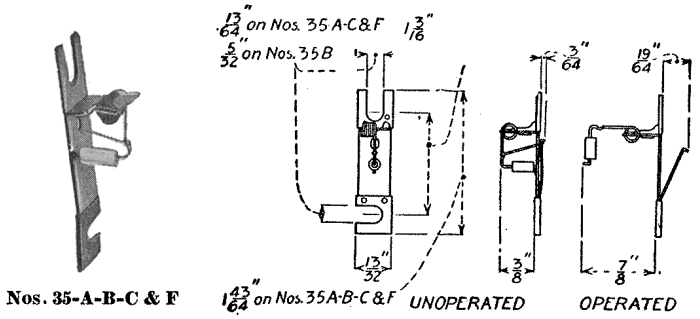
In ordering it is necessary that both the code number and rated capacity be given.

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

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FUSES

Indicator Alarm Type



Nos. 35-A-B-C & F

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

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

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

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

Code No.	Rated Amperes	Operates on Amperes	Operates on In Less Than	Color of Bead	Slotted For Screw	Mounting Centers, Inches
35A	1⅓	2	1½ min.	White	No. 10	1¼
35B	1⅓	2	1½ min.	White	No. 6	1¼
35C	2	3	3 min.	Yellow	No. 10	1¼
35F	½	¾	1½ min.	Red	No. 10	1¼
35G	3	4½	5 min.	Blue	No. 6	1¼
35H	5	6½	5 min.	Green	No. 6	1¼

Dummy Fuses

These fuses are composed of black insulating material and are for use on fuse panels not equipped with fuses.

Code No.	Fuses Used In Place of	Overall Dimensions Inches
63A	35A, B or F	1 43/64 x 1 3/32 x 3/64
64A	24 and 44 Type	1⅜ x 1 3/32 x 3/64

Tubular Fuses



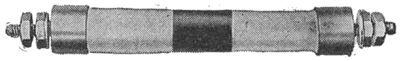
No. 7A | No. 7T | No. 11C

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

Code No.	Rated Capacity Amperes	Used with
7A	1 to 8 as specified	Nos. 77, 1074A, 1075A and 1078A Protectors.
7T	7	"B" Cable Terminals and Fuse Chambers.
11C	7	Nos. 58AP and 1079AP Protectors.
11D	7	No. 25 Protector Mounting (No. 12 Type Protector)

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FUSES—Porcelain Shell Fuses

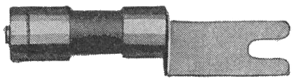


No. 47A

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.	Capacity
47A	7 amperes
47B	14 amperes

No. 60A Fuse

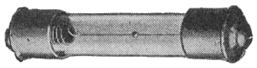


No. 60A

The No. 60A Fuse is a sneak current fuse designed for protection of private branch exchanges in connection with the Nos. 58AP and 1089A and B Protectors. Consists of a red fibre tube approximately $1\frac{1}{16}$ inches long and $\frac{3}{8}$ inch in diameter. Will carry .35 ampere for a period of three hours and blow on .5 ampere in 210 seconds.

Code No.	Protector Mounting	Protector Used with
60A	No. 16	58AP
	No. 80	1089A
		1089B

Glass Shell Fuses

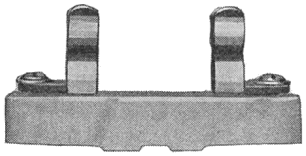


No. 55A

This glass tube type fuse is equipped at both ends with tinned caps to which the fuse element is attached. Designed to mount in the No. 9A Fuse Block. Overall length of fuse is $2\frac{11}{64}$ inches.

Code No.	Will Carry		Will Blow On	
	Amperes	For Minutes	Amperes	In Less Than
52A	.500	....	....	.....
55A	.400	....	.800	.....
62B	.250	15	.375	210 seconds

Fuse Blocks



No. 9A Fuse Block

WITHOUT FUSES

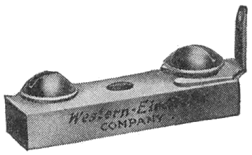
List No.	Description
9A	A porcelain block provided with clips for holding one No. 55A Fuse.

Fuse Chamber

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

Intended for use as a part of "B" Type Cable Terminals but can be furnished separately for mounting in "B" Type Cable Terminal Boxes. Refer to listings under "B" Type Cable Terminals elsewhere.

Fuse Posts



No. 2A



No. 5A



No. 7A

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

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

Code No.	Overall Dimensions, Inches			Finish	Screw No.	Used with Fuse No.
	Length	Width	Depth			
1C	$1\frac{9}{16}$	$\frac{5}{16}$	$\frac{5}{8}$	Tinned Brass	6	Nos. 24 and 35 Types
2A	$1\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{4}$	Nickel Dip	8	Nos. 24 and 35 Types
5A	2	$\frac{3}{8}$	..	Nickel Dip	..	Nos. 24 and 35 Types
5B	2	$\frac{3}{8}$	..	Brass	..	Nos. 24 and 35 Types
6	2	$\frac{3}{8}$	..	Brass	..	Nos. 24 and 35 Types
6B	2	$\frac{3}{8}$	..	Nickel Dip	..	Nos. 24 and 35 Types
7A	$1\frac{15}{64}$	$\frac{3}{8}$	$\frac{1}{8}$	Tinned Brass	6	Nos. 24 and 35 Types
7B	$1\frac{15}{64}$	$\frac{3}{8}$	$\frac{1}{8}$	Tinned Brass	6	Nos. 24 and 35 Types

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Gauges

Code No.	Description and Use
27	For determining when the parts of the No. 109 Type Plugs have reached the limit of wear.
28	For determining when the parts of the No. 110 Type Plugs have reached the limit of wear.
33	A steel gauge for gauging the sleeves of No. 49 Jacks. The gauge plug P-97443 is detachable from the handle and may be ordered separately if desired.
35	Dry battery gauge for testing dry batteries in transmitter pole changer and coin collector service. Provided with a 20 ohm winding for transmitter service when testing three cells in series and a 5 ohm winding for single cell in pole changer and coin collector service. Equipped with two 18″ No. 361 Cords.
37	Direct or two-party selective bell gauges. Consists of two thickness gauges .024 and .012 inches held together by a brass ring.
38	Direct or four-party selective bell gauges. Consists of two thickness gauges .060 and .012 inches held together by a brass ring.
43	Consists of one .012 inch thickness gauge and one .016 inch thickness gauge held together by a brass ring. Intended for gauging the air gap between the armature stop pin and the core of Nos. 2 and 38 Type Ringers respectively.
44	Consists of one .125 inch thickness gauge and .030 inch thickness gauge for gauging the stroke of the operating arm and for gauging the line switch to prevent the resetting of the coin trigger prior to deposit or refund of a coin.
66C	Consists of the following gauges assembled on a holding ring.

1—67A	.015″
1—67B	.020″
1—67C	.025″
1—67D	.030″
1—67E	.035″
1—67F	.040″
1—67G	.003″
1—67H	.004″
1—67J	.008″
1—67K	.005″
1—67L	.006″
1—67M	.010″
1—67N	.023″

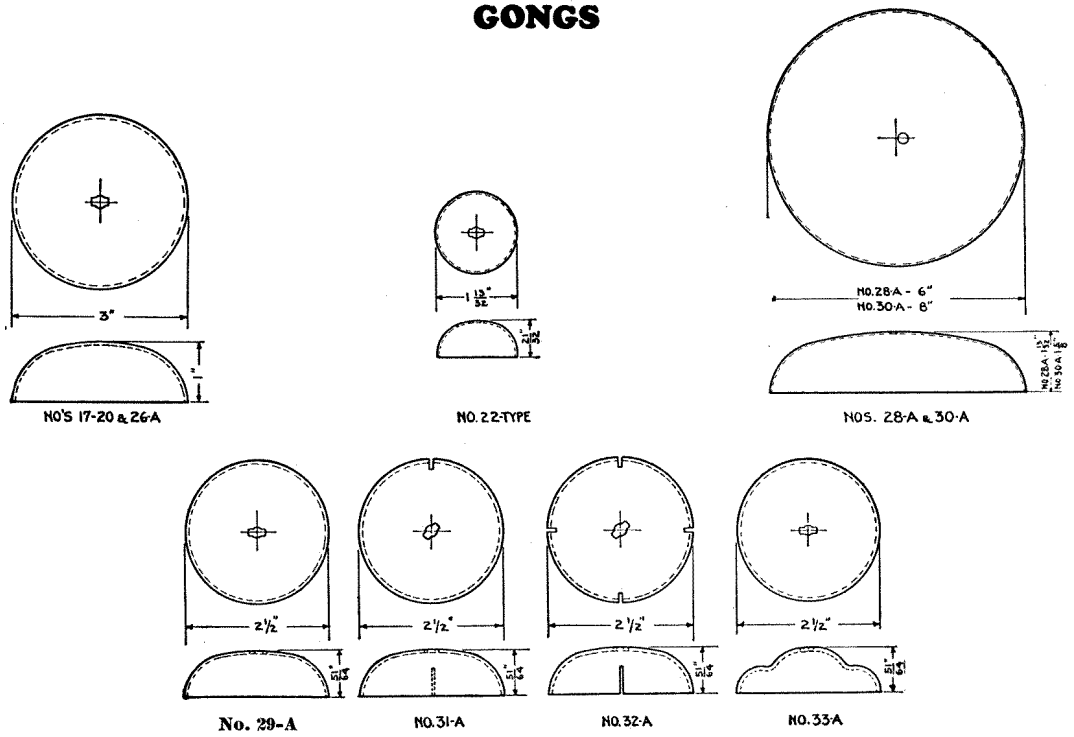
70D	Consists of a nickel silver frame on one side of which is a scale having equally spaced graduations. For use in gauging the tension of relay springs in which the tension does not exceed 50 grams. Scale 50–0–50 grams. Replaces No. 70.
70E	Consists of a nickel silver frame on one side of which is a scale having equally spaced graduations. For use in gauging the tension of relay springs in which the tension is above 50 grams. Scale 150–0–150. Replaces 70B.
70F	Consists of a nickel silver frame on one side of which is a scale having equally spaced graduations. For use in gauging the tension of relay springs in which the tension is 10 grams or less. Scale 10–0–10. Replaces 70C.
95A	Consists of a steel gauge equipped with a wooden handle for gauging the back contact air gap on certain relays of the Nos. 114 and 198 Types.
99A	For use in adjusting the armature or air gaps of "B" and "G" Type Relays. Consists of the following gauges assembled on a holding ring.

100A	.005″
100B	.010″
100C	.015″
100D	.020″
100E	.025″
100F	.030″
100G	.035″
100H	.040″
101A	.030″
101B	.035″
101C	.040″
101D	.050″
101E	.060″

106A	Represents a jack with a sleeve worn to the limit of wear and is provided with a moveable anvil, shaped and located to represent a tip spring of a jack. The anvil which is pivoted, has a pointer attached to read against a scale. The scale has red and black lines which will show whether the plug is correct, needs straightening or should be discarded. Overall dimensions are 5½″ long, 1¾″ wide, and ⅞″ thick.

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GONGS



Gong Dimension Diagram

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.	Description	Principal Use
3	Metal, nickel plated—2" x 1½" x 1⅝"	Cow gong—on standard ringers to give different tone.
10	Metal, nickel plated—2 15/32" diam. 1 1/16" deep	Tea gong—on standard ringers to give different tone.
20	Brass, special black finish	Finished to resist the action of moisture and fumes. For use in No. 1336 Type Mine Telephones and other places where similar service conditions are encountered.
22A	Brass, nickel plated	For use on No. 40 Type Ringers. Each of these gongs has a different tone.
22C	Brass, nickel plated	
22D	Steel, nickel plated	
22E	Brass, nickel plated	
22F	Steel, nickel plated	
26A	Brass, black finish	Standard 3 inch gong for magneto telephones.
28A	Steel, hot dipped galvanized	No. 392 Type Extension Bells. Mounting screw hole drilled slightly off center to permit of adjustment.
29A	Brass, black finish	Standard 2½ inch gong for general telephone use.
29C	Oxidized brass finish	In 533, 534, 553 and 554 Type Subscriber Sets using the 68A, H, J, AA, 72A, G and AC Ringers.
31A	Brass, black finish	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	
33A	Bell metal, black finish	
31C	Brass, black finish	Alternative for 29C.
32C	Brass, black finish	
33C	Bell metal, black finish	

Gong Mountings

Code No.	Description
7	Brass—Consists of a pair of gong posts or gong post extenders together with two No. 6—32 x 5/16 in. R.H.M. Screws.

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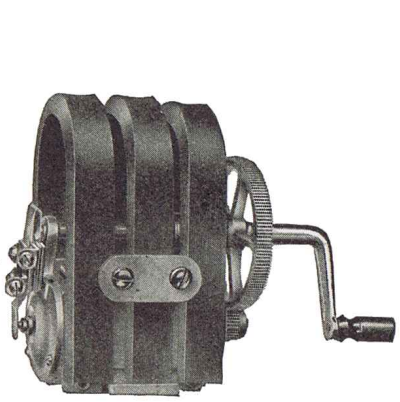
HAND GENERATORS

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

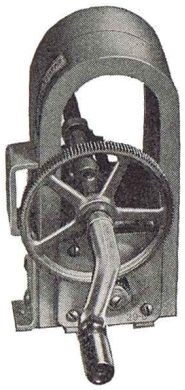
All parts are accurately machined and fitted and the bearings are of such size that no trouble due to the armature scraping on the pole pieces will be encountered even after years of service. The gears are accurately cut so that smooth noiseless operation is obtained.

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

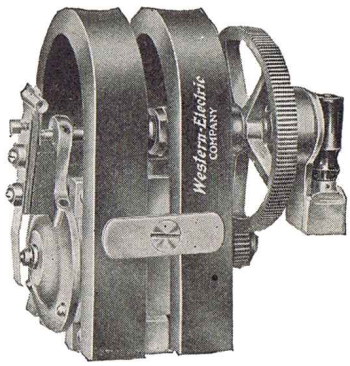
The magnets are made from steel which was developed especially for this purpose and the heat treatment employed is such that their strength is retained indefinitely.



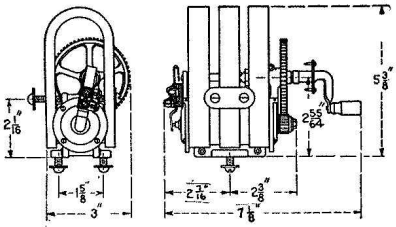
No. 22A



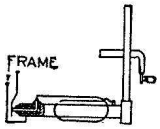
No. 29E



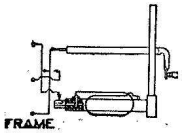
29F



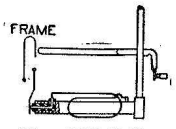
No. 22 Type Generator



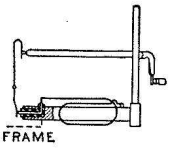
Nos. 22A & E



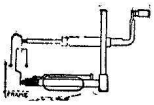
Nos. 22D



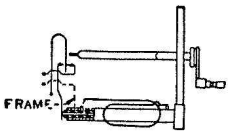
Nos. 22K & N



No. 29B



No. 29E



No. 29F

Schematics of Generator Circuits

No. 22 Type Generators

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

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

Code No.	Voltage and Current	Generator Circuit	Principal Use and Description
22A	60 A.C.	Open	Telephones and small switchboards.
22D	43 P.C.	Closed	Telephones and small switchboards.
22E	42 A.C.	Open	Telephones. Same as 22A except that only two magnets are used. For use on lightly loaded four party selective lines.

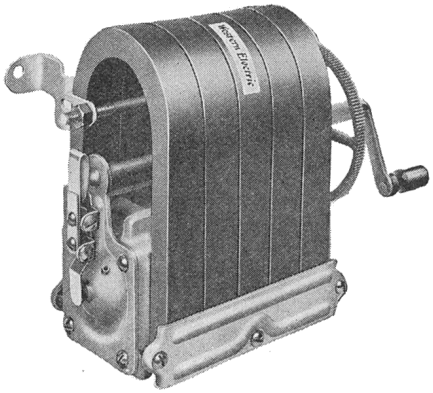
No. 29 Type Generators

The No. 29 Type Generators are used where light weight is essential as in linemen's test sets, and portable telephones.

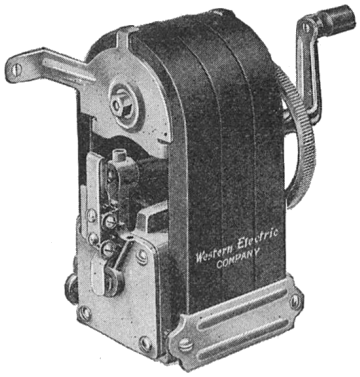
29E	65 A.C.	Open	Has back contact. Used in portable telephones.
29F	60 A.C.	Open	Portable telephones and No. 1017 Type Test Sets. Has folding handle.
29G	60 A.C.	Open	Nos. 526A and 526B Subscriber Sets.

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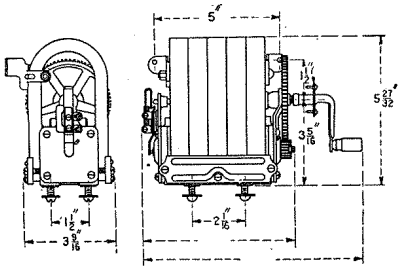
HAND GENERATORS



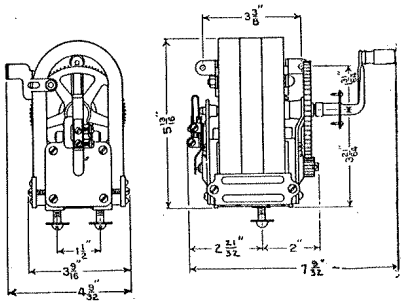
No. 48A



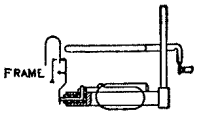
No. 50A



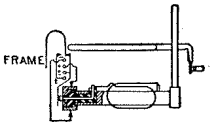
No. 48 Type Generator



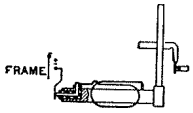
No. 50 Type Generator



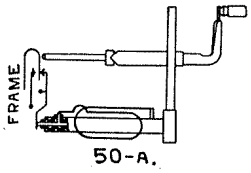
Nos. 48-A, C & G



Nos. 48-B & L



Nos. 48-H, J, K & P



Schematics of Generator Circuits

No. 48 Type Generators

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

Code No.	Voltage and Current	Normal Condition of Generator Circuit	Principal Use and Description
48A	80 A.C.	Open	Standard for telephones intended for use on heavily loaded lines.
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.
48H	80 A.C.	Closed	Switchboards.

No. 50 Type Generators

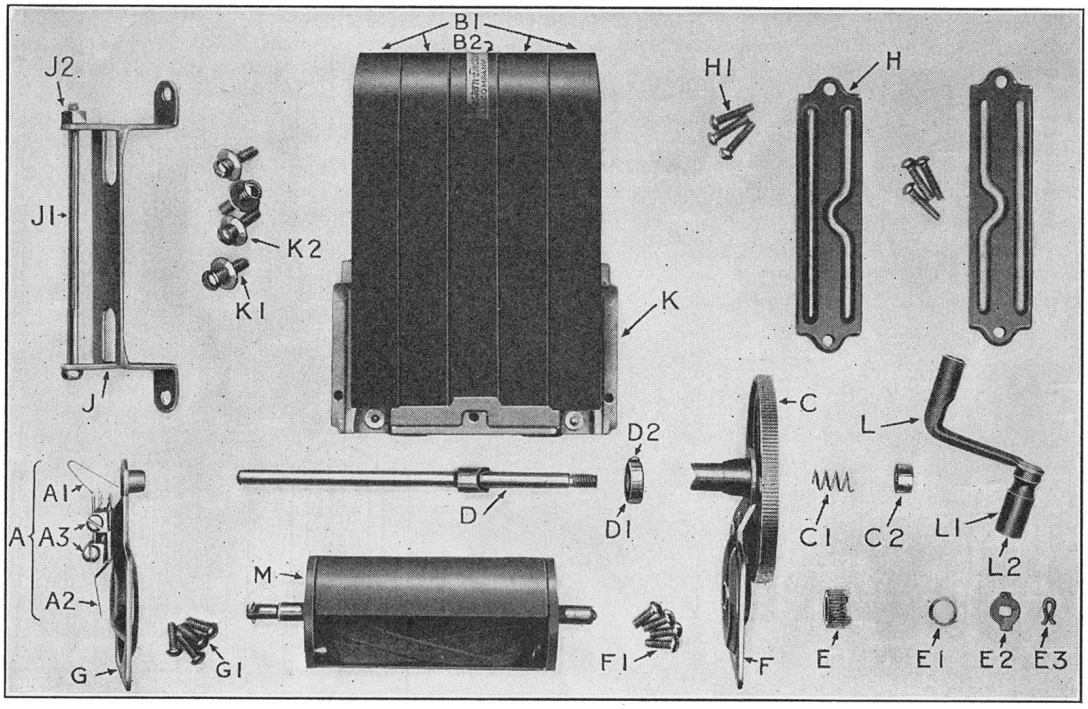
50A	60 A.C.	Open	For telephones for use on medium loaded lines.
50F	60 A.C.	Open	Same as the 50A, except that a shorter crank is provided and the rear mounting bracket is omitted. Intended for use in telephones in which a mounting bracket forms a part of the telephone.

No. 51 Type Generators

51A	80 A.C.	Open	In 536E Subscribers Set in Mine Telephones. All parts are treated to resist moisture and fumes. Contact springs enclosed in protective compartment.

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HAND GENERATOR REPLACEMENT PARTS



Part	Name of Part	22A	22D	22E	22K	22N	29B	29E	29F	48A	48B
A	Contact Spring Assembly	*	*	*	*	*	*	*	*	*	*
A-1	Shaft Contact Spring	P- 46968	P- 44597	P- 46968	.....	.....	P- 20800	P-113335	P-113335	P-101468	P-106102
A-2	Armature Contact Spring	P- 46969	P- 44596	P- 46969	P- 46969	P- 46969	.....	P-122967	P-122967	P-103130	P-106099
A-3	But. H. M. Screw	P-122193	P-116353	P-122193	P-122193	P-122193	.....	P-122982	P-106222	P-106222	P-106222
B-1	End Magnet	P- 18383	P- 18383	xP- 18383	P- 18383	P-207127	xP- 21365	xP-128889	xP-121728	P-106117	P-106117
B-2	Center Magnet	P-136786	P-136786	†P-136786	P-136786	P-207128	†P-136787	†P-136789	†P-136788	P-136790	P-136790
C	Gear and Sleeve	P-139879	P-139885	P-139879	P-139883	P-139883	P-139883	P-139891	P-139891	P-139889	P-139889
C-1	Main Shaft Spring	P-141097	P- 19671	P-141097	.....	.....	P- 10293	P-135611	P-135611	P- 18377	P- 18377
C-2	Shaft Nut or Coupling	P- 18378	P-139870	P- 18378	.....	.....	P-19420	P-149750	P-101492	P-101492	P-101492
D	Shaft	P-139882	P-139860	P-139882	.....	.....	P- 19464	P-139862	P-139862	P-139864	P-139864
D-1	Shaft Nut or Collar	P- 18379	P- 20087	P- 18379	P- 18379	P- 18379	P- 18379	P-113451	P-113451	P-113451	P-113451
D-2	Shaft Collar Screw	.....	.....	.....	.....	.....	.....	P-138680	P-138681	P- 21140	P- 21140
E	Pinion	P- 21624	P- 21624	P- 21624	P- 21624	P- 21624	P- 21624	P-122957	P-121699	P-101493	P-101493
E-1	Pinion Spring	P- 18375	P- 18375	P- 18375	P- 18375	P- 18375	P- 18375	.....	P- 42972	P- 42972	P- 42972
E-2	Pinion Washer & Pinion Cap	..... P- 21625	..... P- 21625	..... P- 21625	..... P- 21625	..... P- 21625	..... P- 21625	P-122964 P-110666	P-103717 P- 42977	..... P- 42977	..... P- 42977
E-3	Cotter pin or R. H. M. Screw	P- 32588	P- 32588	P- 32588	P- 32588	P- 32588	P- 32588	P-122979	P-108955	P-108254	P-108254
F	Bearing Bracket	P- 18366	P- 18366	P- 18366	P- 18366	P- 18366	P- 18366	P-124481	P-131593	P-106290	P-106290
F-1	R. H. M. Screw	P-146134	P-146134	P-146134	P-146134	P-146134	P-146134	P-124483	P-124482	P- 41140	P- 41140
G	Bearing Bracket	P- 18367	P- 20094	P- 18367	P- 18367	P- 18367	P- 20037	P-124480	P-131592	P-106289	P-106143
G-1	R. H. M. Screws	P-146134	P-146134	P-146134	P-146134	P-146134	P-146134	P-124483	P-124482	P- 41140	P- 41140
H	Clamping Plate	P- 5863	P- 5863	P- 5863	P- 5863	P- 5863	P-113358	.....	.....	P-111330	P-111330
H-1	R. H. M. Screw	P- 41383	P- 41383	P- 41383	P- 41383	P- 41383	P- 46983	.....	.....	P- 30443	P- 30443
J	Mt. Bracket	.....	.....	.....	.....	.....	.....	.....	P-121710	P-121753	P-121753
J-1	R. H. M. Screw	.....	.....	.....	.....	.....	.....	.....	P-121774	P- 42986	P- 42986
J-2	Nut	.....	.....	.....	.....	.....	.....	.....	P-121771	P-101556	P-101556
K	Pole Piece	P- 18414	P- 18414	P- 18414	P- 18414	P- 18414	P- 21364	P-140483	P-131600	P-108260	P-108260
K-1	Mounting Screw Lower	P- 22779	P- 22779	P- 22779	P- 22779	P- 22779	P- 48704	.....	.....	P- 22779	P- 22779
	Upper	P- 14943	P- 14943	P- 14943	P- 14943	P- 14943	P- 48703	.....	.....	.....	.....
K-2	Washer	P-131379	P-131379	P-131379	P- 18680	P- 18680	.....	.....	.....	P-131379	P-131379
L	Crank Assembly	P-158949	P-158949	P-158949	P-158946	P-158946	P-143244	P-135306	P-143244	P-158950	P-158950
L-1	Crank Handle	P- 18372	P- 18372	P- 18372	P- 18372	P- 18372	P- 18372	P- 18372	P- 18372	P- 18372	P- 18372
M	Armature	P- 44621	P- 44625	P- 44621	P- 44621	P- 44629	P- 44712	P-121693	P-121693	P-156430	P-156430

x These are left-hand magnets.
† These are right-hand magnets.
* Order as follows: Example: 1 Contact Spring Assembly for No. 48A Generator.

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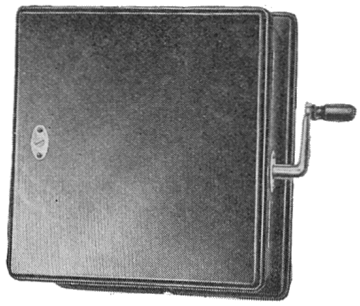
HAND GENERATORS AND BOXES

Hand Generator Replacement Parts (Continued)

Part	Name of Part	48C	48G	48H	48J	48K	48P	48R	48S	50A	50F
A	Contact Spring Assembly	*	*	*	*	*	*	*	*	*	*
A-1	Shaft Contact Spring	P-101468	P-101468	.....	.....	.....	.....	P-101468	P-101468	P-101468	P-101468
A-2	Armature Contact Spring	P-103130	P-103130	P-103130	P-103130	P-103130	P-103130	P-103130	P-103130	P-103130	P-103130
A-3	But. H. M. Screw	P-106222	P-106222	P-106222	P-106222	P-106222	P-106222	P-106222	P-106222	P-106222	P-106222
B-1	End Magnet	P-107912	P-106117	P-106117	P-106117	P-106117	P-106117	P-106117	P-107912	P-106117	P-106117
B-2	Center Magnet	P-136791	P-136790	P-136790	P-136790	P-136790	P-136790	P-136790	P-136791	P-136793	P-136793
C	Gear and Sleeve	P-139889	P-139889	P-139900	P-139900	P-139900	P-139900	P-139889	P-139889	P-139889	P-139889
C-1	Main Shaft Spring	P- 18377	P- 18377	.....	.....	.....	.....	P- 18377	P- 18377	P-141097	P-141097
C-2	Shaft Nut or Coupling	P-101492	P-101492	.....	.....	.....	.....	P-158815	P-158815	P-101492	P-101492
D	Shaft	P-139864	P-139864	.....	.....	.....	.....	P-139874	P-139874	P-139866	P-139866
D-1	Shaft Nut or Collar	P-113451	P-113451	.....	.....	.....	.....	P-113451	P-113451	P-113451	P-113451
D-2	Shaft Collar Screw	P- 21140	P- 21140	.....	.....	.....	.....	P- 21140	P- 21140	P- 21140	P- 21140
E	Pinion	P-101493	P-101493	P-101493	P-101493	P-101493	P-101493	P-101493	P-101493	P-101493	P-101493
E-1	Pinion Spring	P- 42972	P- 42972	P- 42972	P- 42972	P- 42972	P- 42972	P- 42972	P- 42972	P- 42972	P- 42972
E-2	Pinion Washer & Pinion Cap	P-107916	P- 42977	P- 42977	P- 42977	P- 42977	P- 42977	P- 42977	P-107916	P- 42977	P- 42977
E-3	Cotter pin or R. H. M. Screw	P-108254	P-108254	P-108254	P-108254	P-108254	P-108254	P-108254	P-108254	P-108254	P-108254
F	Bearing Bracket	P-106290	P-106290	P-106290	P-103899	P-122083	P-122083	P-106290	P-106290	P-106290	P-106290
F-1	R. H. M. Screws	P- 41140	P- 41140	P- 41140	P- 41140	P- 41140	P- 41140	P- 41140	P- 41140	P- 41140	P- 41140
G	Bearing Bracket	P-106143	P-106289	P-106289	P-103898	P-122085	P-122085	P-106289	P-106289	P-106289	P-106289
G-1	R. H. M. Screws	P- 41140	P- 41140	P- 41140	P- 41140	P- 41140	P- 41140	P- 41140	P- 41140	P- 41140	P- 41140
H	Clamping Plate	P-107914	P-111330	P-111330	P-111330	P-111330	P-111330	P-111330	P-107914	P-113427	P-113427
H-1	R. H. M. Screw	P-107905	P- 30443	P- 30443	P- 30443	P- 30443	P- 30443	P- 30443	P-107905	P- 30443	P- 30443
J	Mounting Bracket	P-106176	P-106840	.....	P-106176	P-106176	P-106840	.....	.....	.....	.....
		P-106177	P-106839	P-121753	P-106177	P-106177	P-106839	P-121753	P-121753	P-113428	P-140909
J-1	R. H. M. Screw	P-107906	P- 42986	P- 42986	P- 42986	P- 42986	P- 42986	P- 42986	P- 42986	P-113429	P-113429
J-2	Nut	P-101556	P-101556	P-101556	P-101556	P-101556	P-101556	P-101556	P-101556	P-101556	P-101556
K	Pole Piece	P-108261	P-108260	P-108260	P-108260	P-108260	P-108260	P-108260	P-108261	P-113410	P-113410
K-1	Mounting Screws	P-107908	P- 22779	P- 22779	P- 22779	P- 22779	P- 22779	P- 22779	P-131380	P- 22779	P- 22779
K-2	Washer	P-131379	P-131379	P-131379	P-131379	P-131379	P-131379	P-131379	P-131379	P-131379	P-131379
L	Crank Assembly	P-158948	P-158947	P-158947	P-158947	P-158947	P-131286	P-158950	P-158950	P-158950	P-158949
L-1	Crank Handle	P- 18372	P- 18372	P- 18372	P- 18372	P- 18372	P- 18372	P- 18372	P- 18372	P- 18372	P- 18372
M	Armature	P-156431	P-156430	P-156430	P-156430	P-156430	P-156430	P-156430	P-156431	P-155522	P-155522

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

Hand Generator Boxes



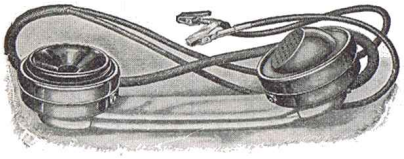
No. 299F

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

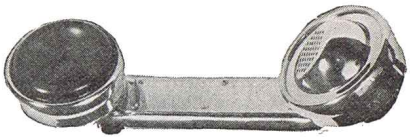
Code No.	Generator	Current	Dimensions of Box, Inches		
			Width	Depth	Length
299F	48A	Alternating	8	6	9
299G	48B	Alternating and pulsating	8	6	9
303G	50A	Alternating	$6\frac{3}{4}$	$5\frac{21}{32}$	$8\frac{9}{16}$

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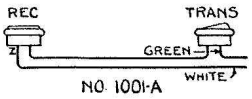
HAND SETS



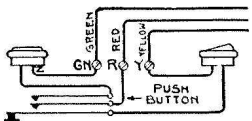
No. 1001A



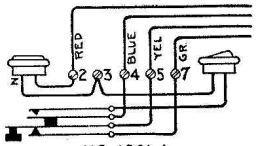
No. 1001C Hand Set



NO 1001-A



NO 1001-C, &H



NO. 1001-J

No. 1001 Type

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

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

The Nos. 1001C and H Hand Sets are provided with a push button switch which is connected so that these hand sets function the same as the No. 1040AL Desk Stand. In view of this, they may be used in connection with our regular magneto and central battery desk set boxes in place of a desk stand, in cases where the service conditions are such that a hand set is required.

Code No.	Transmitter	Receiver	Cords — Code No.	Cords — Length	Push Button Spring Combination	Principal Use
1001A	244W	131W	243 2–574	8 ins. 5 ft. (waterproof)	None	Used by lineman as a test set on central battery lines. The cord is equipped with spring connection clips.
1001C	285	131W	366	6 ft. (waterproof)	2 make	Used with Nos. 1330 and 1331 Portable Magneto Telephones.
1001H	244W	131W	422	5 ft. 2 ins. (waterproof)	2 make	Used with No. 1375B Portable Magneto Telephone.
1001J	244W	131W	502	6 ft.	1 make and 1 break	Used with desk Interphones. No. 1 System.

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

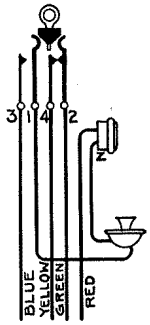
Note 2. Further data on above hand set transmitters and receivers are listed under their respective headings.

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

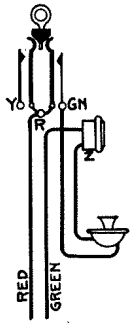
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HAND SETS

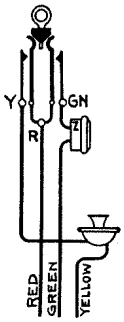
No. 1002 Type



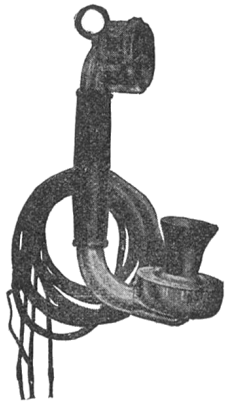
NO. 1002-D



NO. 1002-E



NO. 1002-AC


No. 1002AC

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 may be used in place of deskstands if required. A hook (No. 141A Switchhook) is furnished with each hand set.

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

E1B Hand Set



E1B Hand Set on B1 Hand Set Mounting

The E1B Hand Set is at present furnished as the D-87415 Hand Set but will be furnished as the E1B without change. This handset may be obtained in five standard colors; ivory, gray, old brass, oxidized silver, or statuary bronze. Unless otherwise specified the handset will be furnished in black.

Code No.	Transmitter	Receiver	Cord		Use
			Code No.	Length	
E1B	395B	557B	H3B	4 ft.	With "B" Type Hand Set Mountings as a station hand telephone.

Handset Mountings

Code No.	Description
B1	Black finished desk mounting for E1B Hand Set. For use in manual and dial systems, and is the equivalent of the Nos. 40AL and 51AL Deskstands. For manual service requires a No. 50-H Apparatus Blank and a D3H Cord, which are not furnished unless specified. For dial service a No. 2H Type Dial and a No. 6022 Cord are required. Not furnished unless specified. The mounting can be obtained in the same colors that are standard for the E1B Hand Set.

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HANDSET HANGERS, HEAD BANDS AND HEAT COILS

Handset Hangers

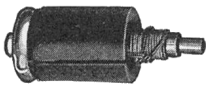
Code No.	Description
1B	Mounts on a vertical surface for holding a No. 1001 Type Hand Set when not in use. The hand set is suspended by its receiver, which fits into a recess in the hanger. Cast brass; black finish. Overall dimensions, 3 1/16 inches wide, 2 1/2 inches deep, and 3 3/8 inches high.
1C	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 (Receivers)

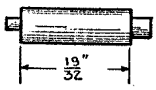
Code No.	Description
1B	Consists of a wire head band with olive drab textile covering, equipped with adjustable yokes for holding two No. 528BW Receivers (less the No. 3A Head Band ordinarily furnished), also for holding two No. 509W Receivers.
1C	Similar to No. 1B, except for use with two No. 128W Receivers.
7A	Leather covered head band of flat cross section for use with a single receiver in train dispatching service.
11A	A single wire head band arranged to hold one No. 128 or 528 Receiver. Made of one piece nickel finished piano wire. A No. 1466 Pad is furnished as part of this head band but is not assembled to it. Replaces the 3A Head Band.
11B	The same as the 11A Head Band except that the No. 1466 Pad is omitted. Replaces the 3C Head Band.

Heat Coils

NO. 76 TYPE



No. 76A Heat Coil

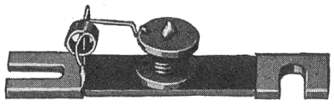


No. 40 Type Heat Coil

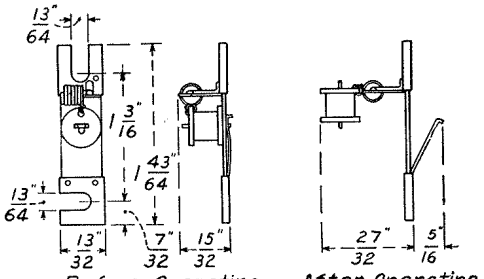
The No. 76A Heat Coil is used in the No. 1168A, No. 1168B, No. 1269A and No. 1269B Protectors and in the Nos. 1435P, 1435H and 1435T Protector Groups for protecting central office equipment against sneak currents. It consists of a black hard rubber shell. When a current greater than that for which it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

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

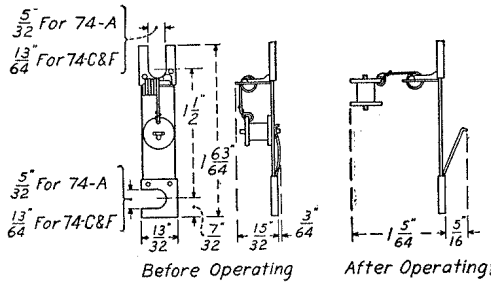
NO. 74 TYPE



No. 74 Type Heat Coil



NO. 74-B,D,E & G



NO. 74-A,C&F

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.

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Heat Coils—Continued

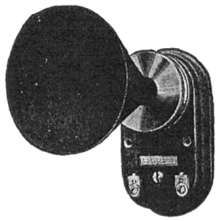
Code No.	Rated Resistance Max.	Rated Resistance Min.	Will Operate in 210 Sec. On Current of (Amperes)	Size of Mounting Screw Required
74A	21.0	19.0	.18	No. 6
74B	4.1	3.7	.40	No. 10
74C	8.0	6.5	.265	No. 10
74D	4.7	4.4	.34	No. 10
74E	8.0	6.5	.265	No. 10
74G	57	53	.110	No. 10

HOWLERS

NO. 1 TYPE

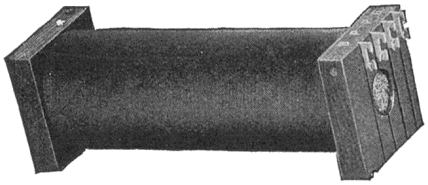
The No. 1C Howlers are equipped with a bi-polar magnet structure of the same general construction as in Western Electric receivers. They are wound to 1,000 ohms resistance. The diaphragm of the howler may be accurately adjusted in relation to the pole pieces by rotating the front half of the case. When the correct position is obtained the case may be locked in position by means of a ring nut. For Morse calling in signal circuit.

Code No.	Description	Overall Dimensions, Ins.
1C	Mounted on a wooden base	$6\frac{1}{4}$ x 6 x $3\frac{15}{16}$

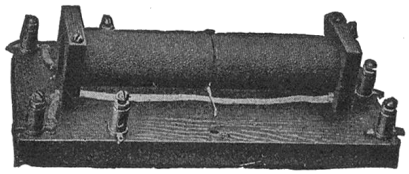


No. 1C Howler

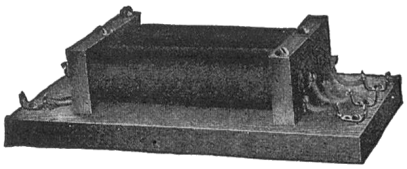
Induction Coils



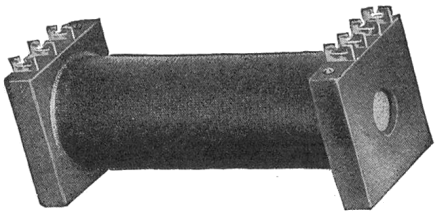
No. 5



No. 10



No. 24



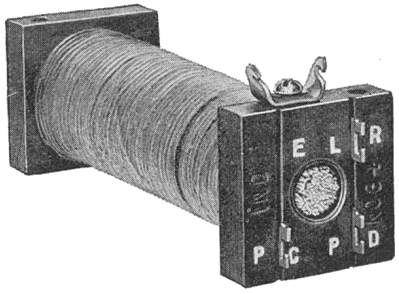
No. 23



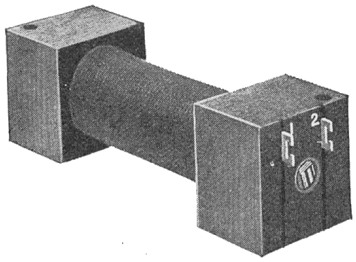
Nos. 13, 29 and 31

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INDUCTION COILS—Continued



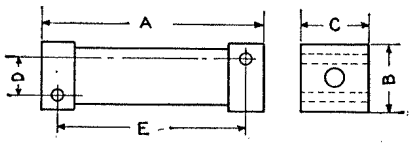
No. 34



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



Induction Coil Nos. 13, 29 and 31



Induction Coil Dimensions

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

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

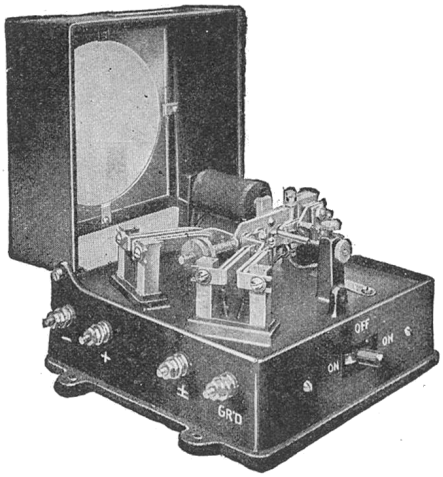
Code No.	Description and Principal Use	Overall Dimensions, Ins. (See Dimension Diagram) A	B	C	D	E
5	When equipped with a magnetic interrupter (P-101495), this induction coil is used for converting the current from three or four dry cells into a high frequency current for signalling howlers and No. 1004 Hand Sets. (See High Frequency Current Signalling Device)	4 29/32	1 9/16	1 9/16	1 3/16	4 3/8
10	Intended for use in local and toll magneto switchboards	8 7/8	2 3/8	4 1/8	....	...
13	Standard for local battery telephones	3 1/4	1	1 5/32	5/8	2 7/8
20	Intended for use in common battery subscribers' sets	4 1/2	1 3/8	1 43/64	....	...
23	Nos. 9 and 10 Central Battery Switchboards and associated desks, Nos. 1 and 4 P.B.X. Switchboards and magneto switchboards	4 1/4	1 9/16	1 3/4	1 3/16	3 7/8
24	No. 1 Central Battery Switchboards and Nos. 1 and 2 Toll Switchboards and associated desks. Consists of two induction coils mounted side by side on a wood base together with five terminals	6 3/4	3 1/4	1 7/8	....	...
29	Train dispatching (local battery) telephones	3 1/4	1	1 5/32	5/8	2 7/8
31	Same as the No. 13 Induction Coil, except that it is treated to resist the action of moisture and fumes. Used in Nos. 1336 and 1536 Type Mine Telephones and 1526A Telephone Set	3 1/4	1	1 5/32	5/8	2 7/8
46B	Standard for central battery telephone. Is interchangeable with the No. 20 Induction Coil, which was formerly the standard. Replaces the No. 46	4 9/16	1 3/8	1 3/8	7/8	3 7/8
55B	Same as 46B except that it is moistureproof. Replaces the No. 55	4 9/16	1 3/8	1 3/8	7/8	3 7/8

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INDUCTION COILS AND INTERRUPTERS

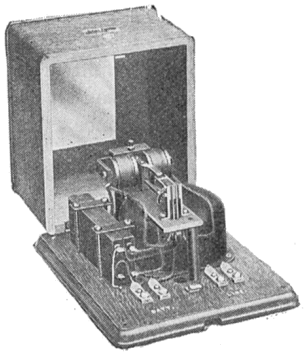
Induction Coils (Continued)

Code No.	Description and Principal Use	A	B	C	D	E
62	Primarily for use in "B" Operators Anti-side-tone Telephone Circuit	4¼	1 9/16	1¾	1 3/16	3⅞
63	Primarily for use in "A" Operators and P.B.X. Attendant's Anti-side-tone telephone circuit	4¼	1 9/16	1¾	1 3/16	3⅞
71	Same as the No. 29 Induction Coil except that it is moisture-proof. For use in the 1526B Telephone Set	3¼	1	1 5/32	⅝	2⅞



No. 84A Open

(Pole Changers)



No. 62A Open

Interrupters

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.

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INTERRUPTERS (Continued)

NO. 84 TYPE

All No. 84 Type Interrupters act as electrically operated pole changers, producing ringing current from a source of direct current. They have been thoroughly tested by wide application and extended service in all branches of the operating field.

The Nos. 84A, 84C, 84F and 84G Interrupters are for use in central battery offices.

The Nos. 84D and 84E Models are designed for magneto exchanges.

Each No. 84 Type Interrupter is mounted on the top of a metal case, 8 inches square at the base, in which condensers, resistance and a switching key for starting and stopping the machine, are mounted. A metal cover with a glass window is hinged on this case and protects the moving parts. A circuit label is pasted on the inside of the cover. These interrupters occupy a small amount of space, are easy to install, have their adjustable parts readily accessible, and require a minimum amount of maintenance.



No. 84A Interrupter

The following is a short description of the three interrupters most generally used.

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 56 volts positive and negative pulsating and 80 volts alternating current.

84D — The operating coil is wound for current from a two-cell Edison BSCO primary battery. Dry cells are used for supplying ringing current, which is alternating only, at 85 volts, when a 100 volt dry cell battery is used.

84E — Similar to the No. 84A Model but operating coil wound for two cells of Edison BSCO primary battery. Furnishes positive and negative pulsating and alternating current for ringing.

NO. 156 TYPE

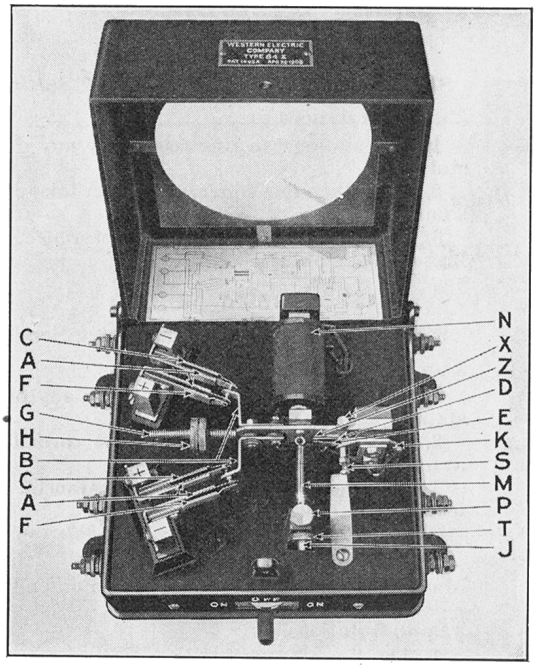
156B — Intended for use in small offices with a source of 135 cycle current for ringing on toll lines. Operates on 24 volt battery, arranged to mount on 19″ Relay Racks and consists of the following apparatus:

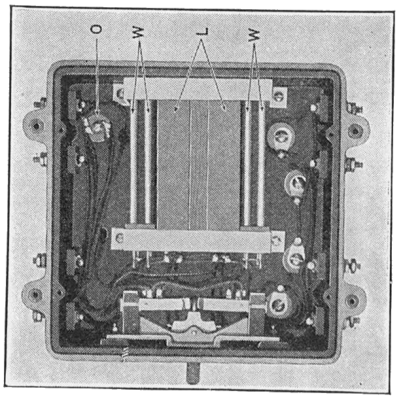
1 Vibrator with Platinum Contacts
1 18K Resistance
1 No. 57B Condenser
1 No. 57AG Condenser
1 No. 57H Condenser
4 No. 57QF Condensers
4 No. 57QH Condensers
1 No. 71H Retardation Coil
1 No. 71K Retardation Coil
1 No. 71R Retardation Coil
1 No. 84A Repeating Coil
1 No. 149D Relay
1 No. 150B Terminal Strip

A No. 91C Gauge is also furnished with this interrupter.

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INTERRUPTERS (Continued)





Bottom View

Types 84A, C, D, E, F and G Interrupters

PIECE PART LIST

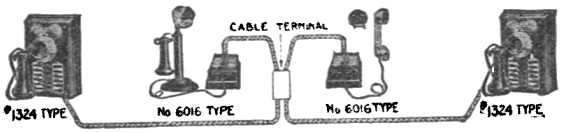
When ordering give piece part number indicated in column under type of Interrupter for which new piece part is wanted.

	Name	84A	84C	84D	84E	84F	84G
A	Inner Ringing Spring	P- 46665	P- 46665	P-103970	P-106359	P-169848	P-169848
B	Vibrator Arm	P- 46651	P- 46651	P-46651	P- 46651	P-169847	P-169847
C	Back Ringing Spring	P- 46667	P- 46667	.....	P-106356	.....	.....
D	Inner Magnet Spring	P- 46668	P- 46668	P- 46668	P- 46668	P-149853	P-149853
E	Outer Magnet Spring	P- 46669	P- 46669	P- 46669	P- 46669	P-149851	P-149851
F	Front Ringing Spring	P- 46666	P- 46666	.....	P-106358	.....	.....
G	Armature Arm	P- 46673	P- 46673	P-103975	P- 46673	P-149865	P-149865
H	Weight Nut	P- 46650	P- 46650	P-103972	P-103972	P- 46650	P- 46650
J	Spiral Spring Adjusting Screw	P- 46648	P- 46648	P- 46648	P- 46648	.....	.....
K	Adjusting Plate (Assembly)	P- 46656	P- 46656	P- 46656	P- 46656	.....	.....
L	Condenser	No. 21J	No. 21J	No. 21J	No. 21J	No. 21E	No. 21E
M	Spiral Spring	P-106011	P-106011	P-106011	P-106011	.....	.....
N	Magnet Coils	P-132829	P-128185	P-133769	P-132828	P-132829	P-128185
O	Resistance Across Contacts	No. 21B	No. 21B	Spl. No. 21 P-103977	Spl. No. 21 A-38625	No. 21B	No. 21B
P	Spring Adjusting Screw Lock Nut	P-123818	P-123818	P-123818	P-123818	.....	.....
R	Stiffening Spring	.....	.....	.....	.....	P- 46620	P- 46620
S	Magnet Spring Adjusting Screw	P- 39625	P- 39625	P- 39625	P- 39625	P- 39625	P- 39625
T	Spring Adjusting Screw Nut	P- 46649	P- 46649	P- 46649	P- 46649	.....	.....
U	Contact Spring Adjusting Clamp	.....	.....	.....	.....	P-149849	P-149849
V	Adjusting Clamp Screw	.....	.....	.....	.....	P-149856	P-149856
W	Resistance in Series with Condenser	No. 18AC	No. 18AC	No. 18AC	No. 18AC	.....	.....
X	Pivot Screw	P- 46654	P- 46654	P- 46654	P- 46654	.....	.....
Y	Reed	.....	.....	.....	.....	P-147480	P-147480
Z	Bumper Pin	P- 48913	P- 48913	P- 48913	P- 48913	P-147489	P-147489

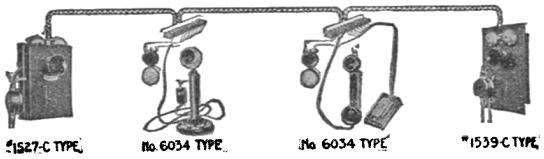
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GRAYBAR INTER-PHONES

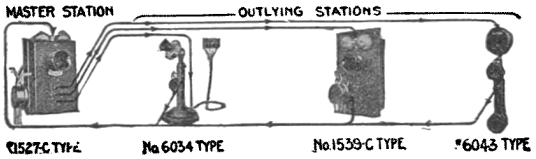
Picture Index of Inter-phone Systems



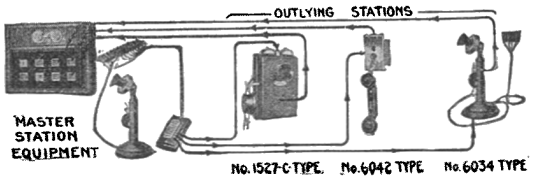
System No. 1



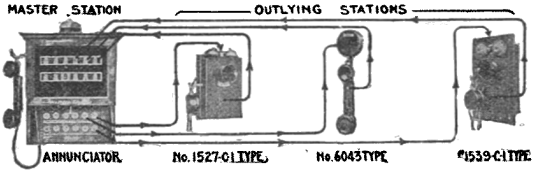
System No. 11



System No. 12



System No. 12A



System No. 12B

SYSTEM NO. 1

Selective Ringing—Selective Talking Service

3 up to 24 stations.

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.

SYSTEM NO. 11

Selective Ringing—Common Talking Service

3 up to 8 stations.

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.

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 handset Interphones 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.

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

SYSTEM NO. 12B

Master Annunciator and Outlying Stations—Common Talking Service

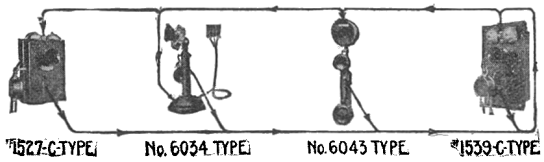
3 up to 24 stations.

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.

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GRAYBAR INTER-PHONES



System No. 15C

SYSTEM NO. 15C

Code Ringing—Common Talking Service

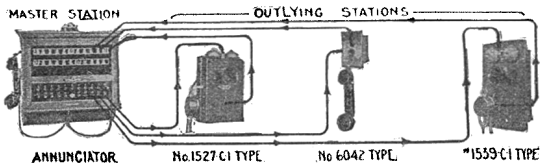
2 up to 6 stations.

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. 18C

SYSTEM NO. 18C

Master Annunciator with Connecting Cords

10 up to 70 stations

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.

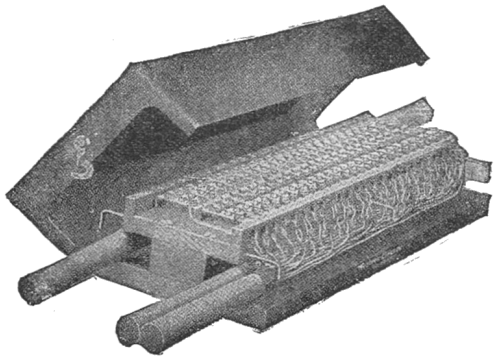
Note. These diagrams are intended to show the Ringing Service provided for the various Inter-phone systems and should not be confused with the wiring diagrams, which are shown in a separate bulletin, "Installing and Maintaining Graybar Inter-phones."

Note. For further information on Inter-phones, write to nearest Graybar house.

GRAYBAR INTER-PHONE ACCESSORIES

Cable

Cable for use in Inter-Phone Installations is shown under Cable on Page 37.



No. 19B. Cable Terminal

NO. 19 TYPE CABLE TERMINALS

The No. 19 Type Cable Terminal is admirably suited for interior or distributing work. It was designed after a great deal of study, and is the best of its kind on the market. Made of hard wood, numbered and shellacked, and equipped with a sheet steel cover, treated with the Parker Rustproof Process, finished in Black Enamel.

Code No.	Capacity in Pairs	Length Ins.	Width Ins.	Depth Ins.
19A	14	8	5⅛	2½
19B	26	14	5⅛	2½

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JACKS

Singly Mounted—Welded Frame Jacks

The following singly mounted, electrically welded frame type jacks replace the corresponding punched frame types. The terminals of the jacks are regularly arranged to accommodate two No. 19 B. & S. gauge wires. Mounting screws are furnished.



No. 215 Jack

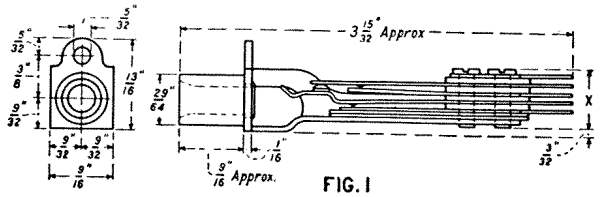


FIG. 1

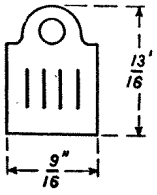


Fig. A

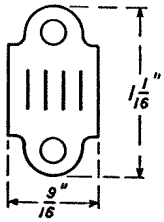


Fig. B

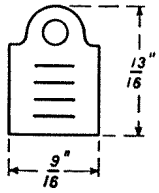


Fig. C

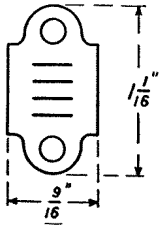
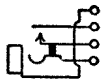
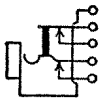


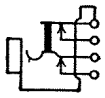
Fig. D



No. 215



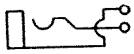
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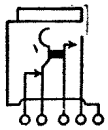
No. 217
220, 235



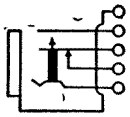
No. 218
219, 231



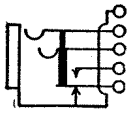
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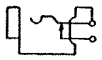
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No. 234



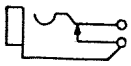
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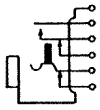
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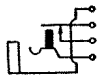
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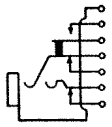
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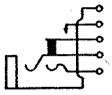
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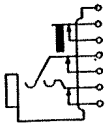
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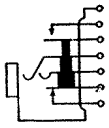
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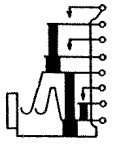
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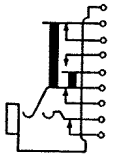
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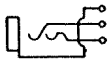
No. 243



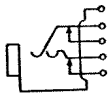
No. 244



No. 245



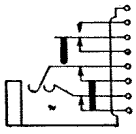
No. 246, 238



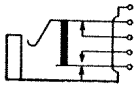
Nos. 248, 239



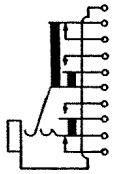
No. 267



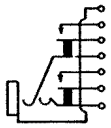
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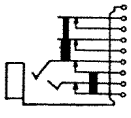
No. 281



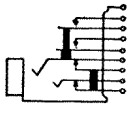
No. 284



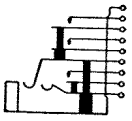
No. 285



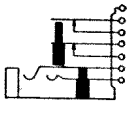
No. 289



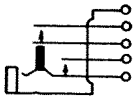
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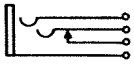
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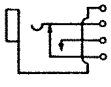
No. 293



No. 297A



No. 300A



No. 303A

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JACKS

Singly Mounted—Welded Frame Jacks

Code letters A, B, C and D of the code numbers listed below indicate the number of mounting lugs (single or double) and their arrangement with respect to the plane of the springs (horizontal or vertical) as illustrated in figures A, B, C and D on the preceding page.

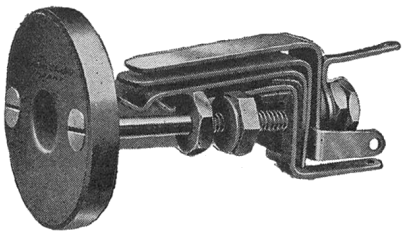
Fig. 1, together with Figs. A, B, C and D, show the general design and dimensions of welded frame type jacks.

Jacks for Use with Plug Nos. 47, 116, 137, 141, 144, 151, 153, 154, 209, 217 and 218

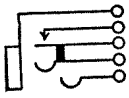
These jacks will mount on $\frac{5}{8}$ inch horizontal centers. For vertical centers, the "A" and "C" Type Jacks will mount on $\frac{5}{8}$ inch in double horizontal rows with lugs in opposite directions and $\frac{7}{8}$ inch when mounted in double horizontal rows with lugs in same direction. The "B" and "D" Types will mount on $1\frac{1}{8}$ inch vertical centers.

Code No.		Code No.	
Fig. "A" Type	Fig. "C" Type	Fig. "B" Type	Fig. "D" Type
215A	....	....	....
216A	....	....	....
217A	....	....	....
218A	218C	218B	218D
219A	219C	219B	219D
220A	220C	220B	220D
221A	221C	221B	221D
223A	....	....	....
225A	225C	225B	225D
226A	....	....	....
227A	....	....	....
228A	228C	228B	228D
230A	....	230B	....
231A	231C	231B	231D
232A	....	232B	....
233A	233C	....	233D
234A	234C	234B	234D
235A	235C	235B	235D
236A	236C	236B	236D
303A	....	....	....

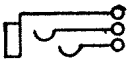
Singly Mounted Jacks—Miscellaneous Types



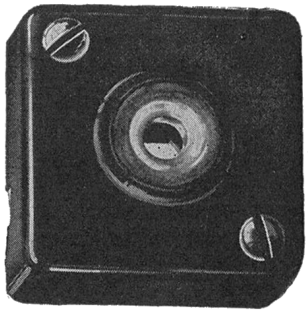
No. 77



No. 77



Nos. 78 & 190



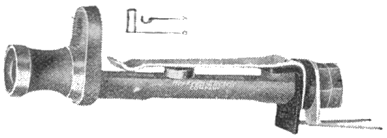
No. 190

Code No.	Description
77	Operator's telephone set. Makes one separate contact when a No. 148 Plug is inserted; has tip, ring and sleeve terminals.
78	Same as No. 77 Jack, except that the make contact is omitted. Diameter of mounting plate $1\frac{7}{16}$ inches.
190	This jack is intended for use in restaurants and similar locations where it is desirable to move a deskstand 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 $1\frac{11}{16}$ inches square and 1 inch deep, and is finished black. The base and cover are slotted to allow wires to be brought in from wire moulding.
367	Similar to the No. 190 Jack except that it is arranged for flush wall mounting.

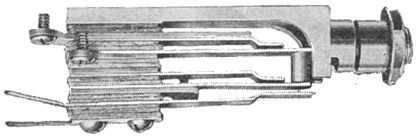
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JACKS

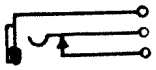
Singly Mounted Jacks—Miscellaneous Types



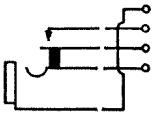
No. 99 Jack



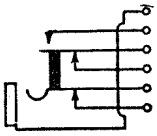
No. 224 Jack



No. 200



No. 208



No. 224

The Nos. 200, 203, 208 and 224 are fibre insulated jacks having micanite bushings. They will mount on any thickness of wood from 3/4 to 7/8 inch, the jack shank being threaded and the jack held in place by means of a nickel finished nut.

Code No.	Mounting Centers, Inches Horizontal	Mounting Centers, Inches Vertical	Used with Plugs	Used in Jack Boxes
99	5/8	15/16	47A, B & 116, 137 & 144	.....
200	15/16	1	47	.....
203	....	....	47	.....
208	15/16	1 3/32	116	385, 386, 389
224	15/16	1 15/32	116	385, 386, 389
309CK	7/8	5/8	47	.....

JACKS FOR USE WITH NO. 109 TYPE PLUG

The mounting centers for these jacks are the same as outlined for the above jacks.

Code No. Fig. "A" Type	Code No. Fig. "C" Type	Code No. Fig. "B" Type	Code No. Fig. "D" Type
246A	....	246B	....
248A	....	....	....
249A	....	249B	....

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

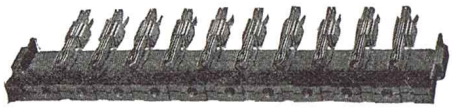
Code No. "A" Type	Code No. "C" Type	Mounting Centers, Inches Horizontal	Mounting Centers, Inches Vertical	Code No. "B" Type	Code No. "D" Type	Mounting Centers, Inches Horizontal	Mounting Centers, Inches Vertical
238A	238C	5/8	*	238B	238D	5/8	1 1/8
239A	239C	5/8	*	239B	239D	5/8	1 1/8
240A	240C	5/8	*	....	....	3/4	1 1/8
241A	241C	5/8	*	....	....	3/4	1 1/8
242A	242C	5/8	*	242B	....	3/4	1 1/8
243A	....	5/8	*	243B	....	3/4	1 1/8
245A	....	5/8	*	....	....	15/16	1 1/8
280A	280C	7/8	*	....	....	15/16	1 1/8
284A	....	7/8	*	....	....	....	...
285A	....	5/8	*	....	....	....	...

* **Note.** Same vertical centers as noted above.

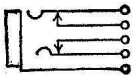
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JACKS AND JACK FASTENERS

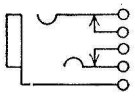
Jacks for Mounting in Strips



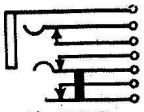
No. 110 Jack Mounting with No. 141 Jack



No. 50



No. 141



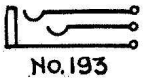
No. 229



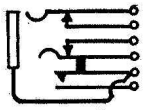
No. 295



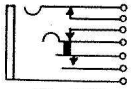
NO. 92



NO. 193



No. 275



No. 308

These jacks are designed for mounting in groups in jack mountings, a few of which are listed under "Jack Mountings." In ordering, the code number of the jack and the code number of the jack mountings should be given as well as the total number of jacks and mountings required.

The number of jacks to be mounted per strip should be specified and the numbering desired, as they will otherwise be furnished unnumbered.

These jacks are not supplied unmounted.

Code No.	Used with Plug No.	Used with Jack Mounting	No. per Strip
49	110	1–2–34–77	5, 10 and 20
50	110	1–2–34–77	5 and 10
92	109	18–19–113	10 and 20
141	110	109–110–112	10 and 20
193*	110	117–118–119 120–122–123 125–127	10 and 20
229	109	145	10
275	110	109–110–112 115–116–136 137	10 and 20
295	110	107–108–109–110 112–115–116–131 136 or 137	10 and 20
308	110	109–110–116–131 136–137	10 and 20

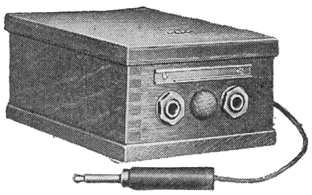
* The No. 119 Tool is designed for extracting and replacing the sleeve of the No. 193 Jack.

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Jack Boxes



No. 345A Jack Box



No. 385A Jack Box

Code No.	Description
345A	Oak box primarily for use in train dispatching circuits at dispatcher's office and is so arranged that two headsets can be connected to the line at the same time. Equipped with 1 No. 30 Jack Mounting, 2 No. 237C Jacks and 2 No. 221C Jacks. Approximate dimensions, length 5½ inches, width 4¾ inches, depth 2 inches.

Cordless Jack Boxes

Oak boxes with nickel trimming for miscellaneous purposes. Each box is equipped with hinge cover and a No. 1A Plug attached by means of a dummy cord. The No. 389 Type is split and hinged on a line midway between the upper and lower jack levels.

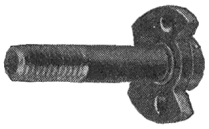
Telephone jack boxes Nos. 385A, B, 386A, B, C and 389A are so arranged that one telephone line can be terminated in each jack. A telephone set can be connected to any of these lines by inserting the plug in the proper jack.

Telegraph jack boxes Nos. 385C, D, 386D, E, F and 389B are so arranged that one telegraph line can be looped through each jack. Resonator set can be connected to any of these lines by inserting the plug in the proper jack. When this is done, the calling set is disconnected.

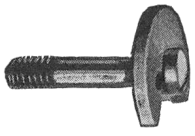
Code No.	Line Equipment	Capacity	Equipped with Jacks	Service	Dimensions, Inches		
					Width	Height	Depth
*385A	2	3	208	Telephone	4½	2¾	6¼
385B	3	3	208	Telephone	4½	2¾	6¼
385D	3	3	224	Telegraph	4½	2¾	6¼
*386A	4	6	208	Telephone	6¼	2¾	7 5/16
*386B	5	6	208	Telephone	6¼	2¾	7 5/16
386C	6	6	208	Telephone	6¼	2¾	7 5/16
*386D	4	6	224	Telegraph	6¼	2¾	7 5/16
386F	6	6	224	Telegraph	6¼	2¾	7 5/16
389A	12	12	208	Telephone	7 5/16	4⅝	6¼
389B	12	12	224	Telegraph	7 5/16	4⅝	6¼

* No. 17C Apparatus Blank, illustrated in the center jack position on the cut of the No. 385A Jack Box, is furnished in all unequipped positions.

Jack Fasteners



No. 16



No. 19

These fasteners serve the purpose of holding either jack mountings or lamp socket mountings in place on the switchboard frame. They are made of brass.

The No. 103 Tool listed under "Tools" should be used in placing and removing fasteners.

Code No.	Used On
15	No. 49 Jack Sections, Nos. 9C and 109A Switchboards having slotted stile strips.
16	No. 92 Jack Sections having drilled stile strips.
19	Nos. 49 and 193 Jack Sections having drilled stile strips on 1 inch centers.
21	No. 49 Jack Sections having stile strips drilled on ¾ inch centers.
25	No. 5 Toll Test Board to clamp Nos. 184 and 185 Jack Mountings and No. 262 Lamp Socket Mountings on relay racks.

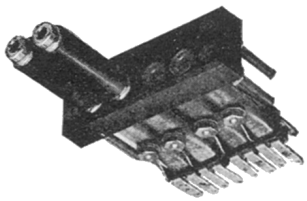
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JACK MOUNTINGS

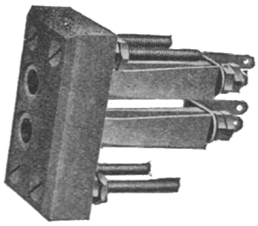
For central battery exchanges it is customary to have the multiple jack strips in each panel separated into groups of five rows by thin white holly strips. Each group consists of one hundred jacks numbered 0 to 99. Each strip has 20 jacks and is divided into four smaller groups (each having five jacks) 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.

In ordering, specify the number of jacks and the Code No., the Code No. of the jack mounting with the number per strip, together with the numbering desired. If the holly strips are to be attached to the upper edge of any of the jack mountings, the order should specify which ones.

The Nos. 30 and 80 Jack Mountings are so designed that the twin plug of an operator's head set may be inserted in each pair of jacks. Mountings will be furnished unnumbered unless otherwise specified.



No. 30 Jack Mounting with No. 99 Jacks

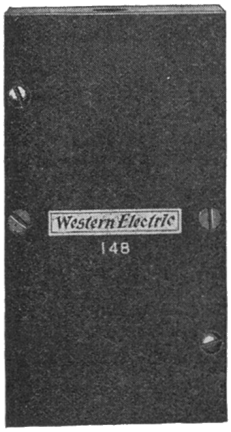


No. 80 with No. 99 Jacks

Code No.	Used with Mounting Jack No.	Ordinarily Used with Plug No.	No. of Jacks per Strip	Mounting —Face Dimensions, Ins.— Length	Width
30	234 Type	137	4	$3\frac{3}{8}$	$1\frac{1}{4}$
80	99	137	2	$2\frac{3}{8}$	$1\frac{1}{4}$
114	49	110	20	$9\frac{3}{16}$	$\frac{7}{16}$
128	219C or	47	10	$6\frac{21}{32}$	$1\frac{1}{4}$
129	similar	47	20	$6\frac{21}{32}$	$2\frac{1}{8}$
130	jack	47	10	$6\frac{21}{32}$	$1\frac{1}{4}$
135	236C	47	30	$21\frac{3}{4}$	$1\frac{3}{8}$
143	238A	110	10	$9\frac{3}{16}$	1
184	218 or	47	24	$16\frac{15}{16}$	$1\frac{1}{4}$
185	similar type		48	$16\frac{15}{16}$	$2\frac{1}{8}$
189A	240A	110	10	$11\frac{3}{16}$	$1\frac{5}{8}$

NO. 148 JACK MOUNTING

This ebony finished wood box is primarily designed for mounting a No. 218A or similar type jack on the side of a desk. Two wood screws with washers are provided for fastening it in place. The overall dimensions are length, 5 inches, width $2\frac{5}{16}$ inches, and depth $1\frac{21}{32}$ inches.



No. 148 Jack Mounting

JACK SPACES

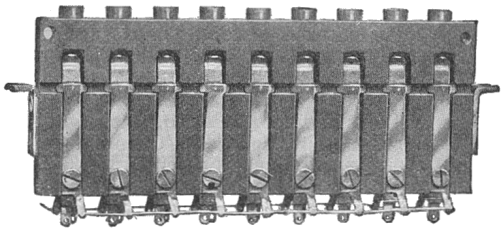
Code No.	Width of Face, Ins.	Finish	Notes
1M	$2\frac{9}{32}$	Mahogany	
1AK	$\frac{1}{64}$	.....	Insulator for use between No. 114 Jack Mounting and No. 102 Lamp Socket Mounting when equipped with No. 30 Lamp Sockets.
62A	$\frac{1}{8}$	Dull Black Fibre	
62B	$\frac{1}{4}$	" " "	
62C	$\frac{3}{8}$	" " "	
63C	$1\frac{1}{4}$	" " "	
63D	$2\frac{1}{8}$	" " "	
101A	$\frac{7}{16}$	" " "	
112AG	$\frac{3}{4}$	" " "	Recommended in place of two No. 112C.
127A	$1\frac{1}{16}$	" " "	
127C	$\frac{1}{4}$	" " "	
127F	$\frac{7}{16}$	" " "	
127M	$3\frac{1}{2}$	" " "	Both edges of face are beveled. Equipped with dust proof shield.
127N	$1\frac{1}{4}$	" " "	
159A	$\frac{7}{16}$	" " "	
159B	$\frac{1}{2}$	" " "	
164A	$\frac{5}{8}$	" " "	Intended to mount in place of Nos. 133, 134 and 135 Jack Mountings in Nos. 105A and B Switchboards.

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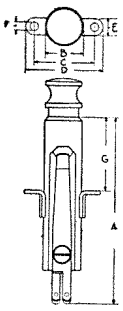
KEYS



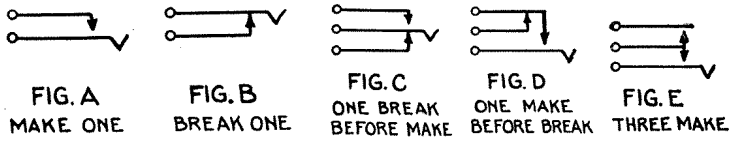
Singly Mounted Type



Group Mounted Type



Dimension Cut



The above contact spring arrangements represent the normal or unoperated contact spring positions of the keys listed below.

Singly Mounted Type Keys

LOCKING TYPE

(Button locks up when depressed to operated position)

Code No.	No. of Springs	Spring Arrangement	Dimensions, Inches (See Dimension Cut) A	B	C	D	E	F	*G
92B	6	2 sets Fig. C	3 9/32	2 1/32	1 1/32	1 5/16	9/32	5/32	11/16 7/8 1 1/4
92D	9	3 sets Fig. C							
92H	8	1 set Fig. A—2 sets Fig. C							
92J	6	1 set Fig. A—2 Sets Fig. B							
92N	3	1 set Fig. C							
92P	2	1 set Fig. C							
424B	6	3 sets Fig. A	3 7/32	2 1/32	1 1/32	1 5/16	9/32	5/32	11/16 7/8 1 1/4

NON-LOCKING TYPE

(Regular Push Button Operation)

Code No.	No. of Springs	Spring Arrangement	Dimensions, Inches (See Dimension Cut) A	B	C	D	E	F	*G
92A	6	2 sets Fig. C	3 9/32	2 1/32	1 1/32	1 5/16	9/32	5/32	11/16 7/8 1 1/4
92W	6	2 sets Fig. D							
92Y	4	2 sets Fig. A							
188A	4	2 sets Fig. A	3 7/32	9/16	1 5/16	1 7/32	9/32	5/32	11/16 7/8 1 1/4
188D	6	2 sets Fig. C							
188E	4	2 sets Fig. A							
424A	6	3 sets Fig. A	3 7/32	2 1/32	1 1/32	1 5/16	9/32	5/32	11/16 7/8 1 1/4
464A	2	1 set Fig. B	3 3/32	1/2	7/8	1 5/32	9/32	9/64	7/8
464B	2	1 set Fig. A							

Group Mounted Type Keys

These are group mounted type, push-button, order wire keys for use with various key mountings. The keys are equipped with red colored plunger buttons. Key mountings are listed elsewhere.

LOCKING TYPE

Code No.	No. of Springs	Spring Arrangement	Key Mounting Code Numbers
248A	4	2 sets Fig. A	273, 283, 290, 292, 295, 296, 297

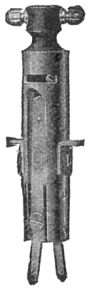
NON-LOCKING TYPE

69A	4	2 sets Fig. A	233, 235, 303, 304, 312, 315, 323, 324, 341
492A	2	1 set Fig. A	342, 343, 344 and 346

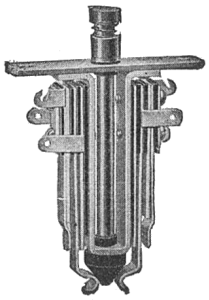
* Arranged for thickness of shelf as indicated.

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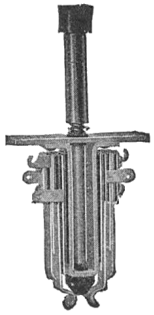
KEYS



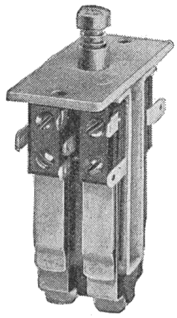
No. 272 & 406 Types



No. 377, 378 Types



No. 375 Type



No. 392, 393, Types

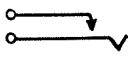


FIG. A
MAKE ONE

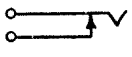


FIG. B
BREAK ONE

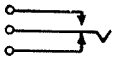


FIG. C
ONE BREAK BEFORE MAKE

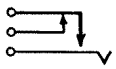


FIG. D
ONE MAKE BEFORE BREAK

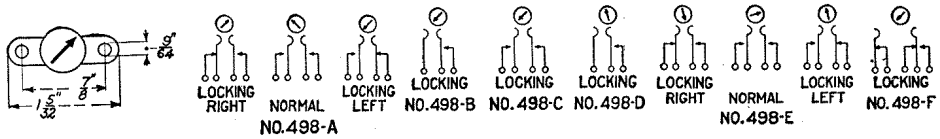
The above contact spring arrangements represent the normal or unoperated spring positions of the keys listed below.

Keys Equipped with Rotating Cams

Singly mounted metal shell keys having hard rubber rotating cam which when operated, breaks and makes contacts and locks in its operated position, otherwise having same construction as No. 92 Type Keys.

Code No.	No. of Springs	Contact Spring Arrangement	Key Shelf Mounting
272A	6	2 sets Fig. C	$1\frac{1}{16}$, $\frac{7}{8}$ or $1\frac{1}{4}$ inch as spec
272C	9	3 sets Fig. C	
272D	12	4 sets Fig. C	
272F	6	2 sets Fig. C	
272G	3	1 set Fig. C	
406A	2	1 set Fig. B	$1\frac{1}{16}$, $\frac{7}{8}$ or $1\frac{1}{4}$ inch as spec.
406C	4	2 sets Fig. A	$\frac{3}{8}$, $1\frac{1}{16}$, $\frac{7}{8}$ or $1\frac{1}{4}$ inch as spec.
406J	6	2 sets Fig. D	
406P	4	1 set Fig. B—1 set Fig. A	$1\frac{1}{16}$, $\frac{7}{8}$ or $1\frac{1}{4}$ inch as spec.

Rotating Button Type Keys



Single mounted rotating type keys. Buttons of Nos. 498A, 498E and 498H are arranged to rotate 180 degrees. The others are arranged to rotate 90 degrees to the right only. Each button is engraved with an arrow to indicate its rotated position. The color of each button is red with the exception of the No. 498F Button which is black. Otherwise having same construction as above No. 272 Type Keys.

Code Nos. 498A, 498B, 498C, 498D, 498E, 498F.

Plunger Type Keys

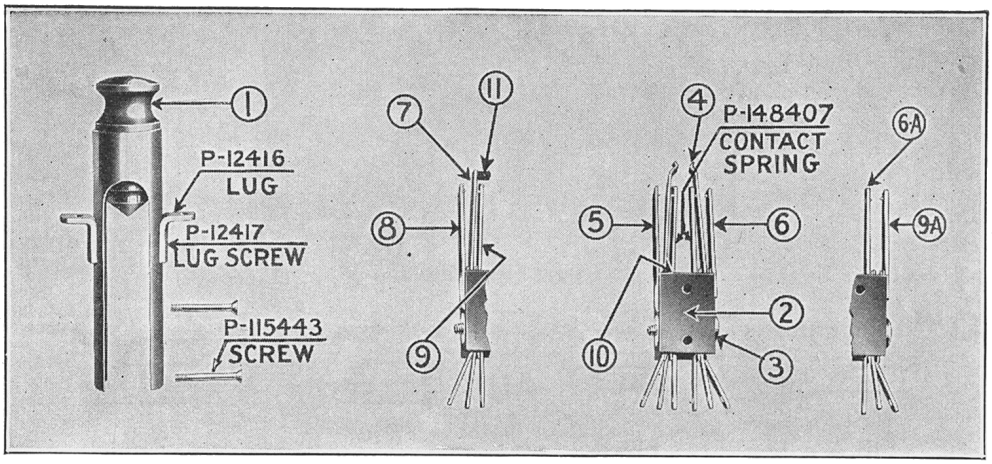
FOR USE WITH KEY LEVERS

The following plunger type keys each have but one plunger rod for its operation. The No. 375A Key is a push button type. All other keys listed below are locking or non-locking in operation according to the type of key lever used. (Key levers are listed elsewhere.)

Code No.	No. of Springs	Spring Arrangement
375A	6	2 sets Fig. C
377A	4	2 sets Fig. A
378A	6	2 sets Fig. C
392A	12	4 sets Fig. C
392D	14	4 sets Fig. C—1 set Fig. B
392F	24	8 sets Fig. C
393A	9	3 sets Fig. C
393D	10	4 sets Fig. B—1 set Fig. A
490A	2	.....
511A	20	10 sets Fig. A
511B	30	10 sets Fig. C

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KEYS



Replacement Parts for Push Buttons and Rotary Lever Keys
Nos. 92, 188, 272, 406, 424 and 464 Types

Key No.	(1) Plunger or Cam Black	(1) Plunger or Cam Red	(2) Spring Mounting Block	(3) Mounting Block Screw	(4) Plunger Springs	(5) Contact Springs with Mounting Block Screw Head (3) at Right	(6) & (6A) Contact Springs with Mounting Block Screw Head (3) at Right
2A	P-143908	P-166912	P-163582	P- 19297	P-148403	P-148698	P-149565
92B	P-143909	P-166906	P-163582	P- 19297	P-148403	P-148698	P-149565
92D	P-143909	P-166906	P-163585	P-111381	P-148403	P-148675	P-149565
92J	P-143908	P-166912	P-163582	P- 19297	P-149572	P-148535	.....
92R	P-143908	P-166912	P-163589	P-147982	P- 39347	P-142468	.....
92T	P-143908	P-166912	P-163582	P-113884	P-149572	.....	P-149565
92Y	P-143908	P-166912	P-163582	P- 19297	P-148253	P-148698	P-149565
188D	P- 42188	P-166918	P-163595	P- 19297	P-149332	P-149335	P-148698
188E	P-163928	P-166922	P-163595	P- 16583	P-147930	P-147931	P-147932
272A	*P-131698	*P-167372	P-163582	P-113884	P-147881	P-148338	P-148372
272C	*P-131698	P-167372	P-163585	P-111381	P-147881	P-148675	P-148372
272D	*P-131698	*P-167372	P-163585	P-111944	P-147881	P-148675	.....
272F	*P-131699	*P-166926	P-163584	P-129761	P-147881	P-148338	P-148372
272G	*P-131698	*P-167372	P-163582	P- 19297	P-147881	P-148338	.....
406A	*P-131698	*P-167372	P-163582	P- 16583	.....	P-148536	P-147887
406C	*P-131699	*P-166926	P-163582	*P-113884	P-149170	P-148338	P-148372
424A	P-143908	P-166912	P-163589	P- 29620	P-148235	P-148673	P-149565
424B	P-143909	P-166906	P-163589	P- 29620	P-148235	P-149566	P-149565
424C	P-143909	P-166906	P-163589	P-111381	P-148235	P-148656	P-147902
424D	P-143908	P-166912	P-163589	P-107721	P-148235	P-149416	P-149416
464A	P-100050	P-165497	P-163595	P-100172	P-149198	P-148485	.....
464B	P-100050	P-165497	P-163595	P-121480	P-148336	P-100009	.....

Key No.	(7) Contact Springs (With Mounting Block Screw Head (3) at Right)	(8) Contact Springs (With Mounting Block Screw Head (3) at Right)	(9) and (9A) Contact Springs (With Mounting Block Screw Head (3) at Right)	(10) Hard Rubber Insulators Large	(10) Hard Rubber Insulators Small	(11) Separator
92A	.....	.....	.....	P-109716	P-109717	.....
92B	.....	.....	.....	P-109716	P-109717	.....
92D	P-148699	P-148535	P-148675	P-162422	P-162420	P-113755
92J	P-163471	.....	P-163471	P-162422	P-162420	P- 23975
92R	P-142469	P-162430	.....	P-162422	P-162420	P-142472
92T	P-163471	P-148535	.....	P-162422	P-162420	P- 23975
92Y	.....	.....	.....	P-109716	P-109717	.....
188D	.....	.....	.....	P-109716	P-109717	.....
188E	.....	.....	.....	P-109716	P-109717	.....
272A	.....	.....	.....	P-109716	P-109717	.....
272C	P-147893	P-148698	P-147894	P-162422	P-162420	P-107684
272D	P-147894	P-148698	P-149565	P-162422	P-162420	P-107684
272F	.....	.....	.....	P-129760	P-129759	.....
272G	.....	.....	.....	P-109716	P-109717	.....
406A	.....	.....	.....	P-109716	P-109717	.....
406C	.....	.....	.....	P-109716	P-109717	.....
424A	P-148693	P-148537	.....	P-162422	P-162420	P- 34308
424B	P-148693	P-148537	.....	P-162422	P-162420	P- 34308
424C	P-148693	P-148537	P-147903	P-162422	P-162420	P- 34308
424D	P-149420	P-149513	P-147903	P-162422	P-162420	P- 34308
464A	.....	.....	.....	P-109716	P-109717	.....
464B	.....	.....	.....	P-109716	P-109717	.....

***Note.** The following parts are not included with the above cams, but must be ordered separately:

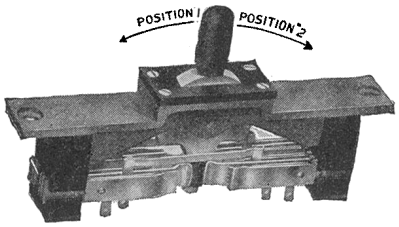
Cam Stud	Cam Stud Nut	Stop Pin
P-131696	P-131697	P-32819

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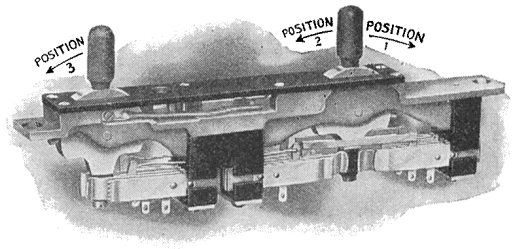
KEYS

Lever Type Keys

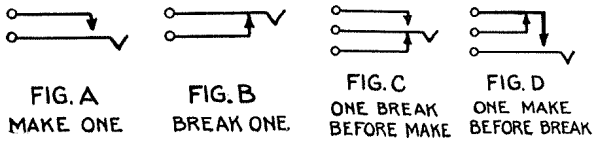
FOR LISTENING AND RINGING SERVICE ON SWITCHBOARDS



No. 104A



No. 102A



The above contact spring arrangements represent the normal or unoperated contact spring positions.

Single Lever Type

Size of top 1½ x ¾ inches

Code No.	No. of Contacts	Contact Spring Arrangement Position 1	Position 2	Corresponding Key Space Code No.
		LOCKING IN BOTH POSITIONS		
136A, *136B	6	2 sets Fig. C	2 sets Fig. C	104B
155A	6	.....	2 sets Fig. C	104B
		COMBINED LOCKING AND NON-LOCKING		
*104A	10	2 sets Fig. C	2 sets Fig. A	104B
184B	12	2 sets Fig. C	2 sets Fig. C	104B
*264A	14	2 sets Fig. C	2 sets Fig. C and 1 set Fig. A	104E

Double Lever Type

Size of top 5¼ x ¾ inches

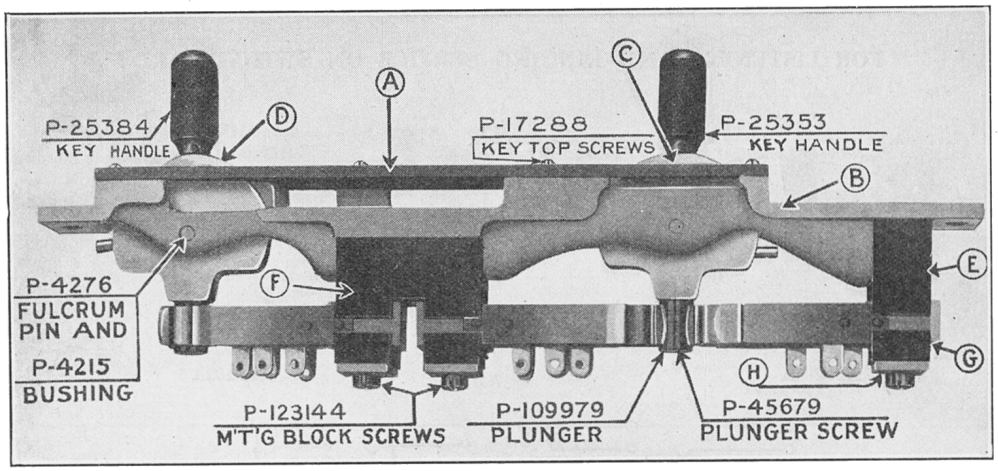
Code No.	No. of Contacts	Contact Spring Arrangement Position 1 Non-Locking	Position 2 Locking	Position 3 Non-Locking	Corresponding Key Space Code No.
†*102A	16	2 sets Fig. C	2 sets Fig. A	2 sets Fig. C	102B
†*110A	18	2 sets Fig. C	3 sets Fig. A	2 sets Fig. C	102B
156A	18	2 sets Fig. C	3 sets Fig. A	2 sets Fig. C	102B
256B	18	2 sets Fig. C	2 sets Fig. A and 1 set Fig. B	2 sets Fig. C	102B

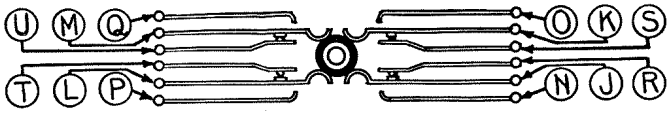
Note. * These keys have common strap wire connections between main springs.

† These keys equipped with indicators to show which ringing lever was last operated.

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KEYS AND PARTS FOR SINGLE AND DOUBLE LEVER TYPE KEYS





Symbol Key No.	A Key Top Plate	B Key Base	C Lever Assembly	D Lever Assembly	E Spring Mounting Block	F Spring Mounting Block	G Spring Clamp Block	H Spring Clamp Plate	I Spring Separator
102 A, B, C	P-163323	P-122755	P- 25363	P- 25360	P- 4252	P- 4305	P- 4254	P-112188	.....
103A	P-163323	P-122756	P- 25360	P- 25360	.....	P- 4305	.....	P-112188	.....
104A	P-112730	P-122757	P- 25355	.....	P- 4252	P- 4252	P- 4254	P-112188	P- 4264
110A	P-163323	P-122755	P- 25363	P- 25360	P- 33686	P- 4305	P- 33688	P-112188	.....
110D	P-163324	P-122755	P- 25363	P- 25360	P- 33547	P- 4305	P- 33548	P- 5802	.....
115A	P-122730	P-122757	P- 25354	.....	.....	P- 4252	.....	P-112188	P- 4264
118 A, B	P-122734	P-122762	.....	P- 25354	.....	P- 16739	P- 4254	P-112188	.....
121A	P-122737	P-122762	P- 25356	.....	P- 4252	.....	P- 4254	P-112188	.....
123A	P-122737	P-122762	P- 25354	.....	.....	P- 16739	.....	P-112188	.....
131A	P-122737	P-122762	P- 25355	.....	P- 4252	P- 16739	P- 4254	P-112188	.....
135 A, B	P-122730	P-122757	P- 25362	.....	P- 4252	P- 4252	P- 4254	P-112188	P- 4264
136A	P-122730	P-122757	P- 25358	.....	P- 4252	P- 4252	P- 4254	P-112188	P- 4264
150A	P-122731	P-122761	P- 25358	.....	P- 33547	P- 4252	P- 33548	P- 5802	.....
155A	P-122730	P-122757	P- 25356	.....	.....	P- 4252	.....	P-112188	.....
156A	P-122733	P-122762	P- 25355	P-25354	P- 33686	P- 4305	P- 33688	P-112188	P- 33495
164A	P-122737	P-122762	P- 25355	.....	P- 33686	P- 16739	P- 33688	P-112188	.....
165A	P-122733	P-122762	P- 25354	P- 25354	.....	P- 4305	.....	P-112188	.....
177A	P-122730	P-122757	P- 25355	.....	P- 33686	P- 4252	P- 33688	P-112188	{ P- 4264 / P-103845
178A	P-122731	P-122761	P- 25355	.....	P- 33547	P- 4252	P- 33548	P- 5802	P- 4264
184 A, B	P-122730	P-122757	P- 25355	.....	P- 4252	P- 4252	P- 4254	P-112188	P- 4264
196A	P-122731	P-122761	P- 25358	.....	P- 33547	P- 4252	P- 33548	P- 5802	.....
198A	P-122730	P-122757	P- 25358	.....	P- 33686	P- 4252	P- 33688	P-112188	.....
247A	P-122730	P-122757	P- 25358	.....	P- 33686	P- 4252	P- 33548	P-112188	.....
249A	P-122730	P-122757	P- 25358	.....	P- 33686	P- 4252	P- 33688	P-112188	P- 33495
256B	P-122733	P-122762	P- 25355	P- 25354	P- 33686	P- 4305	P- 33688	P-112188	.....
264A	P-122731	P-122761	P- 25355	.....	P- 33547	P- 4252	P- 33548	P- 5802	.....
369A	P-122730	P-122757	P- 25358	.....	P- 33686	P- 4252	P- 33688	P-112188	P- 4264
415A	P-122731	P-122766	P- 25358	.....	P-129820	P-129820	P-129821	P- 8216	.....

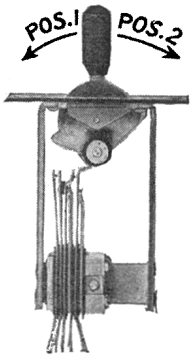
CONTACT SPRING PARTS

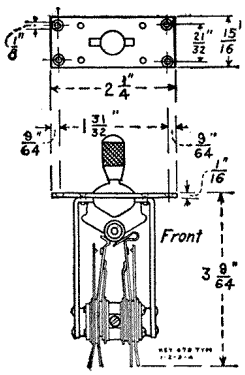
Symbol Key	J	K	L	M	N	O	P	Q	R	S	T	U
	Plunger Springs				Main Contact Springs							
104A	P-148505	P-148505	P-148508	P-148686	P-129033	P-129034	P- 17132	P- 17131	.....	.....	P-129032	P-129031
115A	.....	.....	P-148508	P-148686	.....	.....	P- 17132	P- 17131	.....	.....	P-129031	P-129032
135A, B	P-148507	P-148507	P-148508	P-148686	P- 17131	P- 17132	P- 17132	P- 17131	P-129032	P-129031	P-129032	P-129031
136A	P-131275	P-131276	P-131275	P-131276	P-129033	P-129034	P-129034	P-129033	P-131273	P-131274	P-131274	P-131273
150A	P-131275	P-131276	P-131275	P-131276	P-129033	P-129034	P-129034	P-129033	P-148444	P-148445	P-131274	P-131273
155A	P-131275	P-131276	.....	.....	P-129033	P-129034	.....	.....	P-131273	P-131274	.....	.....
156A	P-148423	P-148422	P-148508	P-148686	P-129033	P-129034	P- 17132	P- 17131	P-148365	P-148366	P-129031	P-129032
177A	P-147934	P-148505	P-148508	P-148686	P-129033	P-129034	P- 17132	P- 17131	P-148365	P-148366	P-129032	P-129031
178A	P-148423	P-148422	P-148508	P-148686	P-148367	P-148436	P- 17132	P- 17131	P-148365	P-148366	P-129031	P-129032
184A, B	P-148506	P-148506	P-148508	P-149686	P-129033	P-129034	P- 17132	P- 17131	P-131273	P-131274	P-129032	P-129031
196A	P-147937	P-147938	P-147937	P-147938	P-129033	P-129034	P-129034	P-129033	P-148361	P-148360	P- 33494	P-148361
198A	P-148422	P-148433	P-131275	P-131276	P-129033	P-129034	P-129034	P-129033	P-148365	P-148366	P-131274	P-131273
247A	P-148422	P-148513	P-131275	P-131276	P-129033	P-129034	P-129034	P-129033	P-148365	P-148366	P-131274	P-131273
249A	P-148422	P-148423	P-148422	P-148423	P- 17133	P-129034	P-129034	P-129033	P-148365	P-148366	P-148366	P-148365
264A	P-148506	P-148506	P-148508	P-148686	P-129034	P-129033	P- 17132	P- 17131	P-148444	P-148443	P-153484	P-153483
369A	P-148422	P-148513	P-148422	P-148513	P-129033	P-129034	P-129034	P-129033	P-148365	P-148366	P-148366	P-148365
415A	P-148511	P-148512	P-148512	P-148511	P-148368	P-148371	P-148371	P-148368	P-148494	P-148493	P-131274	P-131273

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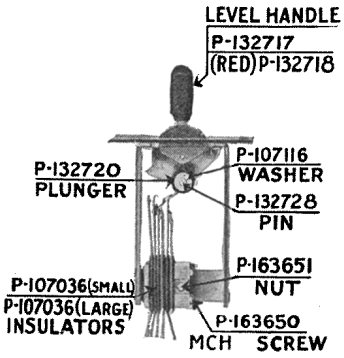
KEYS

Lever Type





General Dimensions of No. 479 Type



Replacement Parts

Keys have black finished metal tops. Four No. 4 Oval Head Wood Screws are furnished with each key for mounting.

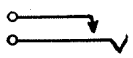


FIG. A
MAKE ONE

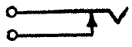


FIG. B
BREAK ONE

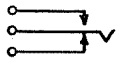


FIG. C
ONE BREAK BEFORE MAKE

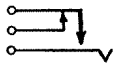


FIG. D
ONE MAKE BEFORE BREAK

The above contact spring arrangements represent the normal or unoperated contact spring position of the keys listed below.

Lever Type Keys—No. 479

LOCKING TYPE

Locking in one or both positions

Code. No.	No. of Contacts	Contact Spring Arrangement — Position 1 Figures A	B	C	D	Position 2 Figures A	B	C	D
479B	10	2	..	..	2	..	..	..	..
479F	5	..	..	..	..	1	..	..	1
479G	8	2	..	..	..	2	..	..	..
479H	12	..	..	..	2	..	..	..	2
479K	12	..	..	2	..	..	..	2	..
479AD	6	..	..	2	..	..	..	..	..
479AP	5	..	..	..	..	..	1	1	..
479AU	12	..	..	..	..	..	..	4	..
479AW	20	2	..	2	..	2	..	2	..
479AY	6	..	..	..	..	1	1	..	..
479BN	24	..	..	4	..	..	..	4	..

NON-LOCKING TYPE

Non-Locking in one or both positions

479BD	8	2	..	..	..	2	..	..	..
479CG	14	1	..	2	..	..	..	2	..
479CS	12	..	..	2	..	..	..	2	..

COMBINATION LOCKING AND NON-LOCKING TYPES

		Locking				Non-Locking			
479D	14	2	1	..	..	1	..	2	..
479E	12	2	..	..	..	1	..	2	..
479T	8	..	..	1	..	..	..	1	..
479AK	12	..	..	2	..	..	..	2	..
479CH	16	1	1	2	..	..	..	2	..
479CM	12	..	2	..	..	1	..	..	2
479FC	14	..	1	..	2	..	..	2	..

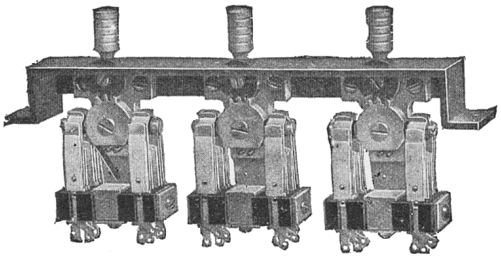
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KEYS

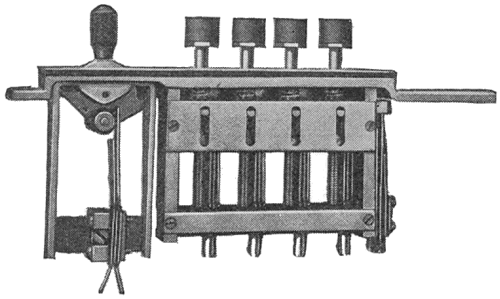
Lever Type Keys

NO. 501 TYPE

The No. 501 Key is a lever type key similar in construction to the No. 479 Type but arranged for mounting in the universal type of keyshelf, also may be used for general purposes, keys are equippedwith black handles and may be obtained with various spring combinations. Moving lever forward operates rear set of springs and vice versa. Mounting screws are furnished.



No. 251E



No. 510 Type Key

NO. 251 TYPE

Combined listening, ringing and switching keys for use in connection with 3 x 7 cordless private exchange switchboards.

Code No.	Description
251E	All listening keys locking, make three and break two keys when operated. Ringing key non-locking makes two and breaks two contacts when operated.
251F	All keys are locked in operated position and all make two and break two when operated.
251G	Same as No. 251F except for method of strapping.

NO. 510 TYPE

The No. 510 Type Keys are for use in Western Electric switchboards employing Harmonic Ringing Systems.

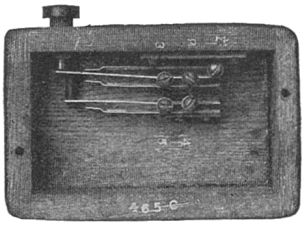
Replaces No. 468 Type Key for new and additional equipments.

When ordering No. 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 No. 510 Type Key if advisable. Consists of four-party restoring type harmonic ringing key unit and a lever key unit mounted in a base $7\frac{5}{16}$ inches long having a hard rubber key top $5\frac{1}{4}$ x .840 inches.

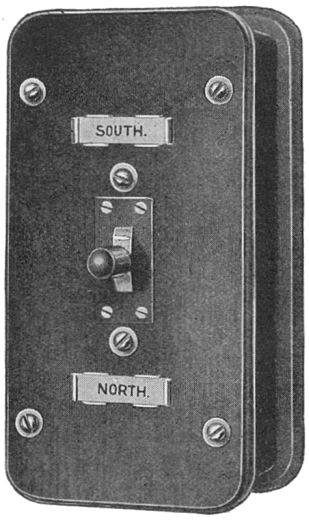
Code No.	Description
510A	For use as a one-way, individual, four-party manual ringing key with listening combination arranged for circuits with flashing recall on both cords.

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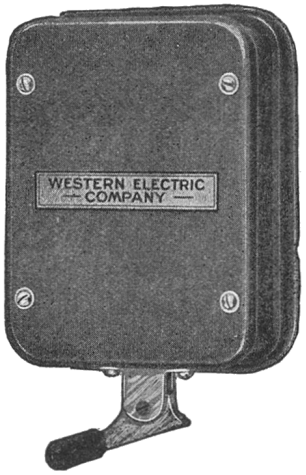
KEYS



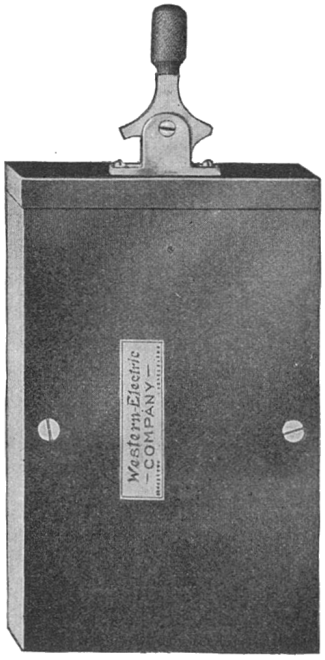
No. 465C. Bottom View



No. 6000B



No. 6000A



No. 6002A

Mounted Type Keys

Code No.	Description
465A	Push button type key mounted in oak box. Size of box $4\frac{11}{16}$ x $3\frac{1}{16}$ x $1\frac{13}{32}$ inches. Non-locking. Makes three and breaks one contact when operated.
465C	Non-locking. Makes two and breaks one contact when operated. Similar to No. 465A.
465D	Non-locking. Makes one and breaks one contact when operated. Similar to No. 465A.

NO. 6000 TYPE

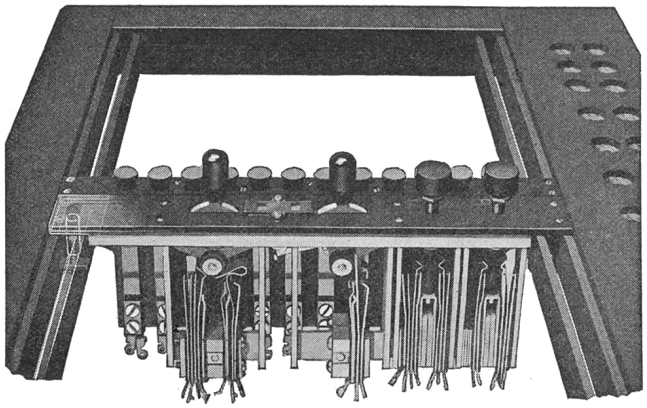
6000A	Wooden box equipped with one No. 377A Key and one No. 6A Key Lever. Size of box (including key lever) $4\frac{3}{4}$ x $3\frac{5}{8}$ x $1\frac{13}{16}$ inches. Locking. Makes two contacts when operated. For use in dispatcher's telephone circuits.
6000B	Wooden box (No. 334 Key Mounting) equipped with one No. 136B Key. Size of box $6\frac{1}{4}$ x $3\frac{7}{16}$ x $2\frac{7}{16}$ 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

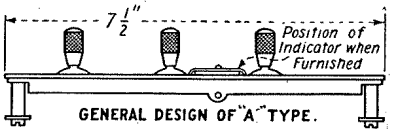
6002A	Wooden box equipped with one No. 378A Key and one No. 23A Key Lever. Ebonized finish. Intended for use as switching key to connect a telephone instrument on either one or both of two lines. Size of box $5\frac{1}{2}$ x $3\frac{7}{16}$ x $1\frac{5}{8}$ inches.
6002B	Wooden box equipped with one No. 378A Key and one 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 one No. 375A Key. Ebonized finish. Intended for use as a ringing key at substations. Dimensions same as No. 6002A.
6002D	Wooden ebonized box equipped with one No. 393A Key and one 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 $6\frac{3}{16}$ x $3\frac{13}{32}$ x $2\frac{5}{32}$.
6002E	Wooden, ebonized box equipped with one 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 $6\frac{5}{16}$ x $3\frac{13}{16}$ x 2 inches. The key lever is located in the center of the box face having dimensions of 2 x $6\frac{5}{16}$ inches.

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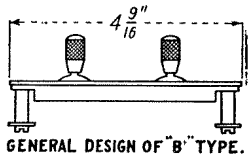
KEYS
(Continued)



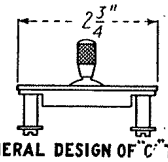
A2 and A3 type keys in universal key shelf



GENERAL DESIGN OF "A" TYPE.



GENERAL DESIGN OF "B" TYPE.



GENERAL DESIGN OF "C" TYPE.

UNIVERSAL TYPE KEYS

Universal type keys are arranged to mount in a Universal type keyshelf, which, instead of being drilled and tapped for a definite location for each key, is provided with two mounting slots running lengthwise of the keyshelf 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, 7½ inches; B type, 4 9/16 inches; C type, 2¾ 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.

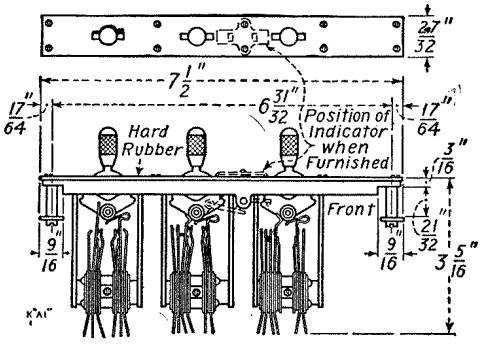
Universal type keys of the same length base will mount in any keyshelf designed for that length of key and apparatus blanks can be supplied either to take the place of keys at non-equipped positions in the switchboard, or to fill the space remaining in the Universal keyshelf after the required keys have 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 catalog.

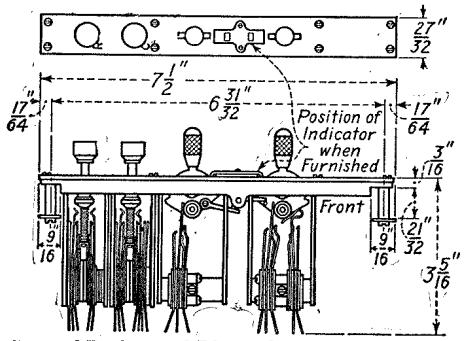
The list of Universal type keys given below is not complete or comprehensive and is not intended to be a guide in the selection of the actual keys required, but will serve for identification of Universal key types referred to in switchboard specifications or proposals.

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 keyshelf 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 keyshelf with "A" type keys and "A" type key spaces.

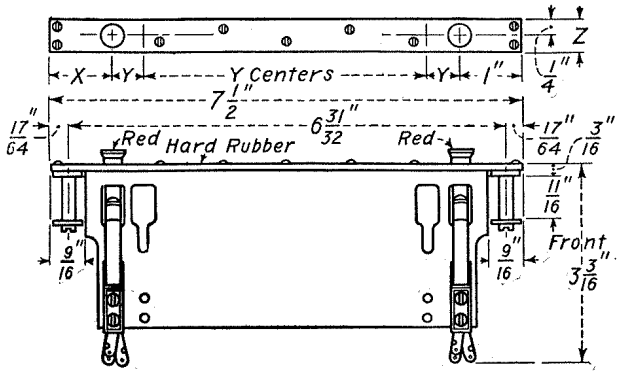
Equipped with one or two lever type key units and one or two push button key units as required.

Moving lever forward operates rear set of springs and vice versa.

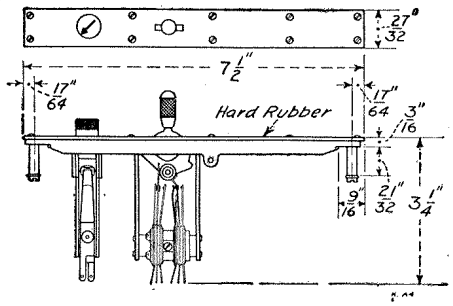
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KEYS

(Continued)



General Design and Dimensions of A-3A Type



General Design and Dimensions of A-4B Type

"A3" Type Keys. Call circuit keys arranged for mounting in a Universal type keyshelf 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.

"A4" Type Keys. Keys arranged for mounting in a Universal type keyshelf 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.

"A5" Type Keys. Arranged to mount in a Universal type keyshelf with "A" type keys and "A" type key spaces.

Equipped with one, two, or three lever type key units and one lamp socket.

Moving lever forward operates rear set of springs and vice versa.

"A6" Type Keys. Arranged to mount in a Universal type keyshelf with "A" type keys and "A" type key spaces.

Equipped with one or more push buttons. Push buttons lock when depressed and are released by operation of any other button.

"A7" Type Keys. Arranged to mount in a Universal type keyshelf with "A" type keys and "A" type key spaces.

Equipped with one or more push buttons. Push buttons lock when depressed and are released by the operation of any other button.

"A8" Type Keys. Arranged to mount in a Universal type keyshelf with "A" type keys and "A" type key spaces.

Equipped with lever type key unit and push buttons.

Moving lever forward operates rear set of springs and vice versa.

"A9" Type Keys. Arranged to mount in a Universal type keyshelf with "A" type keys and "A" type key spaces.

Equipped with a key lever and one or more push buttons.

Push buttons lock when depressed and are released by the operation of any other button.

"A10" Type Keys. Arranged to mount in a Universal type keyshelf with "A" type keys and "A" type key spaces.

Equipped with one or more push buttons.

"A11" Type Keys. Arranged to mount in a Universal type keyshelf with "A" type keys and "A" type key spaces.

Equipped with one or more push buttons.

"A13" Type Keys. Arranged to mount in a Universal type keyshelf with "A" type keys and "A" type key spaces.

Equipped with one or more push buttons and a lever type key.

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KEYS

(Continued)

"A14" Type Keys. Arranged to mount in a Universal type keyshelf with "A" type keys and "A" type key spaces.

Equipped with a key lever and one or more push buttons.

"A15" Type Keys. Arranged to mount in a Universal type keyshelf with "A" type keys and "A" type key spaces.

Equipped with one lever type key unit, one push button key, and two lamp sockets.

"A17" Type Keys. Arranged to mount in a Universal type keyshelf with "A" type keys and "A" type key spaces.

Equipped with plunger type key units.

"A18" Type Keys. Arranged to mount in a Universal type keyshelf with "A" type keys and "A" type key spaces.

Equipped with lever type key units, push buttons, and lamp sockets.

"A20" Type Keys. Arranged to mount in a Universal type keyshelf with "A" type keys and "A" type key spaces.

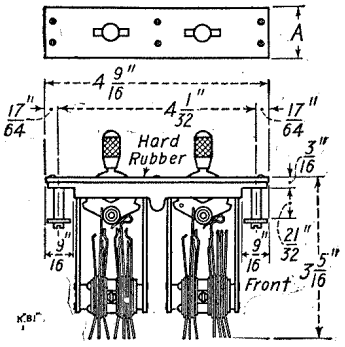
Equipped with lever and push button type key units.

"A23" Type Keys. Arranged to mount in a Universal type keyshelf with "A" type keys and "A" type key spaces.

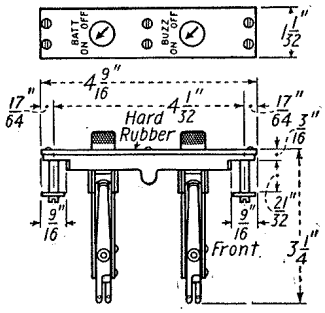
Equipped with one or more push buttons.

"A24" Type Keys. Arranged to mount in a Universal type keyshelf with "A" type keys and "A" type key spaces.

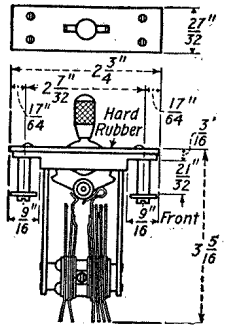
Equipped with four push buttons arranged in groups of two.



General Design and Dimensions of B-1C Type



General Design and Dimensions of B-2A Type



General Design and Dimensions of C-1A Type

"B1" Type Keys. Keys arranged for mounting in a Universal type keyshelf 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.

"B2" Type Keys. Keys arranged for mounting in a Universal type keyshelf 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.

"B3" Type Keys. Arranged to mount in a Universal type keyshelf with "B" type keys and "B" type key spaces.

Equipped with one or more push buttons.

"B5 and B6" Type Keys. Arranged to mount in a Universal type keyshelf with "B" type keys and "B" type key spaces.

Equipped with two push buttons and two lamp sockets.

"B7" Type Keys. Arranged to mount in a Universal type keyshelf with "B" type keys and "B" type key spaces.

Equipped with one, two, or three push buttons and one, two, or three lamp sockets.

"B8" Type Keys. Arranged to mount in a Universal type keyshelf with "B" type keys and "B" type key spaces.

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KEYS

(Continued)

Equipped with push button type key units.

"B9" Type Keys. Arranged to mount in a Universal type keyshelf with "B" type keys and "B" type key spaces.

Equipped with lever and rotary type key units.

"B10" Type Keys. Arranged to mount in a Universal type keyshelf with "B" type keys and "B" type key spaces.

Equipped with two lever type key units.

"B11" Type Keys. Arranged to mount in a Universal type keyshelf with "B" type keys and "B" type key spaces.

Equipped with six push buttons.

"B14" Type Keys. Arranged to mount in a Universal type keyshelf with "B" type keys and "B" type key spaces.

Equipped with one lever type key unit and one lamp socket.

"B15" Type Keys. Arranged to mount in a Universal type keyshelf with "B" type keys and "B" type key spaces.

Equipped with one or two lever type key units.

"B17" Type Keys. Arranged to mount in a Universal type keyshelf with "B" type keys and "B" type key spaces.

Equipped with one lever and one push button type key unit.

"B18" Type Keys. Arranged to mount in a Universal type keyshelf with "B" type keys and "B" type key spaces.

Equipped with a lever type key unit and push buttons.

"B19" Type Keys. Arranged to mount in a Universal type keyshelf with "B" type keys and "B" type key spaces.

Equipped with a lever type key unit and push buttons.

"B20" Type Keys. Arranged to mount in a Universal type keyshelf with "B" type keys and "B" type key spaces.

Equipped with a lever and push button type key lever.

"C1" Type Keys. Arranged for mounting in a Universal type keyshelf with "C" type keys and "C" type key spaces.

Moving lever forward operates rear set of springs and vice versa.

"C2" Type Keys. Arranged for mounting in a Universal type keyshelf with "C" type keys and "C" type key spaces.

Equipped with one or two push buttons having color of buttons as required.

"C5" Type Keys. Arranged for mounting in a Universal type keyshelf with "C" type keys and "C" type key spaces.

Push button type keys with engraved tops.

"C6" Type Keys. Arranged for mounting in a Universal type keyshelf with "C" type keys and "C" type key spaces.

Equipped with one or two colored push buttons.

"C7" Type Keys. Arranged for mounting in a Universal type keyshelf with "C" type keys and "C" type key spaces.

Equipped with two lever type key units.

"E1" Type Keys. Arranged to mount in a Universal type keyshelf with "E" type keys and "E" type key spaces.

Equipped with from one to ten metal frame push buttons.

"E2" Type Keys. Arranged to mount in a Universal type keyshelf with "E" type keys and "E" type key spaces.

Push button type keys. Each push button operates two make contacts and locks when depressed. Operation of any other button releases locked button.

"E3" Type Keys. Arranged to mount in a Universal type keyshelf with "E" type keys and "E" type key spaces.

Push button type keys. Each push button operates three make contacts and locks when depressed. Operation of any other key releases locked button.

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KEYS

(Continued)

A few individual keys are listed below with their principal use.

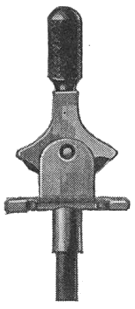
	Functions the same as	Principal Use
A1A	463A	Talking, ringing, monitoring, and cut-off.
A1C	—	Talking, ringing, monitoring, and cut-off.
A1L	463R	Testing on No. 4 Toll Test Board.
A1AL	256A, 256B	Talking and two party ringing.
A1AY	102A	Talking and two party ringing.
A1CN	—	Wheatstone bridge circuit of No. 12 Local Test Desk.
A1EW	—	Ringing, splitting, talking, and monitoring on No. 2 Toll Switchboard.
A1JU	—	Talking and dialing, two way ringing machine switching "A" positions.
A1KG	—	Two wire call wireless toll switching trunk—Rural position.
A1LK	—	22 Type Telephone repeater operator cord circuits.
A3A	12 No. 69A	
A3E	6 No. 242B	
A3G	12 No. 242B	
A5L	—	Battery supply key—telephone repeater.
A10F1	—	Two party machine ringing trunk and toll switching trunks, Nos. 1, 1C and 1D Switchboards.
A10F2	—	
A10F3	—	
A11A1	—	Four party toll switching trunks arranged for coin collect service. No. 9C Switchboard.
A11A2	—	
A11A3	—	
A11AB	—	Master ring back and dial release—Step-by-Step machine switching "A" positions.
B1C	—	Talking—two way ringing—No. 550-B P.B.X., cut-off and night connections.
B1D	462K	Talking—two way ringing—No. 550-B P.B.X., cut-off and night connections.
B10A		Talking and holding.
C1G		Switching.
C1H		Talking.
C1S		Grouping.
C1BF	—	Transfer.
C1BR	—	Talking, sender monitors cord, trouble desk.
C1FH	—	Grouping.
C2F	—	Display key in call indicator.
C3A	—	Talking and holding.

Key Levers



No. 6A

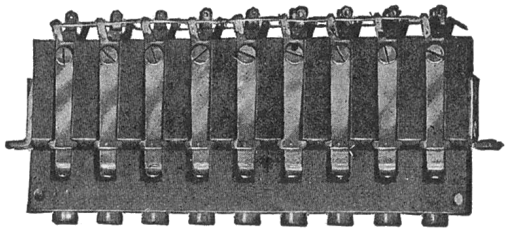
Code No.	Operated Position of Lever	Description
6A	Vertical	Used with lever type keys. Black handle, metal parts nickel plated. Locking.
14A	Horizontal	Otherwise same as No. 6A.
23A		This is a double throw lever, locking in all positions and is used with lever type keys. When the lever is in the vertical 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.



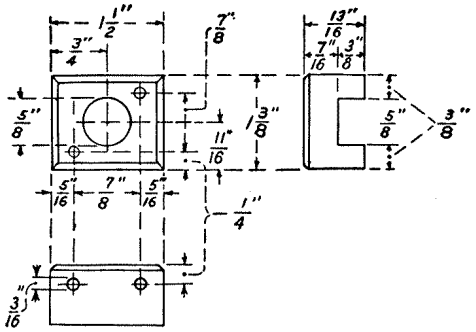
No. 23A

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KEY MOUNTINGS AND SPACES



Side View of No. 69A Keys Mounted in a Typical Key Mounting



NO.360

Key Mountings

A complete line of mountings arranged for use with any of our standard keys are manufactured; further information will be supplied upon request.

Also refer to listings under "Group Mounted Type" Keys.

Code No.	Number of Keys per Strip	Size of Top Inches	Keys Used with
233	10	7 3/8 x 1/2	69A
235	10	9 3/16 x 1/2	69A
303	8	6 7/16 x 1/2	69A
304	8	6 7/16 x 1/2	69A & 242 Type
312	8	6 3/8 x 5/8	69A & 242B
315	4	3 7/8 x 1/2	69A
323	10	6 7/16 x 1/2	69A
324	12	6 7/8 x 5/8	69A & 242 Type
340	10	9 3/16 x 1	92 & 424 Types
341	12	6 7/16 x 1/2	69A

The following key mountings are made of black finished wood and are for mounting push buttons 5/8 inch in diameter and not over 3/4 inch long, for use in signalling between substation extensions.

Code No.	Push Buttons per Mtg.	Dimensions, Inches
360	1	1 1/2 x 1 3/8
361	2	2 3/4 x 1 3/8

102-B Key Spaces

These are intended for use in place of keys where the full equipment of keys for which the keyshelf 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 size and finish of the top.

The following list represents a few of the most commonly used key spaces.

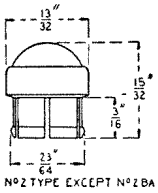
Code No.	Size of Top Inches	Corresponding Key	Code No.	Size of Top Inches	Corresponding Key
102B	5 1/4 x 3/4	102A	A6A	7 1/2 x 3/16	A-1 Type
102E	5 1/4 x 5/16	.....	A12A	7 1/2 x 3/8	A-1 Type
102J	5 1/4 x 9/32	.....	A13A	7 1/2 x 13/32	A-1 Type
102R	5 1/4 x 1/2	.....	A21A	7 1/2 x 21/32	A-1 Type
102W	5 1/4 x 3/16	.....	A27A	7 1/2 x 27/32	A-1 Type
104A	1 1/2 x 3/8	.....	B33A	4 9/16 x 1 1/32	B-1 Type
A5A	5 1/4 x 5/32	A1 Type	C27A	2 3/4 x 27/32	C Type

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LAMP CAPS

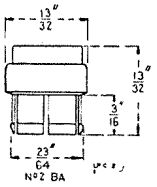
The lenses of Western Electric lamp caps are thick and substantial, being made from specially selected and treated glass. These lenses are held firmly in place in the cap cases by spinning the edges over the lenses. The cases are slotted to give a spring fit for the cap in a socket.

No. 2 and 72 Type—Used with Nos. 12 and 13 Lamp Sockets—Diameter $1\frac{3}{32}$ Inch



No 2 TYPE EXCEPT No 2 BA





No 2 BA


No. 2C

Code No.	Symbol	Color
2A		White opalescent
2B		White opalescent
2C		White opalescent
2D		White opalescent
2E		White opalescent
2F		White opalescent
2G		White opalescent
2H		Red opalescent
2J		White opalescent
2K		White opalescent
2L		Green opalescent
2M		White opalescent
2N		Red opalescent
2P		Jeweled red
2R		Jeweled blue
2S		Jeweled green
2T		Red opalescent
2U		Amber opalescent
2W		Blue opalescent
2Y		Green opalescent

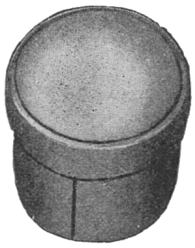
Code No.	Symbol	Color
2AA		Red
2AB		White opalescent
2AC		Red opalescent
2AG		White opalescent
2AH		White opalescent
2AJ		White opalescent
2AK		White opalescent
2AM		White opalescent
2AP		White opalescent
2AS		White opalescent
2AT		White opalescent
2AU		White opalescent
2AY		White opalescent
2BC		White opalescent
2BD		White opalescent
2BE		Green opalescent

No. 72 Type (Translucent numbers on black background)

Code No.	72A	72B	72C	72D	72E	72F	72G	72H	72J	72K
Symbol	0	1	2	3	4	5	6	7	8	9

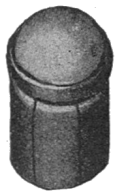
No. 4 Type—Used with No. 4 Type Lamp Sockets—Overall Diameter $37\frac{}{64}$ Inch

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
4A		White opalescent
4B		Jeweled red
4C		Jeweled green

Code No.	Symbol	Color
4D		Red
4F		Green
4G		White opalescent


No. 8A

No. 8 Type—Used with No. 30 Lamp Socket—Overall Diameter $21\frac{}{64}$ Inch

Code No.	Symbol	Color	Code No.	Symbol	Color
8A		White opalescent	8J		White opalescent
8B		Clear	8L		Green opalescent
8D		Red opalescent	8Y		Green opalescent
8E		White opalescent	8AA		Red
8F		White opalescent	8AC		Red opalescent
8G		White opalescent	8AS		Green opalescent
8H		White opalescent	8AU		White opalescent

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LAMPS AND SOCKETS

Lamps



No. 2

The manufacture of switchboard lamps is a highly refined and specialized art. The Western Electric Company has been active in this field for many years and the problems involved have been studied continuously and extensively in its Research and Engineering Laboratories. Methods of manufacture and special treatments for filaments have been perfected which give the lamps long life, uniform quality and high illuminating power. A bright, dependable signal can only be obtained by the use of a lamp of he 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 1¾ inches in length and .3075 inch (approximately 5/16 inch) in diameter. The bulb is made from clear glass and is tipless.

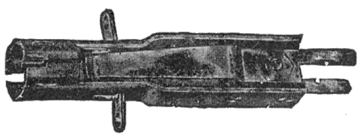
Every lamp is tested for current consumption and for illuminating power.

Code No.	Voltage	Current Consumption Minimum Amperes	Current Consumption Maximum Amperes	Used with Lamp Sockets Number
2A	4	.17	.21	12, 13, 30, 34, 41A
2B	4	.27	.31	12, 13, 30, 34, 41A
2C	15	.09	.12	12, 13, 30, 34, 41A
2E	20	.09	.12	12, 13, 30, 34, 41A
2F	12	.097	.12	12, 13, 30, 34, 41A
2G	24	.075	.115	12, 13, 30, 34, 41A
2H	6	.27	.31	12, 13, 30, 34, 41A
2J	24	.018	.033	12, 13, 30, 34, 41A
2K	30	.09	.12	12, 13, 30, 34, 41A
2L	10	.24	.26	12, 13, 30, 34, 41A
2N	6	.12	.16	12, 13, 30, 34, 41A
2P	8	.085	.10	12, 13, 30, 34, 41A
2R	18	.09	.12	12, 13, 30, 34, 41A
2T	40	.034	.046	12, 13, 30, 34, 41A
2U	24	.035	.045	12, 13, 30, 34, 41A
2W	18	.035	.045	12, 13, 30, 34, 41A
2Y	48	.028	.036	12, 13, 30, 34, 41A
A1*	24	.032	.038	12, 13, 30, 34, 41A
B-1*	18	.18	.30	12, 30, 34
B2*	24	....	.048	12, 13, 30, 34, 41A

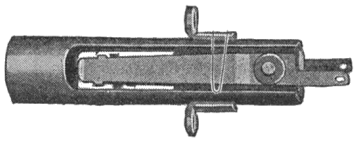
* Tungsten Filaments.

The No. 2 Lamps are now standard for use in the No. 16 Type Lamp Sockets instead of the No. 4 Lamps previously used. To permit of this, an adapter has been designed which may be inserted into the mounting through the lamp cap opening. The No. 2 Type Lamp together with a sufficient number of adapters should be ordered when replacements of No. 4 Type Lamps are to be made. In ordering specify:

Lamp Socket Adapter per D-12279



No. 13



No. 34

Lamp Sockets

Mounted Singly

These sockets are made of brass and are supplied with nickel silver springs, which are insulated with hard rubber. They mount individually and can, therefore, be ordered entirely separate from their mountings. The springs are insulated from the frame. The lamp mounts close to the lens of the lamp cap, giving the greatest possible amount of useful illumination.

Code No.	Used with Lamp No.	Used with Lamp Cap No.	Used with (Thickness of Shelf in Inches)
13	2	2 & 72	7/8 inch
34	2	4	7/8, 1, 1 3/16, 1 1/4, 1 13/16 inches
41A	2	2 & 72	5/8 inch

Mounted in Strips

These sockets are made of brass, and have nickel silver springs with hard rubber insulation. They are equipped in mountings containing 5, 10 or 20 sockets per strip and will not be supplied as a separate item, but must be ordered in connection with lamp socket mountings. (See description under Lamp Socket Mountings.)

Code No.	Used with Lamp No.	Used with Lamp Cap No.	Suitable for Lamp Socket Mounting No.
30	2 Type	8	102, 118, 123, 125

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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.



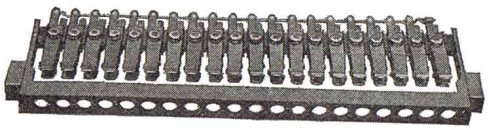
No. 12 Lamp Socket with No. 102 Mounting



No. 12 Lamp Socket with No. 136 Mounting



No. 12 Lamp Socket with No. 137 Mounting



No. 30 Lamp Socket with No. 102 Mounting

LAMP SOCKET MOUNTINGS

Not Arranged for Number Plates

Code No.	Arranged for Lamp Sockets Nos.	No. per Strip	Face Dimensions, Ins. Length	Face Dimensions, Ins. Width	Will Mount with Jack Mountings Nos.	Type of Switchboard Used with
**102	12 and 30	20	9 3/16	7/16	118 and 120	No. 1
105	12 and 30	10	7 21/32	7/16	64 and 86	
**123	12 and 30	20	10 1/2	7/16	115	No. 9
**125	12 and 30	10	10 1/2	7/16	116 and 115	
136	12	10	11 3/16	7/16	108, 109 and 110	No. 1962, No. 10
137	12	20	11 3/16	7/16	108 and 112	No. 1962, No. 10
***138U	12	12	6 7/8	1/2		

** The mounting is made of hard rubber when supplied with No. 12 Lamp Sockets and is of metal when used for No. 30 Lamp Sockets.

*** Mounts with "A3" Keys.



No. 122 with No. 12 Lamp Socket



No. 134 with No. 12 Lamp Socket

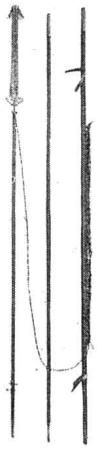
LAMP SOCKET MOUNTINGS

Arranged for Number Plates

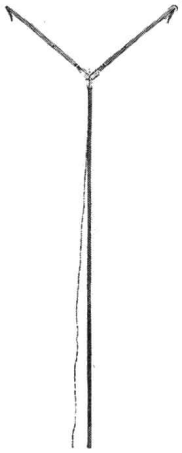
Code No.	Arranged for Lamp Sockets Nos.	No. per Strip	Face Dimensions, Ins. Length	Face Dimensions, Ins. Width	Arranged for Plates Nos.	Will Mount with Jack Mountings Nos.	Type of Switchboard Used with
122	12	10	9 3/16	7/16	31A, 59B	1, 2, 21	No. 1
132	12	10	10 1/2	7/16	31A, 59B	116	No. 9
134	12	10	7 23/32	7/16	60D, 108A	18, 19	No. 1

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LINE POLES



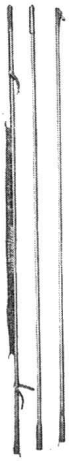
No. 3 Line Pole



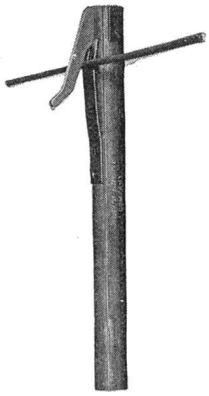
End Section with Spreaders Extended No. 3 Line Pole



Part of End Section with Spreaders Closed No. 3 Line Pole



No. 4 Line Pole

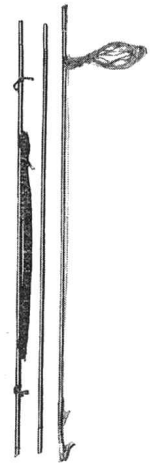


Part of End Section Showing Method of Clamping to Wire No. 4 Line Pole

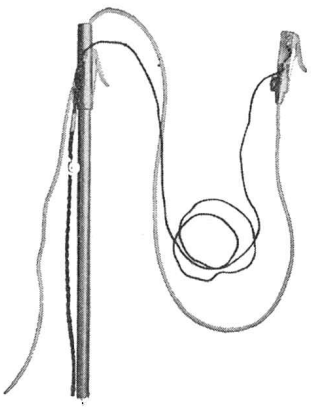
Line Poles

The line poles here listed are intended primarily for connecting portable telephones to open wire lines. They are made of hardwood and are in three sections, each approximately 6 feet in length. The joints are made of seamless brass tubing and are arranged so that the sections are securely locked together when the line pole is in use. The poles are so designed that the middle joint may be omitted if desired, thereby reducing the length of the line pole from 18 to 12 feet.

Contact with the line wires is made by means of a connecting clamp which consists of a metal hook equipped with a spring. When the hook engages the line wire the spring forces the wire into contact with the hook and at the same time scrapes the wire slightly so that a good contact is obtained.



No. 5 Line Pole

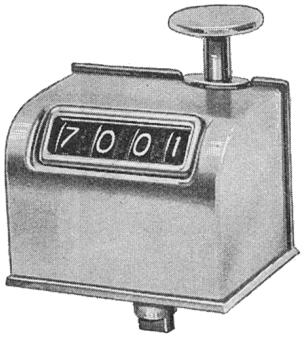


Part of End Section Showing Free Clamp. No. 5 Line Pole

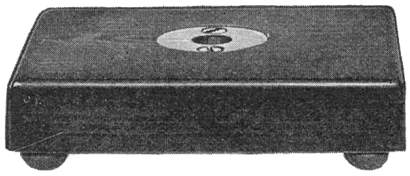
Code No.	For Making Contact with	Cord	Description
3	2 metallic conductors.	100 feet of M2J two conductor cord. For use with 1330-E, 1331-E, 1332-A & E Telephones.	The top section is equipped with two arms hinged at the lower end. These are each equipped with a connecting clamp and are of such length that they will span wires spaced up to 2 feet horizontally.
4	1 metallic conductor (grounded line)	100 feet of M1A two conductor cord. For use with 1314-A Telephones.	The top section has one connecting clamp only.
5	2 metallic conductors.	100 feet of M2K two conductor cord. For use with 1330-E, 1331-E, 1332-A & E Telephones.	The top section is equipped with two connecting clamps. One of these is fixed to the pole and the other free but under control of the user by means of a long cord. This is intended for making connections between two line wires spaced up to 5½ feet, either horizontally or vertically.

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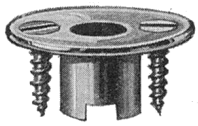
MESSAGE REGISTERS AND COUNTERS



No. 10A



No. 12004



No. 12005

Manually Operated Counters

This mechanically operated, nickel-finished message register is primarily designed for making traffic peg counts. It is 1⅝ x 1¼ inches at the base, and mounts in a socket which is flush in the top of the switchboard keyshelf or the socket can be supplied mounted in a portable mahogany finished base (2¾ x 2¼ inches). The mechanism is strong and compact. The plunger being on the top of the case, is easily located by the operator and its action when depressed clearly indicates when the register has counted. The numbers appear in white on a black background and are easily read. The counter is of the cumulative type, registering up to 9,999 and then repeating, and it cannot be reset. This non-resetting feature increases the accuracy of readings through the elimination of errors in setting and also saves time in operating.

Code No.	Description
10A	Message register (counter only)
12004	Portable base for No. 10-A Message Register.
12005	Flush socket for permanently mounting No. 10-A Message Register.

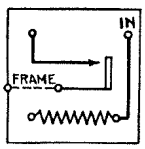


FIG. 1

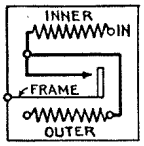
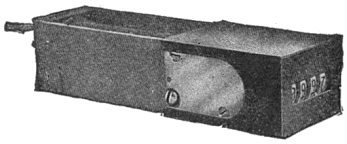


FIG. 2



No. 5L

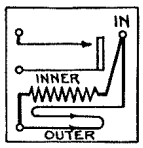


FIG. 3

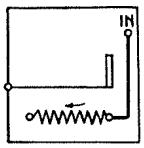


FIG. 4

Electrically Operated Registers

Electrically operated counters, primarily designed for use in connection with special central office circuits, and usually operated by means of a push button key mounted in the switchboard keyshelf.

The Nos. 5H and 5AC are designed for use in making peg counts, and the No. 5L is designed for association with an individual subscriber's line, and when so used is controlled by the switchboard operator to register the number of calls over that line.

The Nos. 5H and 5L may be arranged so as to give simultaneous peg count service and individual line call registering.

These message registers mount on steel mounting plates as listed under the heading of "Mounting Plates." The overall dimensions are 5⅞ inches long (including terminals), 1 3/16 inches high and 1½ inches wide.

Code No.	Windings	Rated Resistance (Ohms)	Operates On	Non-Operate On	Wiring Fig. No.
5H	Single	.27	1.4 amps.	1.25 amps.	Fig. 1 (Frame Connection)
5L	Inner	37.5	*25.5 volts	23.9 volts	Fig. 2
	Outer	463.			
5M	Single	280.	.036 amp.	.032 amp.	Fig. 1 (No Frame Connection)
5S	Single	5.	.313 amp.	.271 amp.	Fig. 4
5T	Single	1000.	.028 amp.	.023 amp.	Fig. 4
5U	Single	1000.	.028 amp.	.023 amp.	Fig. 1 (Frame Connection)
5AA	Single	6000.	.012 amp.	.0108 amp.	Fig. 4
5AC	Inductive	355.	**.065 amp.	**.055 amp.	Fig. 3
	Non-Inductive	600.			
	Combined	223.			

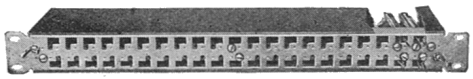
Notes. * With both windings in series. ** Through primary and secondary in multiple.

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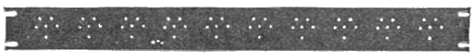
MOUNTING PLATES

The term "Mounting Plates" refers in general to a milled steel plate arranged for mounting relays, resistances, condensers and message registers. These mounting plates must not be confused with mountings for drops, keys, lamp sockets, etc., which are listed elsewhere under their respective titles.

Plates of different capacities and sizes other than those listed can be furnished, also plates arranged for mounting combinations of relays, resistances, etc., information on which will be furnished upon request.



Punched Frame Type



Drilled Plate Type

Mounting Plates for Relays

These plates are available in punched frame and drilled plate types. All punched frame types are equipped with dust-proof covers and are recommended when individual relay covers are not furnished or where the relays are to be mounted in an exposed location.

PUNCHED FRAME TYPE—RELAY MOUNTING

Galvanized finished metal plates $1^{23}/_{32}$ inches in width, with black finished dust-proof covers $3\frac{1}{2}$ inches in depth.

For mounting A and E types of relays on the centers specified, which also conforms with the mounting centers of the particular A or E type relays to be mounted.

Code No.	Relays per Plate	Mounting Centers	Length, Inches	Will Mount Interchangeably with Mounting Plates
*737A	20	$\frac{3}{4}$	19	600 Type
737B	10	$1\frac{1}{2}$	19	600 Type
737C	20	$\frac{3}{4}$	19	600 Type
**737D	10	$1\frac{1}{2}$	19	600 Type
745A	24	$\frac{3}{4}$	$21\frac{5}{8}$	606, 607 and 756
745B	18	1	$21\frac{5}{8}$	606, 607 and 756
745C	20	$\frac{7}{8}$	$21\frac{5}{8}$	606, 607 and 756
745E	18	1	$21\frac{5}{8}$	606, 607 and 756
750A	24	$\frac{3}{4}$	23	602 Type
750B	18	1	23	602 Type
750F	20	1	$21^{19}/_{32}$	602 Type

* Provided with battery and ground clips.

** Provided with ten terminal punchings.

The following mounting plates are black finished metal plates designed to mount Nos. 209 or 215 Type Relays and their associated No. 18 Type Connecting Blocks.

Code No.	Relays per Strip	Dimensions, Inches	Mounting Centers Inches	
823A	—	$2^{23}/_{32} \times 4\frac{1}{4} \times \frac{7}{32}$	—	Mounts vertically
823B	—		—	Mounts horizontally
884K	5	$19 \times 3^{15}/_{32} \times \frac{7}{32}$	$3\frac{1}{2}$	

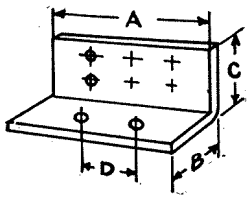
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MOUNTING PLATES

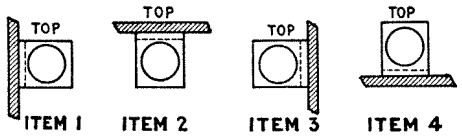
Drilled Plate Type—Relay Mounting

Black finished steel plates 7/32 inch thick, not equipped with covers unless otherwise indicated. When ordering, specify the exact code number of relays to be mounted, as each position must be drilled for the particular relay specified.

Code No.	Relays per Plate	Mounting, Inches: Centers	Length	Width	May be Ordered Drilled for Relays
600A	10	1 3/4	19	1 23/32	Nos. 89, 101, 105, 108, 114, 118, 124, 163, 172, 174 and 198
606A	10	1 3/4	21 5/8	1 23/32	Same as 600A
606S	16	1 1/4	21 3/8	1 23/32	Nos. B, G, H, or J Types of Relays
606T	15	1 11/32	21 5/8	1 23/32	B, G, H or J Types of Relays
609A	10	1 3/4	23	1 23/32	Same as specified 600A
609K	17	1 1/4	23	1 23/32	Drilled as specified
627C	19	1 1/4	26	1 23/32	Drilled as specified
677Y	15	1 5/8	27	1 23/32	Same as specified for 600A. Has Cover
677AB	22	1	27	1 23/32	A or E Type Relays. Has Cover
750F	..	1	21 19/32	1 23/32	A, E, or R Type Relays
823A	2	..	4 1/4	2 23/32	Nos. 209A or 215A Relays—Mounts vertically
823B	2	..	4 1/4	2 23/32	Nos. 209A or 215A Relays—Mounts horizontally
829D	8	1 1/4	14 1/8	1 23/32	Drilled as specified



Dimensions



Drilling Positions

ANGLE TYPE—RELAY MOUNTING

Black Finished 1/8-Inch Steel

In ordering this angle type relay mounting plate, it is necessary to give the exact code numbers of both the mounting plate and relay to be mounted, also in which one of four positions the relay is to be mounted by specifying the particular item number shown above.

These plates are for all types of relays that come within the plate dimensions.

Code No.	No. of Relays	Dimensions, Inches: A	B	C	D
628A	1	1 23/32	1 25/32	2 23/32	1 1/4
628D	2	1 23/32	1 25/32	2 23/32	1 1/4
628E	3	1 23/32	1 25/32	3 1/4	1 1/4

Mounting Plates for Resistances

RELAY RACK TYPE

1 23/32 Inches Wide

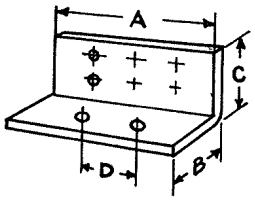
Code No.	Resistances per Plate	Mounting Centers	Length Inches	Mounts Resistances
601A	10	1 3/4	19	
601B	20	7/8	19	
601C	40	7/16	19	
601D	30	7/16	19	
644A	20	7/16	10 3/4	Nos. 18 or 19 Types

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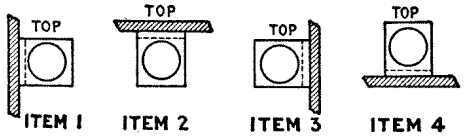
MOUNTING PLATES

Mounting Plates for Resistances—Angle Type

(Continued)



Dimensions



Drilling Positions

ANGLE TYPE

Black Finished—1/8-Inch Steel

In ordering this angle type resistance mounting plate, it is necessary to give the exact code numbers of both the mounting plate and resistance to be mounted, also in which one of four positions the resistance is to be mounted by specifying the particular item number as shown above.

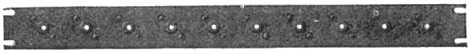
Code No.	No. of Resistances	Centers	Dimensions, Inches A	B	C	D	For Resistances
629A	5	7/16	1 23/32	1 11/16	2 23/32	1 1/4	19 Type
629B	3	7/16	1 23/32	1 11/16	2 23/32	1 1/4	19 Type
629C	8	5/8	1 23/32	1 1/8	2 23/32	1 1/4	1 Type
682A	..	...	1 23/32	1 1/8	1 1/8	2 1/32	19 Type
873A	8	7/16	1 23/32	1 11/16	4 1/32	1 1/4	18 or 19 Type

Mounting Plates for Condensers

RELAY RACK TYPE

In ordering mounting plates for condensers, it is necessary to give the exact code numbers of both the mounting plate and condensers to be mounted.

Code No.	No. of Condensers	Mounting, Inches Centers	Length	Width	To Mount Condensers
756A	8	2 11/32	21 5/8	1 23/32	21AR
854A	10	.....	21 5/8	.....	21 Types



Mounting Plates for Message Registers

RELAY RACK TYPE

Black Finished Steel Mounting Plates 3/8 Inch Thick and 1 1/4 Inch Wide

Code No.	Registers per Strip	Mounting, Inches Centers	Length	Drilled for Message Registers
*628A	1	...	..	No. 5 Type as required
671B	10	1 5/8	19	No. 5H
671C	10	1 5/8	19	Nos. 5L, 5S and 5T
785A	15	1 5/8	27	No. 5 Type as required

* Angle tip mounting plate. Order for drilling positions as described under relay angle mounting plates.

Miscellaneous Mounting Plates

Code No.	Type	Dimensions, Inches	Use
937A	Drilled	3 x 14 1/4 x 1/8	To mount 5 No. 221 Type Relays or No. 98A Repeating Coils, one No. 18 or No. 19 Type Resistances and two No. 34 Lamp Sockets.
943B	Drilled	2 7/32 x 19 x 7/16	Used in pairs to mount 4 No. 77 Retardation Coils per pair.
943G	Drilled	2 7/32 x 19 x 7/16	Used in pairs to mount ten Nos. 101, 102, 104 or 602 Type Balancing Networks per pair.
943K	Drilled	2 7/32 x 19 x 7/16	Used in pairs to mount twenty No. 57N or similar Type Condensers per pair.

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NUMBER PLATES



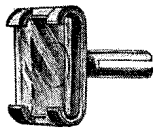
No. 1B



No. 5B

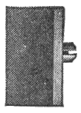


No. 23C

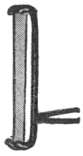


No. 30A

Code No.	Description	Size, Inches	Used in
*1B	White ivory with engraved black numbers; 1/4 inch high.	5/8 diam.	Wooden stile casings and panel numbers.
*5B	Hard rubber, black face, with white engraved characters 1/8 inch high.	1/2 x 5/16	110 Jack Mounting.
*12B	White ivory, black engraved characters; 5/32 inch high.	3/8 diam.	Plug shelves and key shelves to designate plugs and keys.
*21B	Hard rubber, black face with white engraved characters; 5/32 inch high.	1 1/16 x 5/16	135 Jack Mounting.
*23A *23C	Aluminum plates with engraved black characters; 9/32 inch high. Escutcheon pins furnished for mounting. (1/4 inch figures when specified.)	2 5/32 diam.	Flat iron stile casings.
*23D	Aluminum plate with engraved black characters; 9/32 inch high. Machine screws furnished for mounting.	3/8 x 1/4	
**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.	3/8 x 1/4 7/16 x 5/16	Nos. 2, 6 and 17 Jack Mountings and Nos. 2C, 50A, 50B Designation Strips.
59B	Hard rubber. Black face with white characters.	7/16 x 5/16	2 and 34 Jack Mountings.



No. 60D



No. 108A



No. 128B

Code No.	Description	Size Inches	Used in
*60D	Hard rubber, black face with white numbers; 1/8 inch high.	3/8 x 1/4	19 Jack Mounting.
*107B	Aluminum disc with a dull, satin finish and black characters; 1/4 inch high. Furnished with escutcheon pin for mounting.	1 9/32 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.	2 5/32 x 15/64	19 Jack Mountings.
*125A	Metal, nickel finish, black characters.		Transmitter Faces.
126A	Marked "Out of Service."		Used in No. 50 Type Coin Collectors.
*127A	Metal, satin aluminum finish, black characters.	1 3/16 x 2 5/32	No. 4 Toll Test Boards.
128B	Metal, black finish, paper card with celluloid covering.	2 23/64 x 1 3/4	Face of transmitters.
132A 132B	White enamel finish, black numerals and letters. White enamel finish, red numerals, black letters	....	No. 2 Type Dials.

* Engraved as specified in order.

** Numbers from 0 to 9727, inclusive, are furnished on printed sheets, 512 numbers to a sheet. Sheets desired must be specified in order.

For number plates for machine switching, telephone dials, see listing of "Dial Number Plates."

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PLUGS



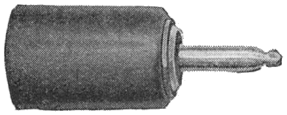
Nos. 109 & 110



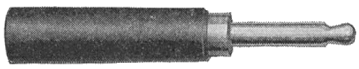
No. 47



No. 146



No. 148



No. 151

Fig. 1

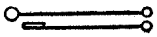
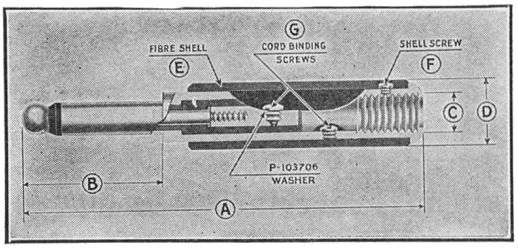


Fig. 2



Dimensions and Replacement Parts

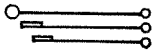


Fig. 3

Code No.	Conductors	Dimensions (see cut) A	B	C	D	Used With Jack Nos.	Used With Cords	Notes	Replacement Parts (see cut) E	F	G
1A	Fig. 1	3 5/16	1 3/16	5/16	9/16	Same as 47A Plug	.....	Shell Frame fully insulated	P-146711	P-82233	P-84662
3A	Fig. 2	3 5/16	1 3/16	5/16	9/16	99, 200, 201, 202, 203, 208, 215, 216, 217, 218, 219, 220, 221, 223 to 228 incl., 230 to 237 incl., 281 and 297 Types.	.....	Shell	P-147704	P-162652	P-162653 & 4
47A	Fig. 2	3 5/16	1 3/16	5/16	9/16	99 and Types 215 to 221 incl., 223, 225, 226, 227, 230 to 237 incl., 281 and 297.	768, P1B, P2A, P2B, P2T, W2F	Has Red Shell	P- 81335	P- 82233	P- 82239
47B	Fig. 2	3 5/16	1 5/16	5/16	9/16	Same as No. 47A	Same as No.47A	Has Black Shell	P-110576	P- 82233	P- 82239
109	Fig. 3	3 1/32	1 1/32	9/32	3/8	Nos. 92, 292 and Types 246, 248, 249.	S3A	*Has Red Shell	P- 81319	P- 81212	P- 82341
110	Fig. 3	3 7/32	1 9/64	5/16	27/64	49, 50, 70, 141, 259, 260, 274, 275, 295, and Types 238 to 245 incl., 267, 280, 284, 285, 289, 290, 291, 293.	P1C, P2B, P3E, S1B, S2B, S3B, W2C, W3C.	*Has Red Shell	P- 81200	P- 81299	P- 82341
116	Fig. 1	3 5/16	1 3/16	5/16	9/16	Same as No. 47A	513, 519, P1A, S1A.	*Has Red Shell	P- 81335	P- 82233	P- 84662
136	Fig. 2	3 5/16	1 3/16	5/16	9/16	99–152	369	Has Red Shell	P- 81335	P- 82233	P- 82239
145	Fig. 2	3 11/64	1 7/64	...	23/64	.....	658	.....	P- 81200	P- 81299	P- 82341
146	Fig. 2	7 23/32	2 39/64	...	15/16	186	L3G, 509	.....	P-143217	.....	P-127343
148	Fig. 3	2 9/16	1	5/16	29/32	Nos. 77, 78, 190	545, D3L, L2F, L2C	Replaces No. 85	P-134310	P-135465	P-135464
151	.....	3 19/64	1 3/16	...	35/64	Same as No. 47A	None required	For plugging out signals in lines in trouble.	P-141307	P-123581	.....
165	.....	2 1/16	1 3/16	...	7/16	Same as No. 47A	.....	A wooden dummy for use in place of 47, 110, or 116 Plugs.	.....	.....	.....
192	Fig. 3	3 7/32	1 9/64	5/16	27/64	Same as No. 110	S3B	Rubber lined, brass shell.	P-113070	P- 81299	P- 82341

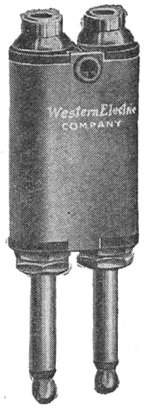
*Note: The following shells can be furnished for the Nos. 109, 110, and 116 Plugs when specified on the order.

Plug No.	Gray Shell	Black Shell
109	P- 90065	P- 91143
110	P- 107882	P-107872
116		P-110576

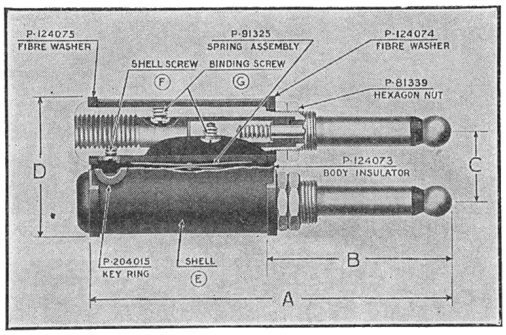
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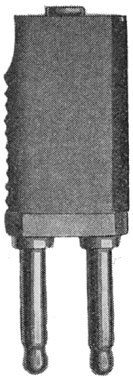
PLUGS

(Continued)

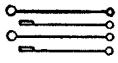


No. 137





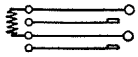
No. 141



137 & 152



211



217

Twin Plugs

When an operator's headset is to be used at a switchboard, it is convenient to wire two adjacent jacks for providing the necessary connections into the switchboard circuit and to use a twin plug in these two associated jacks in order that the necessity for the operator handling two separate plugs may be avoided. This practice is now standard and the Nos. 30, 78 and 80 Jack Mountings are designed for use with jacks so mounted that a twin plug may be inserted only in those jacks which are to be used together.

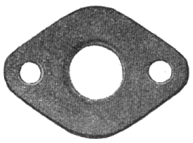
These plugs include a self-adjusting or flexible feature which allows sufficient movement of each plug in the shell to take up any slight off-centering present in the jacks.

Code No.	Conductors (Each Plug)	Dimensions (Inches) A	B	C	D	Used With Jacks	Used With Cords	Notes	Replacement Parts (See Cut) E	F	G
137	2	3 11/32	1 3/16	5/8	1 15/64	Nos. 99, 236A, 236C, 236D and Types 215 to 221 incl., 223, 225, 226, 227, 230 to 237 incl., 281 and 297.	565, L2E, L4B, L4C, L4E, P4C.	Operators head telephone.	P-124076	P-124071	P- 82239
152	2	3 5/16	1 3/16	39/64 to 41/64	1 1/4	Same as No. 137	674, L4C, W2G, W4M.	Same as No. 137 but has ridges in shell to identify one side from the other.	P-142984	P-124071	P- 82239
154	2	3 13/16	1 13/64	5/8	1 9/64	Nos. 99, 236A, 236C, 236D and Types 215 to 221 incl., 223, 225, 226, 227. 230 to 235 incl., 237, 281, and 297.	S2G, S4A	Grooved to mark proper way of inserting plug in jack.	P-211353	P- 82233	P- 82239
186	2	1 27/32	21/32	7/16	1 13/64	No. 19C Test Set	747	.....	P-205776	.....	P-158989
209	1	3 7/32	1 11/64	5/8	1 3/16	Nos. 99, 215, 216, 217, 218, 223, 225, 226, and 227.	.....	.....	P-164690	.....	P-164691
211	3	3 7/32	1 9/64	7/16	1 3/16	No. 49	.....	.....	P-218333	P- 81299	P- 82341
217D	2	4 13/16	1 3/16	5/8	1 9/64	Nos. 99, 215, 216, 217, 218, 223, 225, 226, 227, and 281 Types	.....	See Note 1.	P-167708	P- 82233	P- 82239
241A	2	3 17/32	1 13/64	5/8	1 3/16	Nos. 99, 215, 297, and similar types.	P2T, P2AA, P3J, S3F, W2S, W3H, W3J.	Replaces No. 141A.	P-206009	.....	P- 82341
241B	2	3 17/32	1 13/64	5/8	1 3/16	Same as No. 241A.		Replaces No. 141B.	P-206009	.....	P- 82341
241C	2	3 17/32	1 13/64	5/8	1 3/16	Same as No. 241A.		Replaces No. 141C.	P-206009	.....	P- 82341

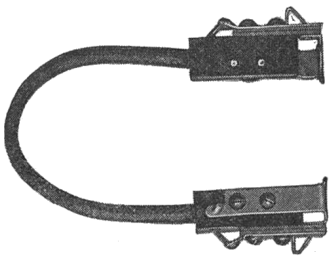
Note 1. The No. 217D has a resistance bridged across the tip springs

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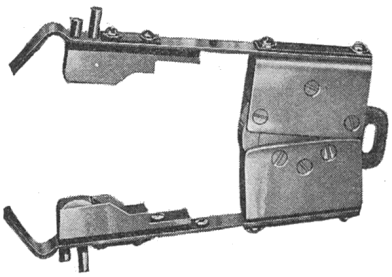
PLUGS, PLUG SEATS AND PLUG TROUBLE CAPS



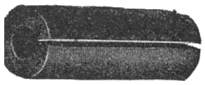
No. 13 Plug Seat



No. 135



No. 206



No. 1A Trouble Cap

Test Plugs

Code No.	No. of Conductors	Ordinarily Used with Cords Nos.	Used with	Notes
135	2	...	No. 76 Heat Coils and Nos. 89, 1168 and 1169 Type Protectors.	This plug is used at the protectors to reverse the polarity of a subscriber's line on which there is a ground on the ring side; the subscriber is given temporary service by battery feed over the tip side of the line.
206	4	716 733	Nos. 1168, 1169, 1268, 1269 and similar type protectors which mount on ½ inch centers.	Used for connections at the protectors of the Main Distributing Frame for testing line in or out of office.
225	4	716 733	Nos. 73A, 75A, 1077A, 1177A, and similar type protectors which mount on ⅜ inch centers.	
234	4	838 839 841 842	No. 36 or similar type terminal strips.	Used in making connections with terminal strips on intermediate distributing frames. Replaces No. 132.
240A	4	...	Test jacks on Nos. 192, 193, 197 and 198 Type Switches having a corresponding number of springs. Nos. 348, 349A, 350A, 356A and 357A.	

Plug Seats

These red fibre plug seats are furnished complete with No. 4 Round Head Wood Screws, ½ inch long, for mounting.

Code No.	Mount on Center, Ins.	Used with Plugs Nos.
12	¾	110
13	¾	109
15	29/32	47
16	....	43–141
17	....	133

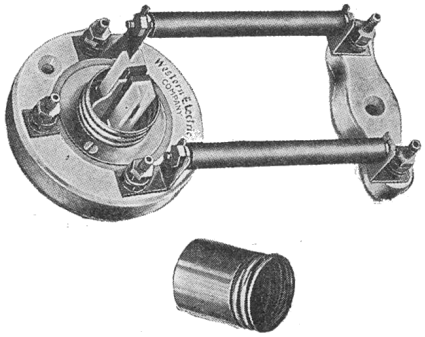
Plug Trouble Caps

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.

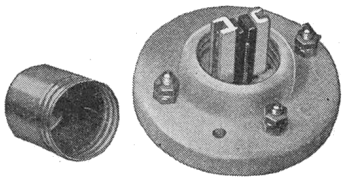
Code No.	Color	Used with Plug Nos.
1A	Black	109
1B	Red	109
2A	Black	47 and 110
2B	Red	47 and 110

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PROTECTORS



No. 58AP



No. 60AP

Telephone Set Protection

Protection of central office and magneto telephone sets against lightning and abnormal electric currents is an important feature of telephone practice. The protector must be simple in construction so that the parts can be easily replaced when necessary, and reliable in operation in order that it may give the desired protection when needed. Western Electric fuses act at one and one-half times their rated current values and open space cut-out protectors will discharge across their air-gaps at a definite voltage value because of the accurate manufacture of the protector blocks.

The wide application of carbon block cut-out (air-gap) protectors makes particularly important the use of protector blocks requiring minimum attention for renewal and cleaning. The following types of protectors are designed to reduce maintenance and give the highest grade of protective service. Each protector has a porcelain base and is equipped with our new design Nos. 26 and 27 Protector Blocks. These blocks embody several advances in construction and operation as described in detail under "Protector Blocks."

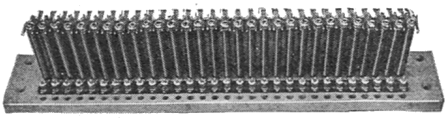
Code No.	Line Protection	Consists of: Protector Mountings	Protector Blocks	Fuses	Protects Central Battery and Magneto Telephones Against
*58AP	2-Wire	1 No. 29B (Brass Cap P-143604), 1 No. 16, 1 No. 48	2 No. 26, 2 No. 27	2 No. 11C (7 amp.)	High potential (lightning) and abnormal currents.
60AP	2-Wire	1 No. 49B	2 No. 26, 2 No. 27	.....	High potential currents (lightning).
62C	1-Wire	1 No. 50C	.....	1 No. 35A (1⅓ amp.)	Abnormal currents.
62D	1-Wire	1 No. 22B	.....	1 No. 24A (1⅓ amp.)	Abnormal currents.
76AP	2-Wire	1 No. 29B (Brass Cap P-143604)	2 No. 26, 2 No. 27	.....	Same as 58AP, less Nos. 16 and 48 Protector Mountings and fuses.
**1089A	16-Wire	1 No. 89A	16 No. 26, 16 No. 27	16 No. 11C (7 amp.)	High potential (lightning) and abnormal currents for group mountings.
**1089B	26-Wire	1 No. 89B	26 No. 26, 26 No. 27	26 No. 11C (7 amp.)	These two protectors replace the No. 1079AP Protector and take up approximately two-thirds the space required by the No. 1079AP.

Note. * Two No. 60A Fuses and one No. 16 Protector Mounting may be used with the No. 58AP Protector as a sneak current arrester for private branch exchange protection.

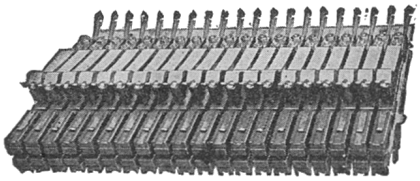
** When sneak current protection is necessary, no additional space is required as No. 60B Fuses mount directly on binding posts provided on the protector mounting.

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PROTECTORS



No. 1078A Protector



20 No. 1269A

Telephone Exchange Protection

These protectors are designed for central battery and local battery exchange protection against high potential (lightning), abnormal and sneak currents, in accordance with the type selected.

NO. 1077 AND NO. 1177 TYPE PROTECTORS

The No. 1077 and No. 1177 Type Protectors are high potential and sneak current arresters designed to mount on "B" Type Main Distributing Frames. They are furnished only in lengths of 101 protectors per strip on 3/8 inch centers.

Code No.	Consists of: Protector Mounting	Protector Blocks	Protector Mica	Heat Coils
1077A	1 No. 77A	2 No. 11, 2 No. 12	2 No. 9	2 No. 76A
1177A	1 No. 77A	2 No. 28, 2 No. 29		2 No. 76A

NO. 1078 TYPE PROTECTOR

The No. 1078A Protector consists of a fuse mounting so designed that the fuses are mounted on 1 1/16 inch centers. It is supplied in standard lengths of 42, 62, 82 and 102 protectors per strip. The base of the protector mounting is designed to act as a fanning strip.

In ordering, the number of protectors per strip should be specified and, if they are to be mounted on a distributing frame, sufficient information for the drilling desired should be given. If the frame is one which we have furnished and installed, the name of the exchange and the location of the protectors on the frame will be sufficient.

Code No.	Consists of
1078A	1 No. 7A Fuse (7 ampere) and No. 78A Protector Mounting. (For one wire protection). Specify number of protectors per strip required.

NO. 1168, NO. 1268 AND NO. 1269 TYPE PROTECTORS

Each protector provides for one pair of wires. The No. 1268 Type Protector Terminals are so arranged that the line wires may be connected directly at one side of the protector and jumpers, extending to a switchboard cable terminal block, connected to the terminals on the other side of the mounting. These units are used on Type "B" Main Distributing Frames.

The No. 1269 Type is similar to the No. 1268, except that the terminals are arranged for connecting the switchboard cable wires directly to one side, jumpers being used from the other side of the protector to an outside line terminal block. These units are used on Type "A" Main Distributing Frames.

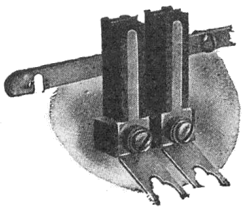
The No. 1168, No. 1268 and No. 1269 Type Protectors may be mounted on walls or partitions by means of the No. 736A Mounting Plate. Where required, one or more of these mounting plates should be ordered as indicated under "Protector Mounting Plates."

These protectors are identical in construction with the Nos. 1168 and 1169 Types respectively, but differ in that they are equipped with the new No. 26 and No. 27 Protector Blocks.

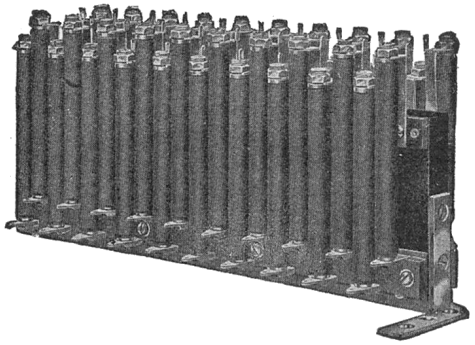
Code No.	Furnished Only in Strips	Consists of: Protector Mounting	Protector Blocks	Protector Micas	Heat Coils
1168A	20 Protectors	1 No. 68A	2 No. 1, 2 No. 2	2 No. 3	2 No. 76A
1168B	23 Protectors	1 No. 68B	2 No. 1, 2 No. 2	2 No. 3	2 No. 76A
1169A	20 Protectors	1 No. 69A	2 No. 1, 2 No. 2	2 No. 3	2 No. 76A
1268A	20 Protectors	1 No. 68A	2 No. 26, 2 No. 27	—	2 No. 76A
1268B	23 Protectors	1 No. 68B	2 No. 26, 2 No. 27	—	2 No. 76A
1269A	20 Protectors	1 No. 69A	2 No. 26, 2 No. 27	—	2 No. 76A

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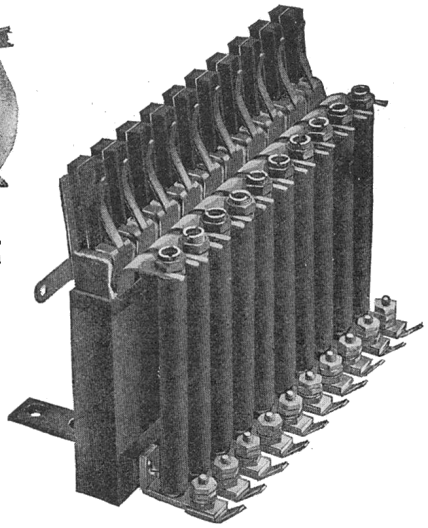
PROTECTORS



No. 17B with Connector and Section of Ground Strip



No. 77B



No. 1074A Protector

Protectors for Cable Terminals

These protectors are listed for maintenance purposes only. For new equipments, refer to listings under "Cable Terminals."

Code No.	Number per Strip	Protector Mounting	Protector Blocks	Protector Mica	Fuse	Protects Against
77B	40 or 50 Protectors	1 No. 56	.....	.....	1 No. 7A (7 amp.)	Abnormal currents
1074A	As Required	74A	1 No. 19 1 No. 20	1 No. 11	1 No. 7A (7 amp.)	High potential and abnormal currents
1075A	As Required	75A	.....	.....	1 No. 7A (7 amp.)	Abnormal currents
*17B	See Ground Strips below	1 No. 15	2 No. 19 2 No. 20	2 No. 11	.....	Used with No. 1075A

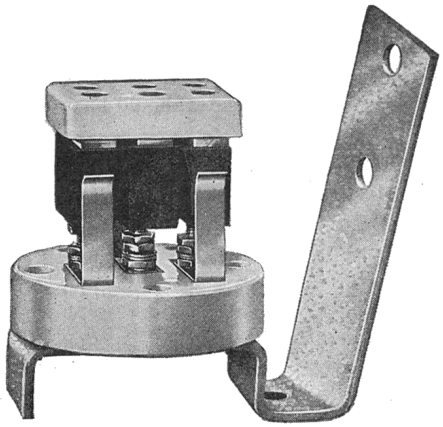
* If new type protector blocks are required, order No. 15 Protector Mounting, equipped with Nos. 26 and 27 Protector Blocks.

Ground Strips for No. 17B Protector

These tinned brass strips are $\frac{3}{8}$ in. wide and $\frac{1}{8}$ in. thick. They are provided with screws for mounting No. 17 Type Protectors on $1\frac{3}{8}$ in. centers and each strip has a screw and washer connection for a No. 8 B.W.G. Copper Ground Wire. The end of the strip is bent over and slotted to hold the ground wire in position. For an illustration of the method of using these strips, see the No. 17 Protector Listing.

Connector P-100332, which is $2\frac{5}{8}$ in. long with two slotted holes on $1\frac{3}{8}$ in. centers, will be supplied when required for connecting two ground strips together, but must be ordered as a separate item.

Code No.	Will Mount
1A	13 No. 17 Protectors
1B	16 No. 17 Protectors
1C	26 No. 17 Protectors



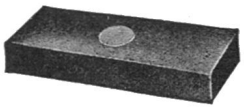
No. 86B Protector, Cover Removed

Large Carbon Block Protector

Code No.		
86B	Consists of a porcelain base having two-line terminals and one ground terminal, three large carbon blocks (which are so placed as to form a high voltage protector) and a metal cover.	Telephone lines against high potential and abnormal currents.

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PROTECTOR BLOCKS



No. 1



No. 2



No. 19



No. 20

Protector Blocks

Code No.	Description	Used with	
		Protector Micas	Protectors
1	Plain carbon block with fuse metal	No. 3	Nos. 1168 and 1169 Types
2	Grooved carbon block without fuse metal	No. 3 and No. 12	Nos. 1168 and 1169 Types
3	Plain carbon block with fuse metal	No. 1 and No. 6	.....
4	Plain carbon block without fuse metal	No. 1 and No. 6	.....
11	Plain carbon block with fuse metal	No. 9	1077A
12	Grooved carbon block without fuse metal	No. 9	1077A

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

NO. 15 TYPE

The No. 15 Protector Block is a paraffined wood dummy which is used in place of the Nos. 11 and 12.

Code No.	Description
15	Paraffined wood dummy

NOS. 19, 20 AND 25 TYPES

The Nos. 19 and 20 Protector Blocks are used together and form an open-space cutout suitable for protection against high potential due to lightning. A mica separator is placed between the blocks to secure the necessary air gap, the No. 10 Protector Mica usually being used for this purpose; when a higher breakdown voltage is desired the No. 11 Mica which is twice as thick may be used, thereby raising the voltage necessary to produce an arc across the air gap to approximately double the usual value. An open space cutout having a fusible metal plug in one side may be obtained by using the Nos. 20 and 25 Protector Blocks and a mica separator.

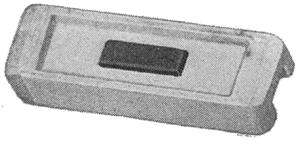
Code No.	Description	Used with Protectors
19	Plain copper block with two pins	17B, 1074A
20	Grooved copper block with two bushings	17B, 1074A
25	Plain copper block with two pins and fuse metal	Used in place of No. 19 Protector Block when fuse metal is desired.

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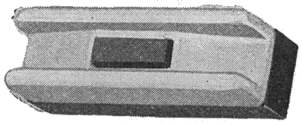
PROTECTOR BLOCKS AND MICAS



No. 26



No. 27



Nos. 26 and 27
(Full Size)

NOS. 26 AND 27 TYPES

The Nos. 26 and 27 Protector Blocks are of new design and embody several advances in construction which greatly reduce maintenance costs and provide better telephone service through fewer interruptions of operation. They are used together without a separator (protector mica) and form an open space cutout which will afford the highest grade of protection against high potentials due to lightning. The two blocks differ in construction as follows:

The No. 26 Protector Block is a solid piece of hard non-dusting carbon. The face of the block is especially ground to present a smooth surface. The No. 26 Protector Block is mounted on the ground side of the protector mounting.

The No. 27 Protector Block consists of a porcelain frame with a countersunk hard carbon plug which is fastened in place with low temperature fusing cement. The surface of the frame which bears against the No. 26 Block, when assembled in a mounting, is finished by grinding. The air-gap between the carbon insert in the No. 27 Block and the face of the No. 26 Block is held to close limits by this grinding process and the consistent operation of the cutouts at the proper voltage is thereby insured.

Ordinary lightning discharges will cause an arc across the air-gap between the carbon blocks but will not heat them sufficiently to melt the cement used for holding the carbon plug in place. A cross with an electric light or power line, however, will cause a discharge or repeated discharges, of such duration that the heating of the carbon insert of the No. 27 Blocks will melt the cement holding it in place and allow the mounting spring to push it into direct contact with the No. 26 Block, thus permanently grounding the line.

Code No.	Description	Used with Protectors
26	Carbon block	Nos. 12AP, 58AP, 60AP, 76AP, 83A, 1079AP, 1089A&B, 1268A and 1269A.
27	Porcelain frame with carbon insert	
30	Porcelain frame with carbon insert	83A Protector Mounting

The new Nos. 26 and 27 Protector Blocks are interchangeable with the old combinations of Nos. 1 and 2 Protector Blocks and No. 3 Protector Mica both at subscribers' stations and central offices, and are therefore available for improving protective equipment already in service. This practice will result in fewer visits of the trouble man to subscribers' stations and a saving in labor will be effected through a material reduction in time required for cleaning and maintenance purposes at the central office. All orders for replacements of Nos. 1 and 2 Protector Blocks and No. 3 Protector Micas should specify the Nos. 26 and 27 Protector Blocks; no separator (protective mica) is needed for the new design of block.

In addition to the above replacements, tests on cable protection have shown that Nos. 26 and 27 Protector Blocks require less attention and replacement due to grounded blocks than the Nos. 19 and 20 Blocks with the regulation .010-inch mica separators; therefore, the Nos. 26 and 27 Protector Blocks can be used advantageously wherever metal (Nos. 19 and 20) Blocks are now used.



No. 3
Protector Mica



No. 10
Protector Mica

Protector Micas

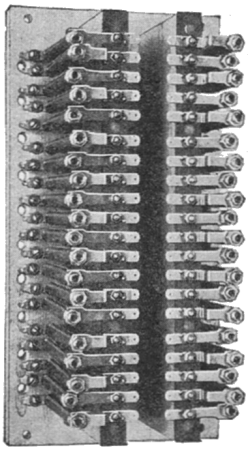
Code No.	Used with Protector Blocks	Used with Protectors
1	Nos. 3 and 4	.....
3	Nos. 1 and 2	Nos. 1168 and 1169 Types
10	Nos. 19 and 20	Nos. 17B, 1074A
*11	Nos. 19 and 20	Nos. 17B, 1074A

* No. 11 Mica is twice as thick as the No. 1

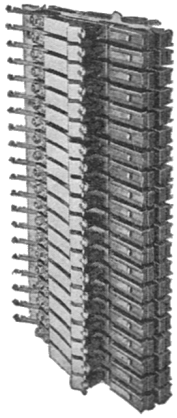
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PROTECTOR GROUPS

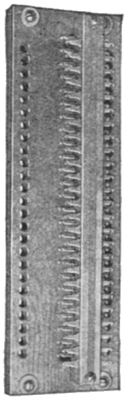
For Distributing Frames



No. 1435U



No. 1435T



No. 1435R & Y

PROTECTOR GROUPS

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

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

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

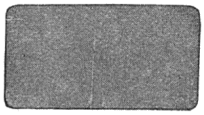
Protector Mountings

Code No.	Description
15	Used to mount No. 17 Type Protector. Intended for use with No. 1 Type Ground Strips which must be ordered separately.
16	Part of No. 58AP Protector, also used as part of mounting for No. 60A Fuse.
22B	A porcelain base equipped with clips and screws for holding a No. 24A Fuse. Part of the No. 62D Protector.
29B	For use in mounting protective apparatus of the Nos. 58, 74, 76 or 79 Type Protectors.
48	An asbestos pad 8 x 4⅜ inches for use with the No. 58 Type Protectors.
50C	A porcelain base equipped with clips and screws for holding a No. 35A Fuse. Part of the No. 62C Protector.

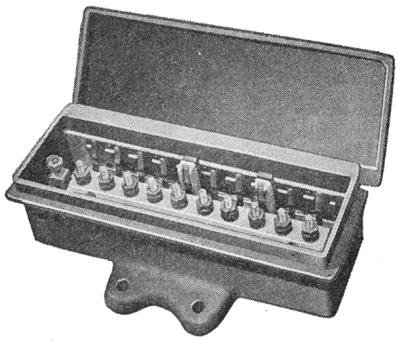
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PROTECTOR MOUNTINGS

(Continued)



No. 48 Protector Mounting



No. 83A Protector Mounting

Protector Mountings

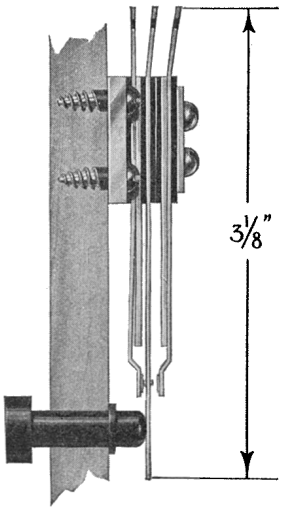
Code No.	Description
56	Protector Mounting for one wire. For mounting one No. 77B Protector.
68A	For use in mounting protective apparatus of No. 1168 Type Protectors. Furnished only in one length, 20 per strip. Arranged to mount on "B" Type Distributing Frames and No. 736A Mounting Plates.
68B	Same as No. 68A except furnished in only one length, 23 per strip.
69A	For use in mounting protective apparatus of No. 1169 Type Protectors. Arranged to mount on "A" Type Distributing Frames and No. 736A Mounting Plates. Furnished only in one length, 20 per strip.
74A	For mounting protective apparatus of No. 1074A Protectors.
75A	Protector mounting for one wire. For mounting one No. 1075A Protector.
77A	For mounting protective apparatus of No. 1077A or No. 1177A Protectors.
78A	For mounting protective apparatus of No. 1078A Protectors.
83A	Designed to protect drop wires between the overhead lines and the subscriber's telephone set from lightning. This protector mounting consists of an iron box approximately 8¾ x 3½ x 2½ inches deep with a hinged cover having a No. 84A Protector mounted within it. Arranged to mount 10 pairs of Nos. 26 and 30 Protector Blocks which must be ordered separately. This protector mounting provides for the protection of 5 pairs of wires. The box mounts directly underneath the crossarms on the poles. Two mounting lugs are provided for this purpose.
86A	Galvanized metal box approximately 10 x 5 31/32 x 3¼ inches over all having a sliding cover with a locking screw. For housing No. 58 Type Protectors in outside installations. Replaces the No. 82A.
88A	Four wire capacity. Consists of a porcelain block with clips for mounting four No. 26 and four No. 27 Protector Blocks, four No. 11C and four No. 60B Fuses. Has two straps for ground connections. For use in Nos. 89A and B Protector Mountings.
88B	Six wire capacity. Consists of a porcelain block with clips for mounting six No. 26 and six No. 27 Protector Blocks, six No. 11C and six No. 60B Fuses. Has two straps for ground connections. For use in Nos. 89A and B Protector Mountings.
89A	Sixteen wire capacity. Consists of one No. 88A and two No. 88B Protector Mountings mounted on a metal frame. For use in No. 1089A Protectors. Together with the No. 89B entirely replaces the Nos. 79A and 80A Protector Mountings.
89B	Twenty-six wire capacity. Consists of two No. 88A and three No. 88B Protector Mountings. For use in Nos. 1089B Protectors. Together with the No. 89A entirely replaces the Nos. 79A and 80A Protector Mountings.

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PROTECTOR MOUNTINGS

Mounting Plate for Protectors

The No. 736A Mounting Plate is used with the Nos. 1268 and 1269 Type Protectors when they are to be mounted on flat surfaces such as walls and partitions. It consists of a supporting bar ¼ x 1½ inches equipped with angle brackets adapted to fasten to cross strips on the wall, etc., and can be supplied in lengths suitable for use with protectors for from 20 to 243 lines. These mounting plates progress in capacity arranged for 20 or 23 and 40 or 43, etc., protectors each. When ordering, give the code number for the mounting plate and the number of protectors to be mounted per plate.



No. 1006A Push Button

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.

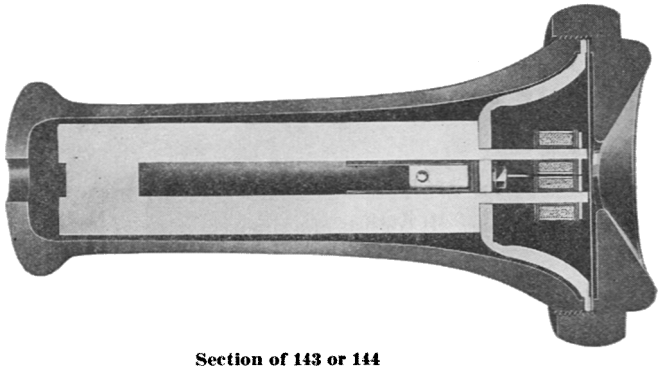
Code No.	Spring Combination	Buttons Furnished for Woodwork Thickness	Principal Use
1002A	Five springs arranged for one break two make contacts	1 3/32, ½ or 9/16 inch as specified.	Used in magneto telephones for central office signalling.
1004A	Six springs arranged for two break-make contacts*	½ in.	Used in magneto telephones for "signalling central secretly."
1006A	Three springs arranged for one break-make contact	1 3/32, ½ or 9/16 inch as specified**	Used in magneto telephones for "central office signalling."

* The No. 1004A is in effect two No. 1006A Push Buttons.

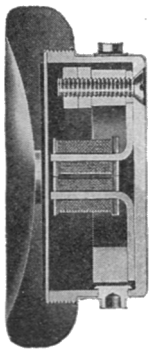
** A button for 1 3/32 inch wood will be furnished in cases when orders do not specify the thickness of the woodwork with which the push button is desired for use.

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RECEIVERS



Section of 143 or 144



Section of 528BW

Western Electric Receivers are as near perfection as scientific research has been able to make them.

The No. 143 Receiver is the same as the No. 144, 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. 144 Receiver is recommended. The No. 144 Receiver is also recommended where high humidity is encountered, for example, in mine service.

The Nos. 143 and 144 Receivers are used on telephones and deskstands 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 deskstands. 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 Deskstand.

Nos. 143, 144 and 171W Receivers are equipped with binding posts that will take either pin (No. 29 Types) or flat (No. 62 Type) cord tips.

The No. 146AW Watch Case Type Receiver is intended principally for use in multiple with the regular receiver furnished on a deskstand or telephone. Equipped with a cut-in switch. Will fit the No. 1A Receiver Holder, which is designed for use on deskstands. Used on telephones installed in noisy locations or where telephone user has defective hearing.

No cords are included with these receivers and must, therefore, be ordered as separate items. Receiver cords for wall or desk type telephones are listed elsewhere under "Cords."



143AW, 144AW, 171W Equipped with Cord

Receivers for Standard Central Battery and Local Battery Service

FOR WALL TELEPHONES AND DESK STANDS



146AW

Replaces	Code No.	Type	Resistance Ohms	Repair Parts: Outer Shell	Repair Parts: Ear Piece	Repair Parts: Diaphragm
143	143AW	Standard	75	P-93518	P-93519	P-95114
144	144AW	Standard	75	P-94533	P-93520	P-95114
146AW		Watch Case	650	P-99403	P-94545	P-95225
558	**558W	Standard	75	P-94533	P-93520	P-95114
RECEIVER FOR SERIES CENTRAL BATTERY SERVICE						
*171W		Magnetless or direct current type	40	P-92613	P-91614	P-95114

* Bi-polar receiver, not provided with a permanent magnet.

** Similar to the 144, except that it is provided with a special cord bushing which secures the cord and prevents it from turning and eliminates the possibility of breaking the conductors. Used with the 1536-E Telephone Set in mines where explosive gases are present.

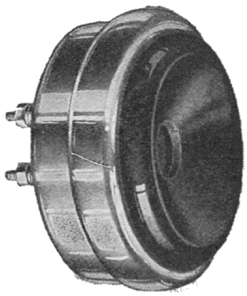
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RECEIVERS

(Continued)



No. 528BW



No. 131

OPERATOR'S STANDARD TYPE

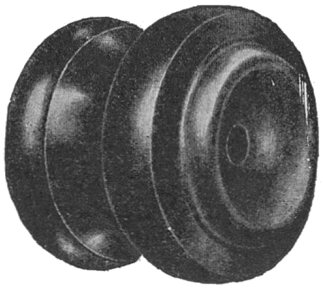
Code No.	Resistance Ohms	Shell Material	Includes Head Band	Used with
528BW	80	Brass, Black Finish	No. 3A	Cords having No. 80 Cord Tips at Receiver End (see head set "Cords").

HAND SET TYPES

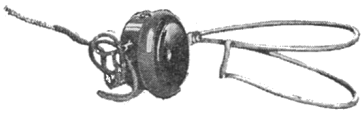
Replaces	Code No.	Resistance Ohms	Shell Material	Used with
131	131W	70	Brass, Nickel Plate	No. 1001 Type Hand Sets
141	141W	70	Brass, Nickel Plate	No. 1002 Type Hand Sets
557B				E1B Hand Set

TEST SET TYPE

515	515W	45	Brass, Black Finish	No. 1017 Type Test Sets



No. 133W



No. 186



No. 1010A

RAILWAY TYPE

Replaces	Code No.	Description	Used with
133W		Insulated bipolar hand receiver with rubber case. (Resistance 70 ohms.)	With No. 1314A Telephone Set.
186	186W	A metal case, black finish, single head receiver with a rubber ear piece, and No. 3B Headband. (Approximate resistance 400 ohms.) Replaces No. 156W.	With Nos. 1040AB, BR Desk Stands, 1293AE, AK, 1317AW, AE Telephone Sets, 1020C, E, 1048DA, DB, DC, DD, 1048GA, GB, GC, GD Arms. With Nos. 546 and 554 Cords.
189	189W	Similar to the No. 186W, except wound to a low resistance. (Approximate resistance 45 ohms.) Replaces No. 148W.	With Nos. 1142AB Desk Stand, 1017B, C, E, 1020A Test Sets, 1120C, 1148DA, DB, DC, DD Telephone Arms and 1317BU Telephone Set. At way stations with No. 501 Type Desk Set Boxes, also on No. 565 Cords.
1010A	190W Headset	Composed of two special No. 189W Receivers with a wire type headband. (45 ohms.)	With No. 566 Cords with breast transmitter. Replaces No. 147W and 153W Receivers.
191W	1010B	Composed of one special No. 189W (45 ohms) and one special No. 186W (400 ohms). Receivers with a wire headband.	On No. 567 Cords multiple connection. Replaces No. 164W Receivers.
508	508W	A concealed binding post hand receiver. Similar in appearance to the No. 143AW. (Resistance 550 ohms.)	On Nos. 1317W, AD, 1293AD, AK and 1336F Telephone Sets. Replaces No. 163W Receivers.
526	526W	A bipolar receiver equipped with 3B Headband. (Approx. resistance 1500 ohms.)	For use in bridging circuitsi n train dispatching systems where several receivers may be on the line at one time.
562A	—	Black finished, permanent magnet, bipolar watch case type receiver having a resistance of approximately 60 ohms. The entire receiver unit is assembled with a phenol plastic cap and case, so that there are no exposed metal parts.	1526A and 1526B Telephone Sets for use by power companies on telephone lines paralleling high tension transmission wires.

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RECEIVERS

Receiver Replacement Parts

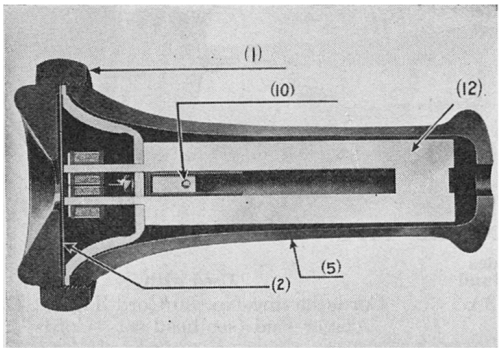


Fig. 1

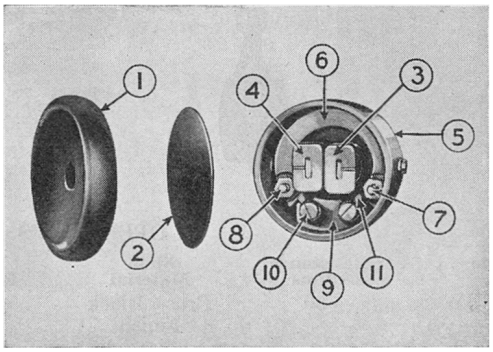


Fig. 2

Symbol	Name of Part	Receiver Code Nos. 131W	133W	141W	143AW	144AW	146W	186W
1	Receiver cap	P-81496	P-90348	P-88295	P-93519	P-93520	P-90683	P-97614
2	Diaphragm	P-81525	P-95118	P-95114	P-95114	P-95114	P-95225	P-95225
3	Right spool assembly	P-81492	P-80724	P-80972	.....	.....	P-90694	P-207460
4	Left spool assembly	P-81493	P-80723	P-80724	.....	.....	P-90695	.....
5	Case	P-90076	P-90803	P-90143	P-93518	P-94533	P-91650	P-207455
6	Magnet	P-93903 P-93904	P-93906	P-93906	.....	.....	P-91043	P-97066 P-97064
7	Magnet machine screw	P-82028	P-87411	P-88284	.....	.....	P-99354	P-97056
8	Nut or binding post	P-81497	P-93592	P-88289	.....	.....	P-93164	P-132958
9	Receiver block assembly	P-81499	.....	P-88291	.....	.....	.....	P-98974
10	Machine screw	P-82027	P-107062	P-88285	P-93799	P-93799	P-82324	P-93540
11	Terminal	P-81500	.....	.....	.....	.....	P-97285	P-97062
12	Inner Unit	.....	.....	.....	P-94436	P-94436	.....	.....

Symbol	Name of Part	Receiver Code Nos. 189W	190W	191W	508W	509BW	515W	528BW	557B
1	Receiver cap	P-145247	P-145248	P-145249	P-99073	P- 99768	P- 94489	P-213314	P-219473
2	Diaphragm	P- 95225	P- 95225	P- 95225	P-95114	P- 98387	P- 95225	P- 98387	P- 98387
3	Right spool assembly	P-207461	P-207461	P-207461	.....	P-205887	P-207461	P- 99812	P-208680
4	Left spool assembly	.....	.....	.....	.....	P-205888	.....	P- 99813	P-208681
5	Case	P-207456	P-207456	P-207456	P-93518	P- 99840	P-207454	P- 99841	P-208691
6	Magnet	P- 97066 P- 97064	P- 97066 P- 97064	P- 97066 P- 97064	....	..... P- 99862	P- 97066 P- 97064	..... P- 99862	..... P-208692
7	Magnet machine screw	P- 97056	P- 97056	P- 97056	.....	P- 99541	P- 97056	P- 99541	P-208687
8	Nut on binding post	P-132958	P-132958	P-132958	.....	P- 98752	P-132958	P- 98752	P- 98752
9	Receiver block assembly	P- 98974	P- 98974	P- 98974	.....	P- 98361	P- 98974	P- 98361	P-208687
10	Machine screw	P- 93540	P- 93540	P- 93540	P-93799	P- 99794	P- 93540	P- 99794	.....
11	Terminal	P- 97062	P- 97062	P- 97062	.....	P- 98383	P- 97062	P- 98383	P- 98383
12	Inner Unit	.....	.....	.....	P-99071	.....	.....	.....	.....

Group Nos. 131W–133W, 186W–189W, 190W–191W, 528BW, 515W and 557B with Note "See Fig. 2."
Group Nos. 143AW, 144AW and 508W with Note "See Fig. 1."

Receiver Holder

NO. 1 TYPE

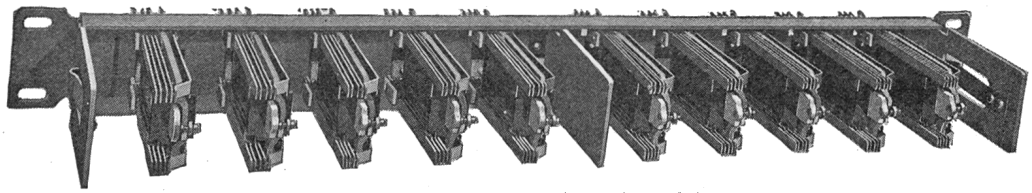
1A This is designed for use on No. 1040 Type Desk Stands for holding a No. 146AW Receiver, in cases where this receiver is connected in multiple with the regular desk stand receiver. It is designed so that the receiver may be easily removed but is normally held so firmly that it will not be dislodged 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.



No. 1A Receiver Holder

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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 spoolheads are of Phenol Fibre and the windings are highly insulated. All windings will carry continuously without injury, currents greater than required for operation.

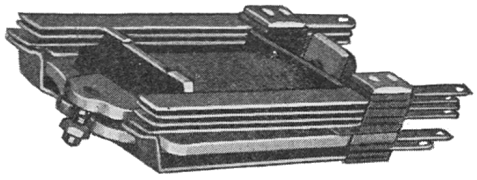
7. Small Size and Ease of Mountings. Compact in design, these relays are light in weight and occupy a small amount of space. Their terminals are all at one end and conveniently arranged for making soldered connections. Mounting plates for placing groups of relays under common dust-proof covers and also 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.

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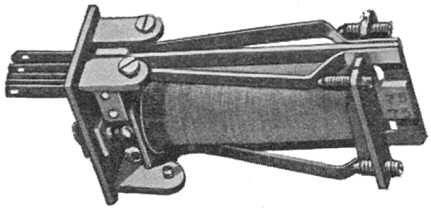
RELAYS

Flat Type Relays—Continued

The "A," "B," "E," "H," and "G" Type Relays are all of the Flat Type form of construction and can be supplied to meet a great variety of circuit conditions.



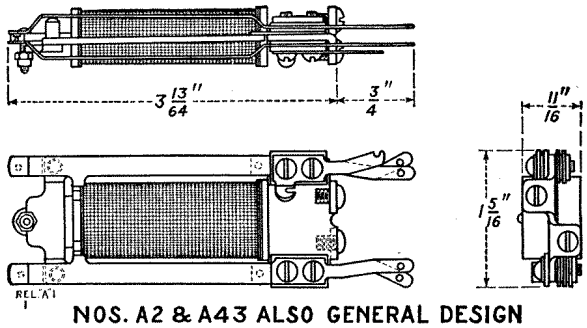
"A," "E" & "H" Type Relay



"B" & "G" Type Relay with Cover Removed

"A" TYPE RELAYS

The "A" Type Relays are designed for use as line and cut-off relays only. These relays will mount on ¾ and 7/8 inch horizontal and 1¾ vertical centers. Intended to mount on mounting plates provided with dust-proof metal covers.



NOS. A2 & A43 ALSO GENERAL DESIGN AND DIMENSIONS OF "A" TYPE

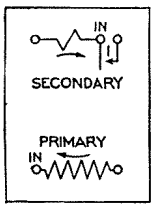


FIG. 1
A-1

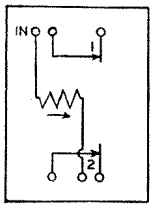


FIG. 2
A-2

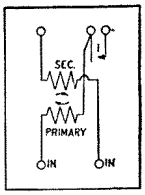


FIG. 31
A-25

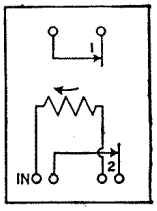


FIG. 27
A-26

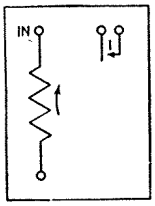


FIG. 5
A-50

Schematics Showing Windings

Code No.	Windings	Rated Resistance (Ohms)	Operate (Ampere)	Release (Ampere)	Non-Operate (Ampere)
A-1	Primary	1000	.0058	.0024	....
	Secondary	1000			
A-2	Single	34	.060	....	....
A-25	Primary	1000	.0058	.0024	....
	Secondary	1000			
A-26	Single	34	.047	....	....
A-50	Single	34	.040	.020	....

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RELAYS

Flat Type Relays—Continued

"E" TYPE RELAYS

The "E" Type Relays are designed for heavy duty, all-around purpose telephone relays. The relays are designed for two sets of contact springs which may be duplicates or may differ in contact arrangement, making it possible, in many cases, to use one of these relays where two or more of another style would be required. May be mounted in groups on punched type mounting plates (see listings elsewhere) which are provided with common dust-proof metal covers on 1¾ inch vertical and ¾ inch or 1 inch horizontal centers (depending upon the number of contact springs). When an individual dust-proof cover for each relay is desired the El Relay Cover should be specified. In this case the relay will mount on 1¼ inch horizontal centers and 1¾ inch vertical centers.

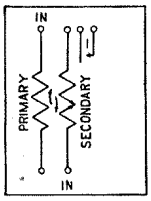
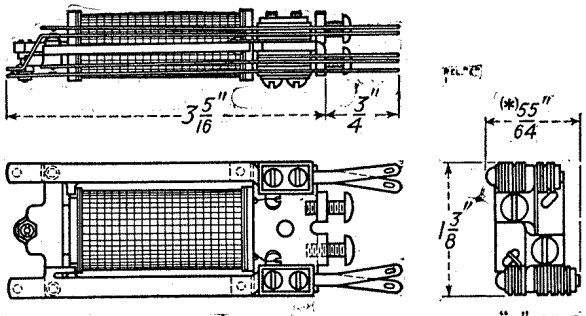


FIG. 1
E-4



NO. E-7 ALSO GENERAL DESIGN AND DIMENSIONS OF "E" TYPE

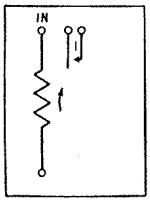


FIG. 2
E-5 and 114

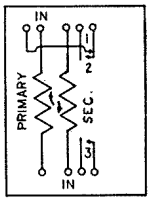


FIG. 25
E-31 and 525

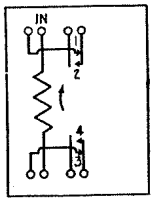


FIG. 14
E-65 and 148

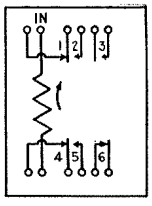


FIG. 16
E-82

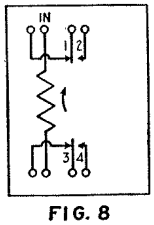


FIG. 8
E-127

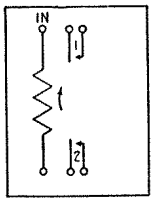


FIG. 7
E-1083

Schematics

Code No.	Windings	Rated Resistance (Ohms)	Operate (Ampere)	Release (Ampere)	Non-Operate (Ampere)
E-4	Primary	250	.0131	....	....
	Secondary	700	.008	....	.006
E-5	Single	1000	.008	.003	....
E-31	Single	500	.012	....	....
E-65	Single	1000	.013	....	....
E-82	Single	34	.070	....	....
E-114	Single	500	.0099	.0032	....
E-127	Single	500	.018	....	....
E-148	Single	350	.018	....	....
E-216	Single	500	.022	....	....
E-370	Single	500	.018	....	....
E-525	Single	220	.020	....	....
E-1083	Primary	650	.016	....	....
	Secondary	1000	.028		

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RELAYS

Flat Type Relays—Continued

"H" TYPE RELAYS

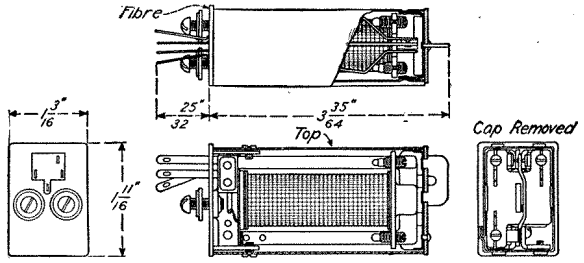
The relays of the "H" Type are similar to the "E" Relays, but have higher impedance due to the laminated construction of their cores. They are each equipped with a cross-talk proof cover and will mount on 1¼ inch horizontal and 1¾ inch vertical centers.

"B" TYPE RELAYS

"B" Type Relays differ from the above "A," "E," and "H" Types in that they are provided with a micrometer screw adjustment feature which permits of extremely accurate adjustments being made. They are used as supervising relays in switchboard cord circuits and in other places where a sensitive, highly efficient and reliable relay is required. When used as a series supervisory relay, the transmission loss is very low. These relays have superior "flashing" ability and will operate in a line having as high as 1,000 ohms resistance.

"B" Type Relays are provided with individual covers, each having a removable cap which may be placed in position without affecting the adjustment of the relay. The individual covers are dust-proof and cross-talk proof on all "B" Type Supervisory Relays. For purposes in which the cross-talk shielding is not required, dust-proof covers are supplied. These relays may be mounted on 1¼ inch horizontal and 1¾ inch vertical centers.

The use of a supervisory relay of the "B" Type secures the operating advantages which are obtained through sensitive adjustment and small operating current low transmission loss, and reduced maintenance.



'B' ALSO GENERAL DESIGN & DIMENSIONS OF 'B' TYPE

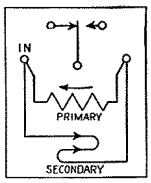


FIG. 3
B-3

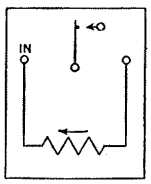


FIG. 5
B-10

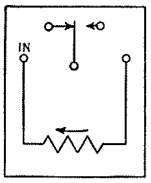


FIG 6
B-22&46

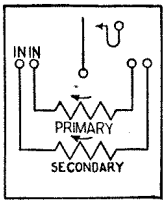


FIG. 30.
B-105

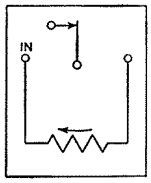


FIG. 4
B-223

Schematics

Code No.	Windings	Rated Resistance (Ohms)	Operate (Ampere)	Release (Ampere)
B-3	Primary	16.4	.015	.005
	Secondary	31		
	Combined	10.7		
B-10	Single	1.7	.022	.002
B-22	Single	96	.016	....
B-46	Single	220	.0028	.0009
B-105	Primary	27	.013	....
	Secondary	5000	.0015	.0005
B-223	Single	1000	.006	.0035

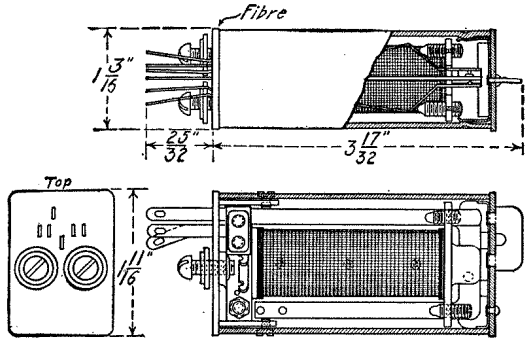
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RELAYS

Flat Type Relays—Continued

"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 1¼ inch horizontal and 1¾ inch vertical centers.



NO. G-3 ALSO GENERAL DESIGN AND DIMENSIONS OF "G" TYPE

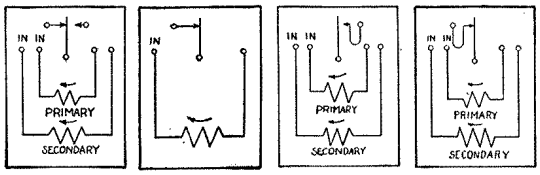


FIG. 7 G-1 | FIG. 1 G-28 and 32 | FIG. 14 G-29 | FIG. 15 G-41

SCHEMATICS

Code No.	Windings	Rated Resistance (Ohms)	Operate (Ampere)	Release (Ampere)
G-1	Primary	75	.010	.005
	Secondary	75		
G-28	Single	365	.0037	.001
G-29	Primary	500	.0022	.0003
	Secondary	3500	.0025	....
G-32	Single	900	.003	.0008
G-41	Primary	250	.0104	.0066
	Secondary	250		

"J" TYPE RELAYS

"J" Type Relays are designed for use with alternating current and are otherwise similar to the "B" Type Relays but having different core, spoolhead and adjusting plate characteristics. Each relay is equipped with a metal dustproof cover with removable cap and will mount on 1¼ inch horizontal and 1¾ inch vertical centers.

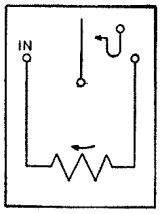


FIG. 3
J-3 and 20

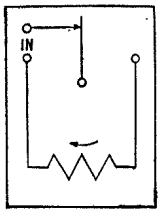


FIG. 7
J-11

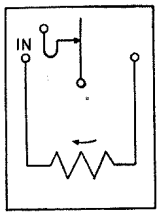
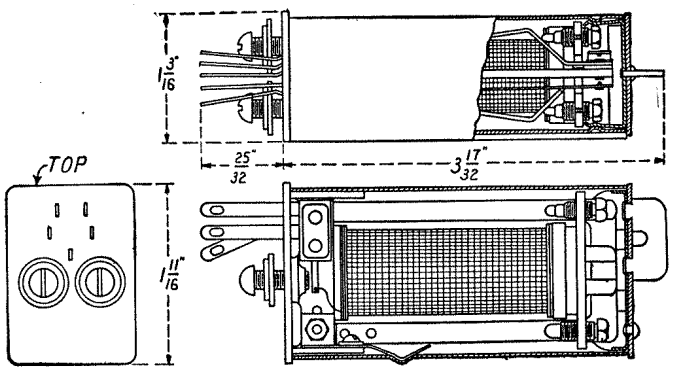


FIG. 6
J-15



NO. J-1 ALSO GENERAL DESIGN AND DIMENSIONS OF "J" TYPE

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RELAYS

Flat Type Relays—Continued

"J" TYPE RELAYS—(Continued)

Code No.	Windings	Rated Resistance (Ohms)	A.C. Volts	Operate Amperes	A.C. Volts	Non-Operate Amperes
J-3	Single	1090	—	.006	—	—
J-11	Single	1090	—	.006	—	—
J-15	Single	1600	—	.004	—	—
J-20	Single	1600	—	.004	—	—

"R" TYPE RELAYS

The "R" Type Relays are similar to the "E" Type except that the core, although having the same cross-sectional area, is of a semi-elliptical shape which affords a greater winding space and permits of a shorter length of turn than is possible on the "E" Type Core.

These relays mount on drilled type mounting plates on 1¾ inch vertical centers and 1 inch horizontal centers unless provided with individual dust-proof covers, in which case they mount on 1¼ inch horizontal centers.

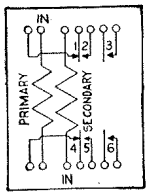


FIG. 36
R-49

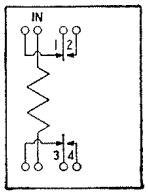
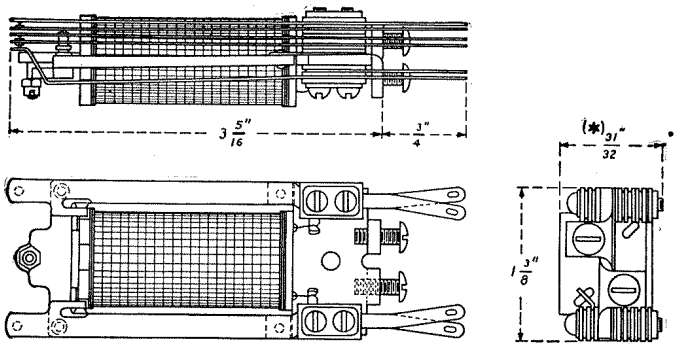


FIG. 48
R-286



NO. R-7 ALSO GENERAL DESIGN AND DIMENSIONS OF "R" TYPE

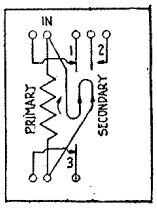


FIG. 215
R-503

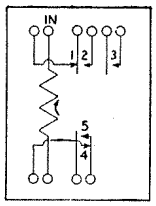


FIG. 94
R-852

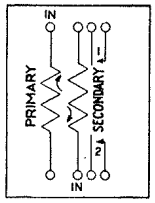


FIG. 89
R-913

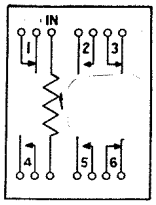


FIG. 151
R-966

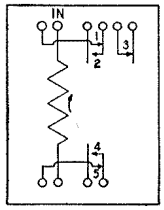


FIG. 307
R-1333

Schematics

Code No.	Windings	Rated Resistance (Ohms)	Operate (Ampere)	Release (Ampere)	Non-Operate (Ampere)
R-49	Primary	225	.055	....	....
	Secondary	275	.056	....	....
R-286	Single	275	.019	....	....
R-503	Primary	2100	.0175	....	....
	Secondary N.I.	2800			
	Combined	1200			
R-851	Single	365	.028	....	.017
R-852	Single	1200	.0107	....	....
R-913	Primary	550	.0185	....	.010
	Secondary	550	.0415	....	.020
R-966	Single	155	.057	....	.021
R-1333	Single	50	.064	....	....

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RELAYS

Flat Type Relays—Continued

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.

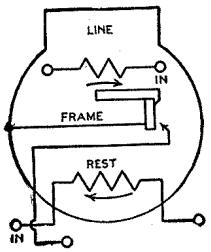
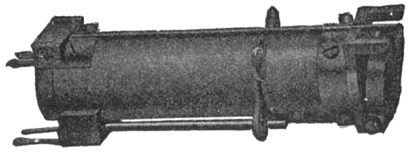


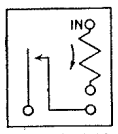
FIG. 1


No. 44 Type

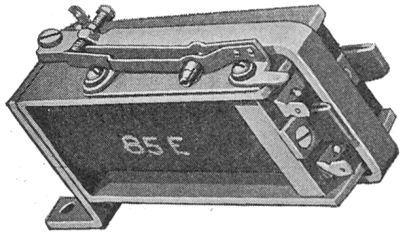
Code No.	Rated Resistance—Line	Rated Resistance—Restoring	Operating (Ampere) Line	Operating (Ampere) Restoring
44A	700	45	.0075	.08
44C	700	48	.0075	.1016
44G	700	370	.0075	.037

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.



NOS. 85-A-B-E-F-G & J
Schematic



No. 85 Type

Code No.	Rated Resistance (Ohms)	Operates through Resistance (Ohms)
85F	1.75	900
85J	2040	* 5000
85M	2040	**18000
85N	2040	*5000

Note. * Non-inductive, in series with a ½ mf condenser on 60 volts A.C., 16⅔ cycles.

** Non-inductive, in series with a ½ mf condenser on 60 volts A.C., 16⅔ cycles.

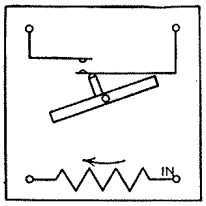
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RELAYS

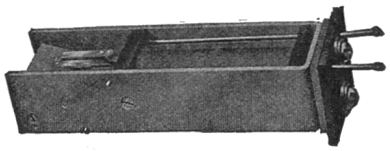
Flat Type Relays—Continued

NO. 87 TYPE RELAYS

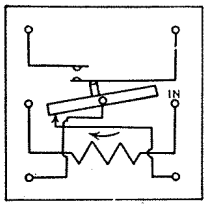
No. 87 Type Relays close a local circuit only while the line is being rung upon. They have flexible contact springs and heavy armatures of sluggish action so that the local circuit remains closed as long as there is ringing current on the line and are used in trunk circuits between central offices. They are equipped with cross-talk proof covers. One contact is made when the relay is operated. One form of this type of relay has an independent breaking contact.



NOS. 87-A-B-C&D



No. 87 Type

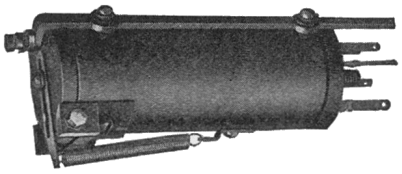


NOS. 87-E-F & G

Code No.	Windings	Rated Resistance (Ohms)	Operate (Ampere)	Release (Ampere)	Will not stick when D.C. Ampere is reduced to zero
87A	Single	700	90 volts A.C. in series with a 2 mf. condenser and a 500 ohm non-inductive resistance.	....	.055
87E	Single	700		....	.055

NO. 114 TYPE RELAYS

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. 114 Type

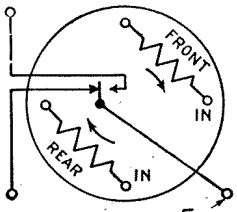


FIG. 2
No. 114B

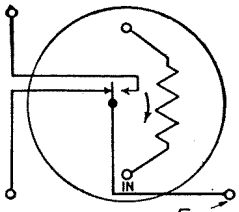


FIG. 3
No. 114G
No. 114AU

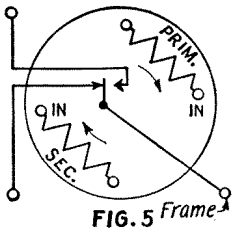


FIG. 5
No. 114K

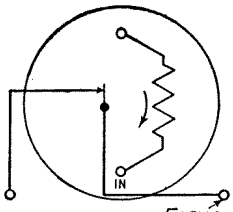


FIG. 7
No. 114AK

Code No.	Windings	Rated Resistance (Ohms)	Operate (Ampere)	Non-Operate (Ampere)
114B	Front 97, Rear 97		*.010	*.009
114G	Single	520	.006	.0055
114K	Primary	72	.016	
	Secondary	33	**	....
(a)114AK	Single	188	(b)	(c)
114AU	Single	520	.029	.026

Notes. * Through both windings in series aiding.
** Holds on .034 ampere.
(a) Intended for use as tripping relay in machine ringing circuits.
(b) Operates on 100 volts A.C. at 19⅓ cycles superimposed on 18 volts D.C. Operates in series with 940 ohm non-inductive resistance.
(c) Non-operates in series with 1130 ohms non-inductive resistance.

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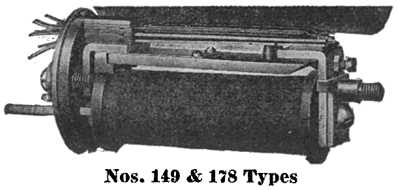
RELAYS

Flat Type Relays—Continued

NO. 149 AND NO. 178 TYPE RELAYS

The No. 149 Type Relays are slow-release cut-off relays. Equipped with dust-proof metal covers and will mount on $1^{2}\frac{3}{32}$ inch centers.

The No. 178 Type Relays are similar in design to the No. 149 Types and in addition are designed for slow operation. Will mount on $1^{2}\frac{3}{32}$ inch centers.



Nos. 149 & 178 Types

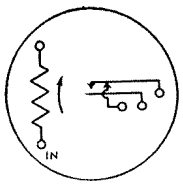


FIG. 2
Nos. 149C, D & E

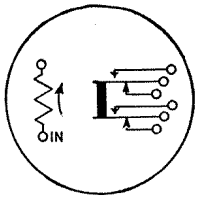


FIG. 1
Nos. 178S & BN

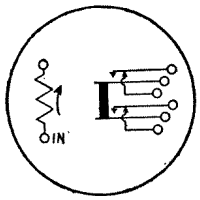


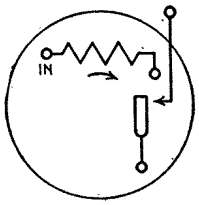
FIG. 2
Nos. 178AG & BY

Code No.	Windings	Rated Resistance (Ohms)	Operate (Amperes)	Non-Operate (Ampere)	Release (Ampere)
149C	Single	99	.017	....	.005
149D	Single	485	.010	....	.003
149E	Single	9.5	.100	.060	....
178S	Single	320	.056	.048	....
178AG	Single	320	.030	....	.002
178BN	Single	1050	.030	.020	....
178BY	Single	2000	.0075	....	.0006

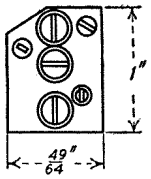
NOS. 189 AND 196 TYPE RELAYS

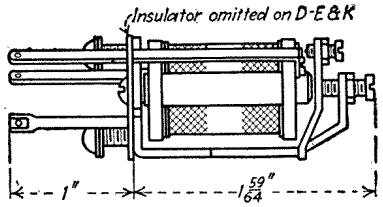
These are return pole piece relays. The No. 189 Type are intended for use on mounting plates provided with dust-proof covers. They will mount on $1\frac{3}{8}$ inch vertical centers (allowing for mounting plate cover) and $1\frac{3}{16}$ inch horizontal centers.

The No. 196 Type Relays are equipped with dust-proof covers. They have a rectangular laminated "U" shaped core provided with two form wound coils. Will mount on $2\frac{7}{16}$ inch vertical and $1\frac{7}{16}$ inch horizontal centers.



NOS. 189-D-E & K
Schematic





NO. 189-A ALSO GENERAL DESIGN AND DIMENSIONS OF NO. 189 TYPE

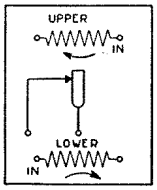


FIG. 1
Nos. 196A & E

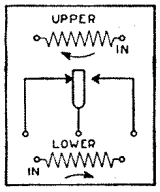
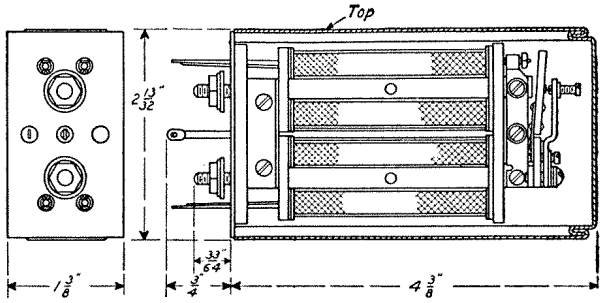


FIG. 2
No. 196B



NO. 196-A RELAY ALSO GENERAL DESIGN AND DIMENSIONS OF NO. 196 TYPE

Code No.	Windings	Rated Resistance (Ohms)	Operate (Ampere)	Release (Ampere)
189D	Single	1000	.009	.0034
196A	Upper	1600	*.001	Open circuit
	Lower	1600		
196B	Upper	1600	*.001	Open circuit
	Lower	1600		

* **Note.** Through both windings in series.

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RELAYS AND RELAY COVERS

RELAYS

Flat Type—Continued

Code No.	Windings	Rated Resistance (Ohms)	Operate (Ampere)	Release (Ampere)
196E	Upper / Lower	240 / 240	*.0023	Open circuit

* **Note.** Through both windings in series.

NO. 215 TYPE

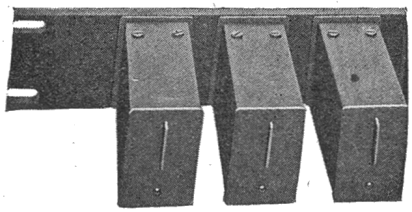
The No. 215 Type Relays are polarized relays equipped with reed type armatures and dust-proof covers. They mount on No. 823 or similar type Mounting Plates through the medium of No. 18B Connecting Blocks. They are insulated from the mounting plates and will mount mechanically on 2¾-inch vertical and horizontal centers but due to their sensitiveness to magnetic interference the mounting centers with respect to other relays or any other magnetic apparatus should be given special consideration in each case.

Code No.	Windings	Resistance (Ohms)	Operating Ampere
215A	Parallel	85 each	(*)
215FA	Single	595	†

Note:

* For reliable operation in telegraph circuits, should receive an operating current of not less than .015 amp. through both windings in series aiding, but the relay is adjusted to operate at a speed not greater than 60 times per minute on current reversals of .001 amp.

† For reliable operation for general use, should receive an operating current of not less than .00083 ampere, but the relay is adjusted to operate at a speed of approximately 60 times per minute on current reversals of .0005 ampere.



Relay Covers (on Mounting Plate)

Relay Covers

E1 RELAY COVER

The E1 Relay Cover is an individual dust cover for "E" Type Relays when used on mounting plates without the regular mounting plate cover. Has a black finish and is furnished with a support which attaches to the relay and holds the cover in place. The closest centers on which the "E" Type Relays will mount when equipped with these covers are 1¼ inches horizontal and 1¾ inches vertical.

E2 RELAY COVER

The E2 Relay Cover has a removable cap which when removed, gives access to the contacts for examination, otherwise same as E1 Relay Cover.

R1 RELAY COVER

The R1 Relay Cover is an individual dust-proof cover for "R" Type Relays when used on mounting plates without the regular mounting plate cover. Has a black finish and is furnished with a support which attaches to the relay and holds the cover in place. The closest centers on which "R" Type Relays will mount when equipped with these covers are 1¼ inch horizontal, and 1¾ inch vertical.

R2 RELAY COVER

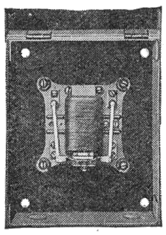
The R2 Relay Cover is similar to the R1.

The "R" Type Relays will mount on 1⅜ inch horizontal, and 1¾ inch vertical centers when equipped with these covers.

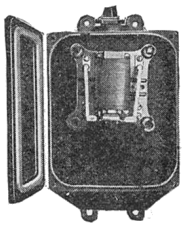
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Relays

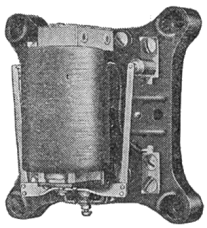
FOR SIGNALLING PURPOSES



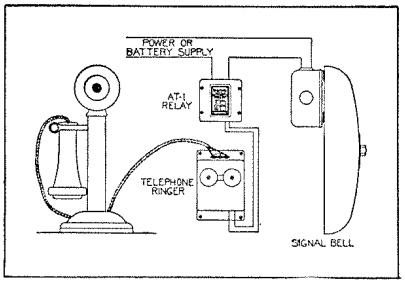
Style H.
Non-Weatherproof
(5″ x 7″ x 3″)



Style W. Weatherproof
(6¼″ x 9½″ x 3½″)



Telephone Relay
(4″ x 4″ x 2¼″ over all)



Schematic Wiring Diagram

TELEPHONE EXTENSION RINGING RELAYS AND RELAY SETS

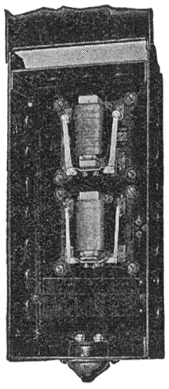
Telephone Type Relays

Coil has resistance of 1000 or 1700 Ohms as specified. Operates on standard telephone central office ringing current (75 volts 16⅔ cycles to 90 volts 20 cycles). Also furnished for battery ringing.

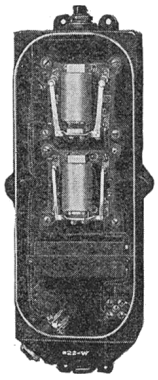
Contact Rating { Maximum Watts 400
Maximum Voltage 250

	Type		Type		Type
1000 Ohm Coil	ATJ1-H ATJ1-W	1700 Ohm Coil	ATJ12-H ATJ12-W	Battery Type (Specify Ringing Voltage)	DTJ1-H DTJ1-W

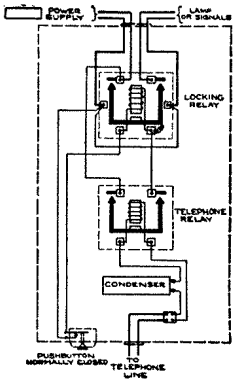
Two Circuit: Substitute letter "U" for letter "J."
Without Housing: Omit letter "H."



Style H.
Non-Weatherproof
(6½″ x 13½″ x 4″)



Style W. Weatherproof
(7″ x 17″ x 4″)



Wiring Diagram

Telephone Type Relay Sets

(Same as above, with condenser in series with coil.)

	Type
1000 Ohm Coil 1-MF Condenser	No. 1-H No. 1-W
1000 Ohm Coil 2-MF Condenser	No. 2-H No. 2-W
1700 Ohm Coil 1-MF Condenser	No. 3-H No. 3-W
1700 Ohm Coil 2-MF Condenser	No. 4-H No. 4-W

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Telephone Locking Relay Sets for Police and Taxi Cab Signalling, Etc.

Set consists of two relays wired for connection to telephone, signal, and lighting circuits. Operation: During ringing at local telephone station telephone relay (lower) is energized, closing contacts of circuit to locking relay (upper). Locking relay closes contact of circuit to local lamp or bell until opened by manually operated push button. (Specify voltage and cycles of both relays.)

		Type
1000 Ohms—2-MF Condenser.	A.C. Locking	No. 20-H / No. 20-W
1700 Ohms—1-MF Condenser.	A.C. Locking	No. 21-H / No. 21-W
1000 Ohms—2-MF Condenser.	D.C. Locking	No. 22-H / No. 22-W
1700 Ohms—1-MF Condenser.	D.C. Locking	No. 23-H / No. 23-W
Battery Type A.C. Locking		No. 24-H / No. 24-W
Battery Type D.C. Locking		No. 25-H / No. 25-W

A.C. and D.C. Relays

Model 3 Relays (Front and Back Contact)

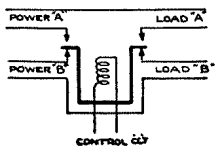
FRONT CONTACTS CLOSED AND BACK CONTACTS OPENED WHEN COIL IS ENERGIZED

For One and Two Circuits

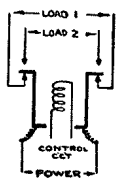
Class	Contact Capacity (In Amperes) at 110 Volts A.C.	Contact Capacity (In Amperes) at 110 Volts D.C.	Alternating Current — Stamped Steel Housing Type	Alternating Current — Housing Watertight Type	Direct Current — Stamped Steel Housing Type	Direct Current — Watertight Housing Type	
L Front Cts., Silver	5	4	ALJ3-H	ALJ3-W	DLJ3-H	DLJ3-W	Series J (One Circuit)
L Back Cts., Silver	5	3					
P Front Cts., Carbon	10	10	APJ3-H	APJ3-W	DPJ3-H	DPJ3-W	
P Back Cts., Silver	15	6					
R Front Cts., Silver	15	8	ARJ3-H	ARJ3-W	DRJ3-H	DRJ3-W	
R Back Cts., Silver	15	6					

Class	Contact Capacity (In Amperes) at 110 Volts A.C.	Contact Capacity (In Amperes) at 110 Volts D.C.	Alternating Current — Stamped Steel Housing Type	Alternating Current — Housing Watertight Type	Direct Current — Stamped Steel Housing Type	Direct Current — Watertight Housing Type	
L Front Cts., Silver	5	4	ALU3-H	ALU3-W	DLU3-H	DLU3-W	Series U (Two Circuit)
L Back Cts., Silver	5	3					
P Front Cts., Carbon	10	10	APU3-H	APU3-W	DPU3-H	DPU3-W	
P Back Cts., Silver	15	6					
R Front Cts., Silver	15	8	ARU3-H	ARU3-W	DRU3-H	DRU3-W	
R Back Cts., Silver	15	6					

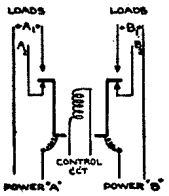
SUGGESTED CIRCUITS



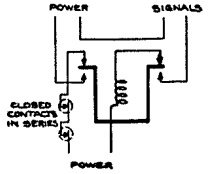
No. 1
One Circuit (Series J)



No. 2
Two Circuit (Series U)



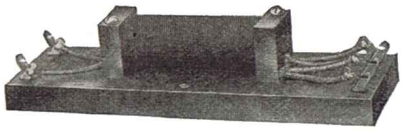
No. 3
Two Circuit (Series U)



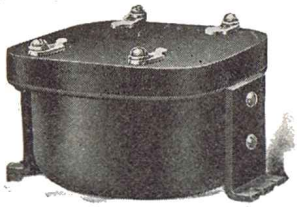
No. 4
Locking Relay (Series J)

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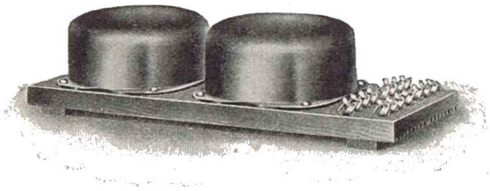
REPEATING COILS



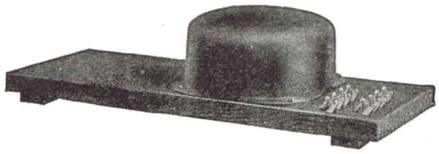
No. 20A



No. 25E



No. 25A



No. 26A

NO. 20 TYPE

The No. 20 Type Coils are intended for use in operator's telephone set for busy test. The No. 20E is for use at positions equipped with machine ringing trunks provided with mechanical locking keys. The No. 20G and H are for use in "B" operators' anti-side tone set.

Code No.	No. of Coils	No. of Windings Each Coil	Winding Resistances, Ohms — Primary	Secondary	Tertiary	Impedance Ratio	Dimensions, Inches — Wood Base	Coil
20A	1	2	277	40	360	1 to 45	$5\frac{7}{16}$ x $1\frac{1}{4}$	.....
20E	1	2	215	29	365	.....	.....	$3\frac{1}{4}$ x $1\frac{5}{32}$
20G	1	2	277	40	...	.....	.....	$3\frac{1}{4}$ x $1\frac{5}{32}$
20H	1	2	215	29	...	.....	.....	$3\frac{1}{4}$ x $1\frac{5}{32}$

NOS. 25, 26 AND 27 TYPES

The following coils are intended for use in the regular cord circuits and incoming trunk circuits of central battery switchboards.

The No. 25A has terminals for both coils at one end of wood base.

The Nos. 26A and 27A are each equivalent to one-half of No. 25A.

Code No.	No. of Coils	No. of Windings Each Coil	Winding Resistances, Ohms — Primary	Secondary	Tertiary	Impedance Ratio	Dimensions, Inches — Wood Base	Coil
25A	2	4	2 of 21	2 of 21	.....	1 to 1	$10\frac{3}{4}$ x 4	.....
26A	1	4	2 of 21	2 of 21	.....	1 to 1	$10\frac{3}{4}$ x 4	.....
27A	1	4	2 of 21	2 of 21	.....	1 to 1	6 x 4	.....

The following coils are intended for 48-volt battery long distance and incoming toll trunks of central battery switchboards.

The No. 25S has terminals for both coils at one end of wood base.

The No. 27D is equivalent to one-half of No. 25G.

Code No.	No. of Coils	No. of Windings Each Coil	Winding Resistances, Ohms — Primary	Secondary	Tertiary	Impedance Ratio	Dimensions, Inches — Wood Base	Coil
25S	2	4	2 of 21	2 of 21	2 of 40	1 to 1	$10\frac{3}{4}$ x 4	.....
27D	1	4	2 of 21	2 of 21	2 of 40	1 to 1	6 x 4	.....

The No. 25E Coil is intended for use in Nos. 1278 and 1302 Types of railway telephone sets. Base of coil provided with mounting lugs.

25E	1	2	42	42	....	1 to 1	$3\frac{7}{8}$ x $4\frac{7}{8}$	.....

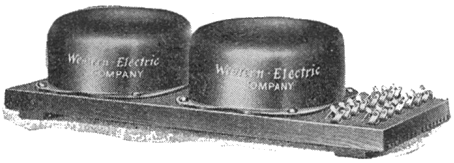
The No. 27F Coil is intended for use in operator's monitoring and service observing circuits in manual systems.

27F	1	4	2 of 28.75	2 of 22.75	....	1 to 4	$4\frac{3}{4}$ x 4	.....

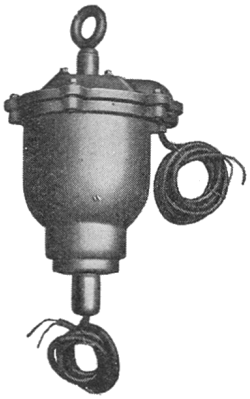
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REPEATING COILS

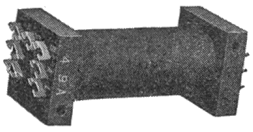
(Continued)



No. 76A



No. 50A



No. 49A

NO. 42 TYPE

The following coil is intended for use in magneto cord circuits to prevent ringing through.

Code No.	No. of Coils	No. of Windings Each Coil	Winding Resistances, Ohms — Primary	Secondary	Tertiary	Impedance Ratio	Dimensions, Inches — Wood Base	Coil
42A	1	4	35, 53, 72, 90	.....	.....	.....	.....	2¼ x 1⅝

The following coils are intended for use in phantom and simplex circuits.

The Nos. 75 Type and 76A have two coils mounted on a wood base.

The No. 78A is equivalent to one-half of No. 76A.

The No. 78A also consists of two resistance units enclosed in shell, each unit is non-inductively wound and is adjusted to have approximately the same D.C. resistance as the corresponding repeating coil windings. Intended for use at intermediate stations on phantom lines where one side of phantom circuit is terminated, the phantom circuit and the other side circuit going through.

WINDINGS

Code No.	No. of Coils	No. of Windings Each Coil	Resistances, Ohms — Primary	Secondary	Tertiary	Impedance Ratio	Dimensions, Inches — of Wood Base	of Coil
75A	2	4	2 of 22	2 of 23	.....	1 to 1	10¾ x 4	.....
75B	2	4	2 of 21	2 of 14	.....	1 to 1.62	10¾ x 4	.....
75E	2	4	2 of 9	2 of 23	.....	2.66 to 1	10¾ x 4	.....
76A	2	4	2 of 20	2 of 21	.....	1 to 1	10¾ x 4	.....
*78A	..	4	2 of 21	2 of 21	.....	1 to 1	10¾ x 4	.....
83B	1	4	2 of 22	2 of 23	.....	1 to 1	.....	2 9/16 x 4 3/16 x 4 9/16

* Has two resistance units. See above notes.

NO. 49A TYPE

The No. 49A Coil is intended for use in graduated howler circuit of the No. 12 Local Test Desk and trouble positions of local switchboards. Taps are brought out on the secondary winding, dividing the winding in sections to obtain various resistances.

49A	1	2	1.65	31	.....	1 to 15	.....	3⅝ x 1⅜

NO. 50A TYPE

The No. 50A Type is intended for use in telephone systems operated in connection with high voltage transmission lines.

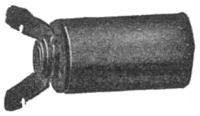
50A Consists of two windings on a steel core, the windings insulated from each other to withstand 30,000 volts A.C. for one minute. Resistance of inner windings 26.5 ohms, of outer winding 36.5 ohms. The coil is enclosed in a cast iron case with two porcelain bushings (large bushing P-143586, small bushing P-143585), for bringing out the leads from each winding. Case is furnished with six-foot leads. Height 20 inches, width 9½ inches, length 11½ inches.

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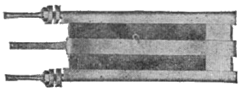
RESISTANCES



No. 18



No. 1



No. 19

NO. 1 TYPE

These resistances are small, compact units having one winding on a brass core and are assembled with fibre 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 $\frac{17}{32}$ of an inch, length $1\frac{1}{4}$ inches. A mounting screw is furnished with the resistance.

INDUCTIVELY WOUND

Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms
1A	400	1C	500	1E	300	1G	3000	1J	20	1N	700	1R	250	1U	45
1B	2500	1D	60	1F	1000	1H	200	1K	30	1P	5	1T	350	1AN	120

NON-INDUCTIVE WINDINGS

Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms	Code No.	Resistance, Ohms
1L	100	1AF	22.0	1AS	*711	1BH	565	1CE	971	1CU	*400	1DE	190	1DH	182.6
1W	2000	1AG	1000.0	1AT	*606	1BU	663	1CL	1226	1CY	482	1DF	337	1DJ	2141.0
1AD	8.5	1AK	2.2	1AU	371	1BW	1917	1CM	*200	1DB	5000	1DG	1295	1DR	4000.0
1AE	14.0	1AL	1	1BD	*1575	1CD	398	1CP	*2700	1DC	250				

* These resistances have impregnated windings.

NO. 18 TYPE

Resistances of the No. 18 Type have a micanite core upon which a single winding is placed. The winding is protected by a covering of sheet mica. The ends of the winding are soldered to tinned terminal posts which are also used for mounting the unit. Each terminal post is provided with two fibre washers and a hexagonal nut.

The overall dimensions are: length, $4\frac{21}{32}$ inches, width, $1\frac{21}{64}$ inches, thickness, $\frac{3}{4}$ inch.

The resistance values do not vary more than plus or minus 5 per cent from those rated in the table below. In some cases, as noted, the resistance is held to even closer limits. Each resistance will dissipate six watts continuously without injury from heating.

The mounting plates listed elsewhere under the heading of "Mounting Plates," provide for assembling these resistances in compact groups and when so mounted the terminals are conveniently located for making soldered connections.

Code No.	Resistance Ohms	Code No.	Resistance Ohms	Code No.	Resistance Ohms	Code No.	Resistance Ohms	Code No.	Resistance Ohms	Code No.	Resistance Ohms
18A	37	18Q	110	18AG	226	(b)18BD	580	18CJ	5	(b)18DS	1700
18B	40	18R	10	18AH	320	(b)18BE	20	18CK	440	18EA	9000
18C	83	18S	20	18AJ	400	18BF	284	18CN	800	18EC	6000
18D	120	18T	50	18AK	60	(b)18BG	400	(b)18CR	2000	(b)18EE	128
18E	140	18U	100	18AL	4	18BH	1000	(d)18CU	.8	18EF	2500
18F	150	18Y	90	18AM	250	18BJ	1200	18CW	1.6	18EM	8600
18G	200	18Z	67	18AN	350	(b)18BK	1300	(b)18DA	1510	18ES	4800
18H	210	18AA	95	(b)18AP	500	18BL	750	18DB	3000	(a)18EU	500
18J	30	18AB	45	18AR	380	(b)18BM	1000	(b)18DC	325	18EW	5000
18K	80	18AC	500	18AT	1600	(b)18BR	60	(b)18DG	426	18FC	4000
18L	170	18AD	240	(b)18AW	40	(b)18BT	200	18DH	700	(c)18FF	43.2
18M	53	18AE	600	18AY	2.4	(b)18BU	300	(b)18DJ	15	18FG	8080
18N	180	18AF	300	18BA	2000	(b)18BW	100	(a)18DP	18.75	(b)18FL	620
18P	130										

NO. 19 TYPE

These resistances are similar in construction to the No. 18 Type and may be mounted on $\frac{7}{16}$ inch horizontal centers and $1\frac{3}{4}$ inch vertical centers. They differ from the No. 18 Type in that two windings are provided and the end of each winding soldered to a center terminal. The two outside terminals are used as mounting posts. The resistance values do not vary more than plus or minus 5 per cent from those rated below and in some cases, as noted, the variation is held to closer limits.

Code No.	Resistance Ohms	Code No.	Resistance Ohms	Code No.	Resistance Ohms	Code No.	Resistance Ohms
19A	37 and 37	19AN	260 and 260	(c)19DG	133 and 770	(c)19GB	80 and 85
19B	40 and 40	19AP	180 and 180	(e)19DM	.2 and .4	(c)19GC	75 and 110
19C	40 and 83	19AW	2.5 and 2.5	19DN	100 and 100	(c)19GH	425 and 425
19D	83 and 83	19BA	900 and 900	19DP	.25 and .5	19GJ	300 and 500
19H	40 and 120	19BB	300 and 2300	19DR	1 and 2	19GL	300 and 300
19K	100 and 100	19BC	50 and 300	19DT	150 and 300	19GM	400 and 1000
19S	60 and 90	19BE	30 and 90	19DY	500 and 500	(e)19KG	160 and 2990
19T	25 and 25	19BG	200 and 400	(c)19EA	115 and 115	(e)19KH	286 and 1325
19Z	120 and 120	19BJ	350 and 350	19EB	20 and 330	(e)19KJ	467 and 512
19AD	150 and 150	19BL	1 and 1	19EC	650 and 1600	(e)19KL	269 and 1490
19AH	240 and 240	(c)19CA	185 and 770	19EW	800 and 800	19KM	84 and 6350
19AJ	200 and 200	19CN	100 and 200	(c)19GA	400 and 600	(e)19KN	146 and 651
19AM	50 and 50						

Note (a) Resistance value does not vary more than plus or minus ½%.

Note (b) Resistance value does not vary more than plus or minus 1%.

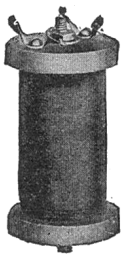
Note (c) Resistance value does not vary more than plus or minus 2%.

Note (d) Resistance value does not vary more than plus or minus 3%.

Note (e) Resistance value does not vary more than plus or minus 10%.

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RESISTANCES



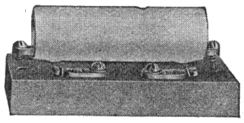
No. 5



No. 34A Resistance



No. 38 Type



No. 31A Resistance

NO. 5 TYPE

Resistances of the No. 5 Type have a single winding on a wooden spool. A threaded stud with a hexagonal nut is supplied for mounting. The overall dimensions are: diameter $1\frac{7}{16}$ inches and length $3\frac{1}{4}$ inches.

Code No.	Resistance Ohms	Code No.	Resistance Ohms
5G	10000	5K	750
5J	600	5M	2500

NO. 21 TYPE

The No. 21 Type have a single winding. The core is of brass with fibre heads. Equipped with wood screw for mounting. Resistance value does not vary more than plus or minus 5 per cent.

Code No.	Approximate Resistance (Ohms)
21A	6000
21B	5000

NO. 31A TYPE

A steel tube enamelled resistance is mounted on a maple base 4 inches in length and 2 inches wide. The overall height is $1\frac{3}{4}$ inches. Two screw terminals are provided. 1200 ohms resistance.

NO. 34 TYPE

Variable resistance windings of this type are brought out at several points and a screw terminal provided for connecting at each point. The core is of brass with a fibre 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, $2\frac{1}{16}$ inches, length overall, $2\frac{23}{64}$ inches.

	Terminal No.	34A	34B	34C	34G	34H
Approximate resistance in steps (ohms)	1	200	100	4	2900	320
	2	400	200	8	2500	160
	3	800	400	16	2200	80
	4	1600	800	32	1700	40
	5	3200	1600	64	1300	20
	6	4600	....	500	900	10
	7	6400	....	1000	700	...
	8	12800	....	1500	.....	...
Approximate total resistance (ohms)	..	30000	3100	3124	12200	630

NO. 36 TYPE

These resistances have four windings connected in series and brought out at four terminals. They are intended for use as artificial lines.

Code No.	Resistance (ohms) 1–3 and 2–4 (each)	Resistance (ohms) 1–2 and 3–4 (each)
36F	91	1071
36G	213	577
36J	742	367
36K	1330	336

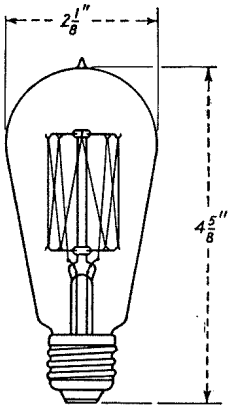
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RESISTANCES—Continued

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, $^{23}/_{32}$ inch.

Code No.	Resistance Ohms	Code No.	Resistance Ohms
38A	48000	38T	70000
38B	12000	38U	72500
38C	15000	38W	100000
38D	50000	38Y	4000
38E	20000	38AA	10000
38F	5330	38AB	30000
38G	7300	38AC	7500
38H	10200	38AG	36500
38K	14200	38AH	25500
38L	17000	38AM	6440
38N	24000	38AN	4580
38P	27240	38AP	11060
38R	37500	38AR	75000
38S	52500		



No. 6 Type

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. They have been superseded by the No. 8 Type but are available for additions and maintenance.

Code No.	Watts	Rated Voltage	Current at Listed Voltages (amperes) 125 Volts	120 Volts	110 Volts	72 Volts	70 Volts	30 Volts	24 Volts	20 Volts	10 Volts
6A	10	125	.0894	...	...	.0643	...	...	.0342	...	...
6B	15	125	.1305	...	...	.095	...	...	.048	...	...
6C	25	125	.222	...	...	.163	...	...	.085	...	...
6D	25	100	...	...	.220	...	.176	...	...	.086	...
6E	25	30	...	...	...	...	...	.680	...	.530	.350

NO. 8 TYPE RESISTANCE LAMPS

These lamps supersede the No. 6 Type which is however available for additions and maintenance. The bulb is tubular in shape and is tipless. The filament is of tungsten.

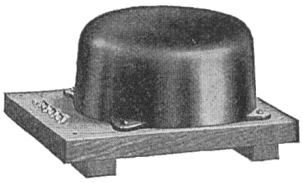
Overall length is approximately $2^{7}/_{8}$" and the diameter of the bulb is approximately $1^{1}/_{4}$".

The current limits at different voltages are given below and are subject in all cases to variations of plus or minus 15 per cent.

Code No.	Current at listed voltages (amperes) 125 Volts	120 Volts	100 Volts	72 Volts	70 Volts	30 Volts	24 Volts	20 Volts	15 Volts	10 Volts	6 Volts
8B	.089	....	....	.064	....	....	.034	....	....	....	....
8C	.130	....	....	.095	....	....	.048	....	....	....	....
8D	.222	....	....	.163	....	....	.085	....	....	....	....
8E	....	....	.220	....	.176	....	....	.086	....	....	....
8F	....	....	....	....	....	.680	....	.530	....	....	....
8G	....	.529	....	....	.379	....	....	.178	....	....	....
8H	....	....	....	....	....	.325	....	....	.212	....	.120

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RETARDATION COILS



No. 5AA



Nos. 8B, K, L, N,



Nos. 8 C, M,



No. 5AF



No. 12G



Nos. 12A, 12L and 12S



No. 12M

NO. 5 TYPE

Code No.	No. of Windings	Resistance (Ohms)	Use	Size of Coil or Base (Inches)
5A	2	20.5 (each)		5½ x 5½
5C	2	250 (each)		7½ x 3⅛
5U	2	500 (each)	As bridging coil in connection with duplex sets.	9¼ x 8
5W	1	146	As balancing coil in connection with duplex sets.	6 x 4
5AA	2	74 (each)	In standard composite sets.	11 x 8⅝
5AD	2	25 (each)	Nos. 52A and 53A Selector Apparatus Cases.	9 x 9
5AF	4	330 (total)	In phantoming magneto subscribers' circuits.	3⅞ x 3⅞

NO. 8 TYPE

8B	2	85 (each)	No. 8C unmounted	9 1/16 x 1 29/32
8C	2	85 (each)	Mounted	10¾ x 2
8K	2	35 (each)	Unmounted	9 1/16 x 1 29/32
8L	2	175 (each)	Unmounted	9 1/16 x 1 29/32
8M	2	165 (each)	Mounted	10¾ x 2
8R	1	100	Mounted—For use in Morse Generator Taps	9 3/16 x 2¾

NO. 12 TYPE

12A	1	165	Operator's telephone circuit in Nos. 1, 9 and 10 Switchboards and Nos. 101 and 102 Private Exchanges.	6 x 1¾
12E	1	230		6 x 1¾
12G	1	2.3	Nos. 1312A and 6023A Telephone Sets. Has a movable core for varying impedance.	3 13/16 x 1 x 1 13/32 high
12L	1	400	Operator's telephone circuit No. 4 P.B.X.	6 x 1¾
12M	1	2.3	Nos. 1314A and E Telephone Sets.	3¼ x 1
12S	1	100	Operator's telephone circuit in No. 550 P.B.X.	6 x 1¾
12AD	1	140	In attendant's battery supply circuit of No. 2 Order Turret arranged for 18 volt operation.	4¼ x 1⅜

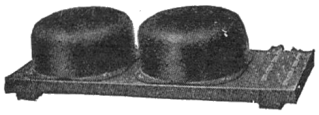
NO. 51 TYPE

51A	1	520	No. 295AK Desk Set Box and Nos. 1293AD, AE, AK, AL; 1317W, AD, AE and AW Telephones.	1⅛ height 1⅛ diameter
51B	1	520	No. 1336F Telephones. Same as No. 51A, except is moisture proofed.	1⅛ height 1⅛ diameter
51F	1	45	Nos. 101A, B; 102A, B, C and D Selector Sets.	1⅛ height 1⅛ diameter

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RETARDATION COILS

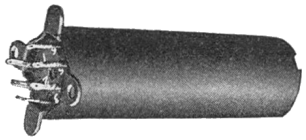
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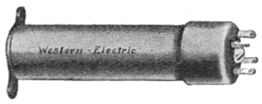
No. 44 Type



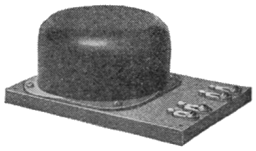
No. 47



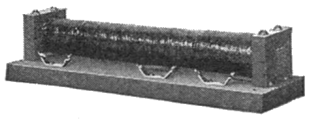
No. 54



Nos. 46M, N, P, W and Y



No. 48A Retardation Coil



No. 60 Type

NO. 44 TYPE

Code No.	No. of Windings	Resistance (Ohms)	Use	Size of Base, (Inches)
44B	2 on each coil	203 each	Toll cord circuits	$10\frac{3}{4}$ x 4
44D	2 on each coil	83 each winding	Toll cord circuits	$10\frac{3}{4}$ x 4
44F	4 on each coil	330 each coil—4 windings in series	A phantom circuit retardation coil	$11\frac{3}{4}$ x $4\frac{3}{16}$
44G	1 on each coil	115 each	In phantom circuit balancing composite sets at repeater stations	$9\frac{13}{16}$ x 4

NOS. 46 AND 47 TYPES

The Nos. 46 and 47 Types of retardation coils are designed for general use in switchboard circuits. The No. 46 Types are arranged for front connections and are equipped with mounting lugs at one end for mounting on $1\frac{3}{32}$ inch centers by means of two screws. The overall dimensions are $3\frac{7}{8}$ inches long by 1 inch in diameter. The terminals project out $\frac{5}{16}$ of an inch.

The Nos. 47 Types differ from the Nos. 46 Types only in that they are arranged to mount on mounting plates. The overall dimensions are $3\frac{5}{8}$ inches long by 1 inch in diameter. The terminals project out $\frac{13}{16}$ of an inch.

Code No.	Code No.	No. of Windings	Resistance (Ohms)	Code No.	Code No.	No. of Windings	Resistance (Ohms)
46A	47A	1	600	46L	47L	1	400
46B	47B	1	150	46M	47M	2	125 (each)
46C	47C	1	200	46N	47N	2	100 (each)
46D	47D	1	250	46P	47P	2	500 (each)
46F	47F	1	500	46S	47S	1	40
46G	47G	1	750	46W	....	2	200 (each)
46H	47H	1	350	46Y	47Y	2	1000 (each)

NOS. 48 AND 49 TYPES

Code No.	No. of Windings	Resistance (Ohms)	Use	Size of Base (Inches)
48A	2 in series	100 (total)	Grounded composite circuits	6 x 4
49A	2 inner 2 outer	37 each 46 each	Intended to remove electrostatic and electro magnet charges from telephone lines. (Similar to No. 48A Type.)	

NO. 54 TYPE

Arranged for back connecting. The shell is $4\frac{7}{8}$ inches long and $1\frac{1}{2}$ inch diameter. The two mounting holes are on $1\frac{27}{32}$ inch centers.

Code No.	No. of Windings	Resistance (Ohms)	Use
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.
54D	2	85 (each)	In No. 505B Cordless and 550C P.B.X. Switchboards as a battery feed coil.

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RETARDATION COILS

(Continued)

NO. 60 TYPE

Code No.	No. of Windings	Resistance (Ohms) Max.	Resistance (Ohms) Min.	Use	
60A	2	.23 .39	.19 .31	Intended for use with the Nos. 84F and 84G Interrupters to limit the noise in the battery due to the operation of the interrupter.	10½ x 3¼
60B	2	5.8 10.2	4.8 8.4	Used with the Nos. 84F and 84G Interrupters to limit the inductive noise in the switchboard wiring and cable.	

NO. 71 TYPE

Code No.	No. of Windings	Approx. Resistance each winding (Ohms)	Use
71A	2	186.0	Telephone Repeater Equipments.
71B	2	0.9	Battery supply coil in Telephone Repeater Equipments.
71K	2	1.0	With 135 cycle ringing equipment.
71R	1	14.8	In the 156B Interrupter.
71S	2	1.5	Battery supply coils in telephone repeaters.

NO. 75A

This is a high impedance shell type coil enclosed in a cross-talk proof case and is arranged to mount on mounting plates. It has two windings of approximately 3800 ohms each.

Overall dimensions: Base, $2\frac{5}{8}$ x $3\frac{3}{16}$ inches; height, $3\frac{29}{32}$ inches.

NO. 77A

The No. 77A Retard Coil is the same as the No. 5AA except that it is not mounted on a wooden base. It is intended for use in composite sets mounted on relay racks.

NO. 82G

This is a toroidal type coil enclosed in a sheet metal case arranged for relay rack mounting. Overall dimensions: Base, 3 x $1\frac{7}{16}$ inches, height $3\frac{3}{16}$ inches. The resistance of the winding is 3.5 ohms. Intended for use in telephone repeater equipments.

NO. 83A

A shell type coil enclosed in a cross-talk proof case furnished with two lugs for mounting. Has two windings of approximately 320 ohms each. Intended for use in the plate battery feed circuit of No. 1A Carrier Panel.

NO. 91 TYPE

Code No.	No. of Windings	Approximate Resistance of each winding (ohms)	Use
91A	2	0.9	Telephone repeater circuits.
91C	2	209	With composite ringer equipment.
91AY	2	180	In side circuits.

NO. 93 TYPE

The No. 93 Type is a toroidal type coil enclosed in a cross-talk proof case and is intended for use in basic networks.

Overall dimensions: Base $2\frac{3}{8}$ x $2\frac{11}{32}$ inches, height $3\frac{17}{64}$ inches.

Code No.	No. of Windings	Approximate Resistance (Ohms) of Windings
93A	2	11 (each)
93B	2	7 (each)

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RETARDATION COILS

(Continued)

NO. 94 TYPE

Toroidal type coils enclosed in sheet metal cases provided with mounting lugs.

Code No.	No. of Windings	Approx. Resistance of each winding (ohms)	Overall Dimensions Inches	Use
94A	2	160	3¼ x 1 7/16 x 3 3/16	In low pass filter of the No. 21 Type 130 volt Repeater for phantom and physical circuits.
94E	1	322	3 1/16 x 1 7/16 x 3 3/16	In low pass filters in telephone repeater sets.
94F	1	70		In low pass filters in telephone repeater sets.
94G	2	7.5		In side circuit at repeater installations.

NO. 105D

A toroidal type coil enclosed in a cross-talk proof case arranged for mounting on relay rack mounting plates. It has one winding of 29.2 ohms. Overall dimensions: Base, 2 9/16 x 4 3/16 inches; height, 4 17/32 inches.

NO. 110A

A toroidal type coil enclosed in a cross-talk proof case arranged for mounting on mounting plates. It has two windings the approximate resistance of each being 83 ohms.

Intended for use with telephone repeaters.

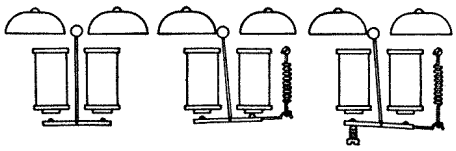
Overall dimensions: Base, 2 9/16 x 4 13/16 inches; height, 4 17/32 inches.

NO. 116A

A solenoidal type coil wound on a non-magnetic core. Has one winding of approximately 2.6 ohms resistance. Is intended for use in eliminating high frequency interference produced by pole changes, interrupters, ringing machines, etc. in telephone offices.

Overall dimensions: Diameter, 2 3/8 inches; height, 1 5/16 inches.

RINGERS



Unbiased **Biased to Prevent Tapping** **Biased for Pulsating Current**

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 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.

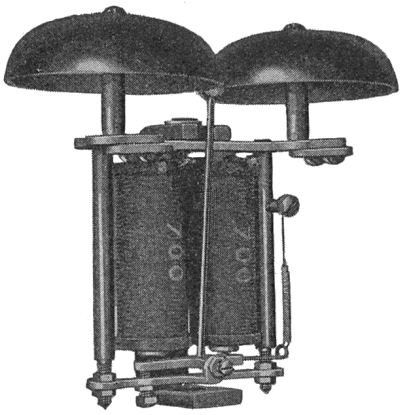
The ringers that are equipped with a biasing spring and armature stop screw or screws are intended primarily for use on pulsating (PC) or superimposed current (SC). However, such ringers are frequently operated on alternating current (AC) particularly in central battery systems.

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.)

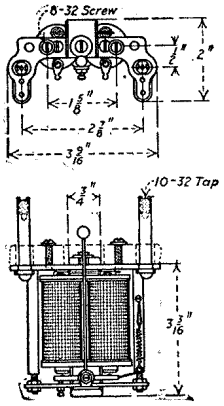
Ringers which are not equipped with biasing springs are suitable for use only on alternating current.

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RINGERS—Continued



Illustrating General Design of Nos. 6 and 8 Type Ringers



Nos. 6 and 8 Type Ringers also Nos. 42 and 52 Types

NOS. 6, 7, 8, 42 AND 52 TYPES

Code No.	Ringer Code No.	Type of Armature Air Gap Adjustment	Resistance (Ohms)	Biasing Feature	Current Adjusted For	Gong Posts—Length	Gong Posts—Woodwork Thickness	Gongs—Code No. & Finish	Gongs—Diameter Inches
6AG	6A	Lock nut	*1400	Spring & screw	AC	1 9/16	5/8	29A black	2 1/2
6FG	6F	Lock nut	1600	Spring	AC	1 9/16	5/8	29A black	2 1/2
7AG	7A	Lock nut	1400	Spring & screw	AC	1 7/16	3/8	29A black	2 1/2
8J	—	Lock nut	3500	Spring & screw	AC	1 5/16	3/8	—	—
8AG	8A	Lock nut	*1400	Spring & screw	AC	1 23/64	3/8	29A black	2 1/2
42AG	42A	Lock nut	**1000 and 3000	Spring & screw	PC or SC	1 5/16	3/8	29A black	2 1/2
52AG	52A	Lock nut	**1000 and 3000	Spring & screw	PC or SC	1 31/64	9/16	29A black	2 1/2

* **Note.** The Nos. 6A and 8A Ringers were formerly wound to 1000 ohms resistance instead of 1400 ohms. The 1000 ohm and 1400 ohm ringers have the same impedance and may be used interchangeably in service.

** One spool of the Nos. 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.

NO. 68 TYPE

The No. 68A Ringer is similar to the No. 8A Ringer except that it has a heel iron designed to mount either 29C, 31C, 32C, or 33C Gongs in an inverted position. This ringer is intended for use in Nos. 533A, B, K, Y, 534A, D, K, P, Y, DF, 553A, B, and Y Subscriber Sets.

Overall dimensions approximately 3 7/32 x 4 5/16 x 1 5/8 inches.

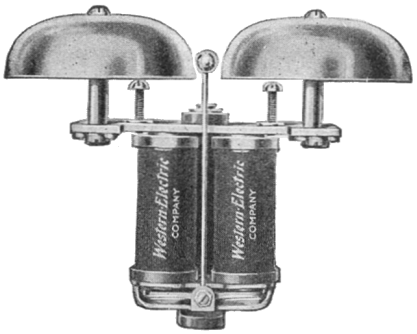
NO. 78 TYPE

The No. 78A Ringer is similar to the No. 68A Ringer except for the method of mounting and the position of the gongs on the ringer and that it is equipped with paper filled coils. This ringer is intended for use in the small 534-A Type Subscriber's Set.

Overall dimensions approximately 4 1/8 x 3 7/16 x 1 9/16 inches.

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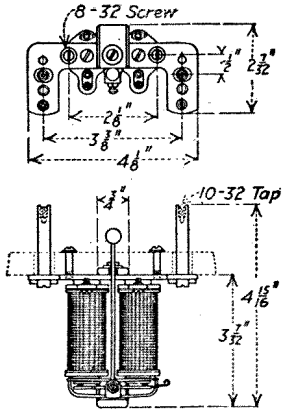
RINGERS—Continued



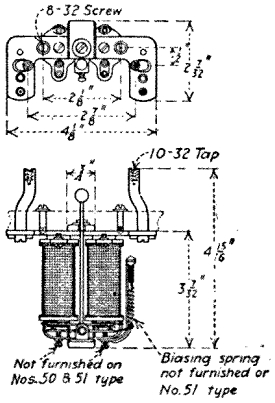
No. 38 Type



No. 51 Type



Nos. 38 and 45 Type Ringers Also General Dimensions of No. 47 Type (with Biasing Spring)



Nos. 49, 50 and 51 Type Ringers

NOS. 38, 45, 47, 49, 50, 51 AND 53 TYPES

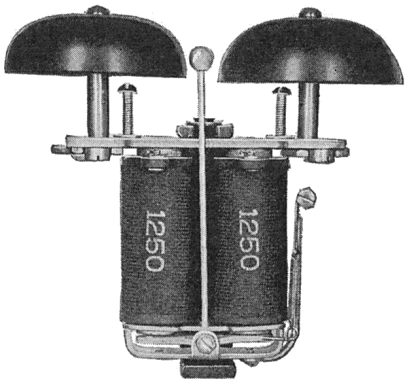
Code No.	Ringer Code No.	Type of Armature Air Gap Adjustment	Resistance (Ohms)	Biasing Feature	Current Adjusted For	Gong Posts: Length	Gong Posts: Woodwork Thickness	Gongs: Code No. & Finish	Gongs: Diameter Inches
38AG	38A	Single Screw	1000	None	AC	$1\frac{37}{64}$	$\frac{5}{8}$	26A black	3
38BG	38B	Single Screw	2500	None	AC	$1\frac{37}{64}$	$\frac{5}{8}$	26A black	3
38FG	38F	Single Screw	1600	None	AC	$1\frac{37}{64}$	$\frac{5}{8}$	26A black	3
45BG	*45B	Single Screw	2500	None	AC	$1\frac{43}{64}$	—	20 black	3
47AG	47A	Single Screw	1020	Spring	AC	$1\frac{43}{64}$	$\frac{5}{8}$	26A black	3
47BG	47B	Single Screw	2500	Spring	AC	$1\frac{43}{64}$	$\frac{5}{8}$	26A black	3
49BG	**49B	Single Screw	2500	Spring & screw	PC	$1\frac{43}{64}$	$\frac{5}{8}$	29A black	$2\frac{1}{2}$
51AG	**51A	Single Screw	1020	None	AC	$1\frac{43}{64}$	$\frac{5}{8}$	29A black	$2\frac{1}{2}$
51BG	**51B	Single Screw	2500	None	AC	$1\frac{43}{64}$	$\frac{5}{8}$	29A black	$2\frac{1}{2}$
51FG	**51F	Single Screw	1600	None	AC	$1\frac{43}{64}$	$\frac{5}{8}$	29A black	$2\frac{1}{2}$
53AG	53A	Single Screw	1020	None	AC	$1\frac{9}{16}$	$\frac{5}{8}$	29A black	$2\frac{1}{2}$
53BG	53B	Single Screw	2500	None	AC	$1\frac{9}{16}$	$\frac{5}{8}$	29A black	$2\frac{1}{2}$
53FG	53F	Single Screw	1020	None	AC	$1\frac{9}{16}$	$\frac{5}{8}$	29A black	$2\frac{1}{2}$

* Treated to resist the action of moisture and fumes used in mine telephones.

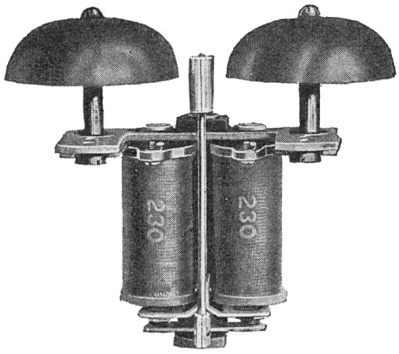
** The Nos. 49, 50 and 51 Type Ringers have bent gong posts which permit of their use in woodwork drilled for ringers having three inch gongs; for example drilled for the No. 38 Type Ringer.

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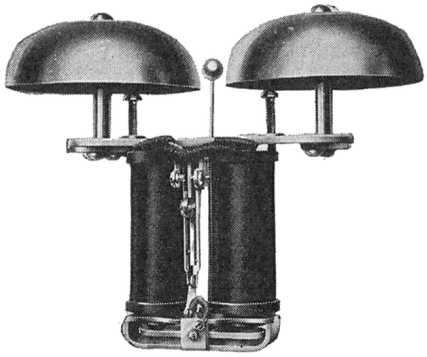
RINGERS AND RINGER INDICATORS—Continued



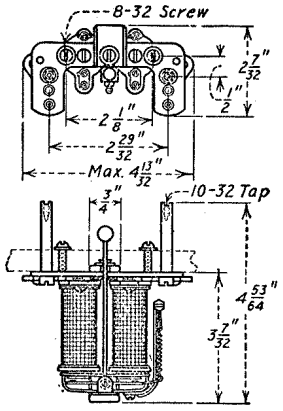
No. 54 Type



No. 41SG Ringer



No. 60 CG Ringer



No. 55 Type Ringers also General Dimensions of Nos. 53 and 54 Types

NOS. 54 AND 55 TYPES

Code No.	Ringer Code No.	Armature Adjustment	Resistance (Ohms)	Biasing Feature	For Current	Gong Posts (Ins.) Length	Gong Posts (Ins.) Drilling	Gongs and Finish	Diameter Ins.
54BG	54B	Single Screw	2500	Spring & screw	PC	1 9/16	5/8	29A black	2 1/2
55AG	55A	Single Screw	1000	Spring	AC	1 9/16	5/8	29A black	2 1/2
55BG	55B	Single Screw	2500	Spring	AC	1 9/16	5/8	29A black	2 1/2
55FG	55F	Single Screw	1600	Spring	AC	1 9/16	5/8	29A black	2 1/2

HARMONIC RINGERS

41RG	41R	None	1800	None	16 2/3 cycles	1 9/16	5/8	29A black	2 1/2
41SG	41S	None	460	None	33 1/3 cycles	1 9/16	5/8	29A black	2 1/2
41TG	41T	None	285	None	50 cycles	1 9/16	5/8	29A black	2 1/2
41UG	41U	None	200	None	66 2/3 cycles	1 9/16	5/8	29A black	2 1/2
41WG	41W	None	1800	None	20 cycles	1 9/16	5/8	29A black	2 1/2
41YG	41Y	None	285	None	60 cycles	1 9/16	5/8	29A black	2 1/2

GENERAL NOTES ON RINGERS

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 3/64 inch lower than the lugs which project through the slots in the gong.

Spacers to adapt the ringers to 3/8 or 1/2 inch woodwork will be furnished if specified in order.

In ordering, specify whether ringer is to be mounted in a wooden or metal type of set.

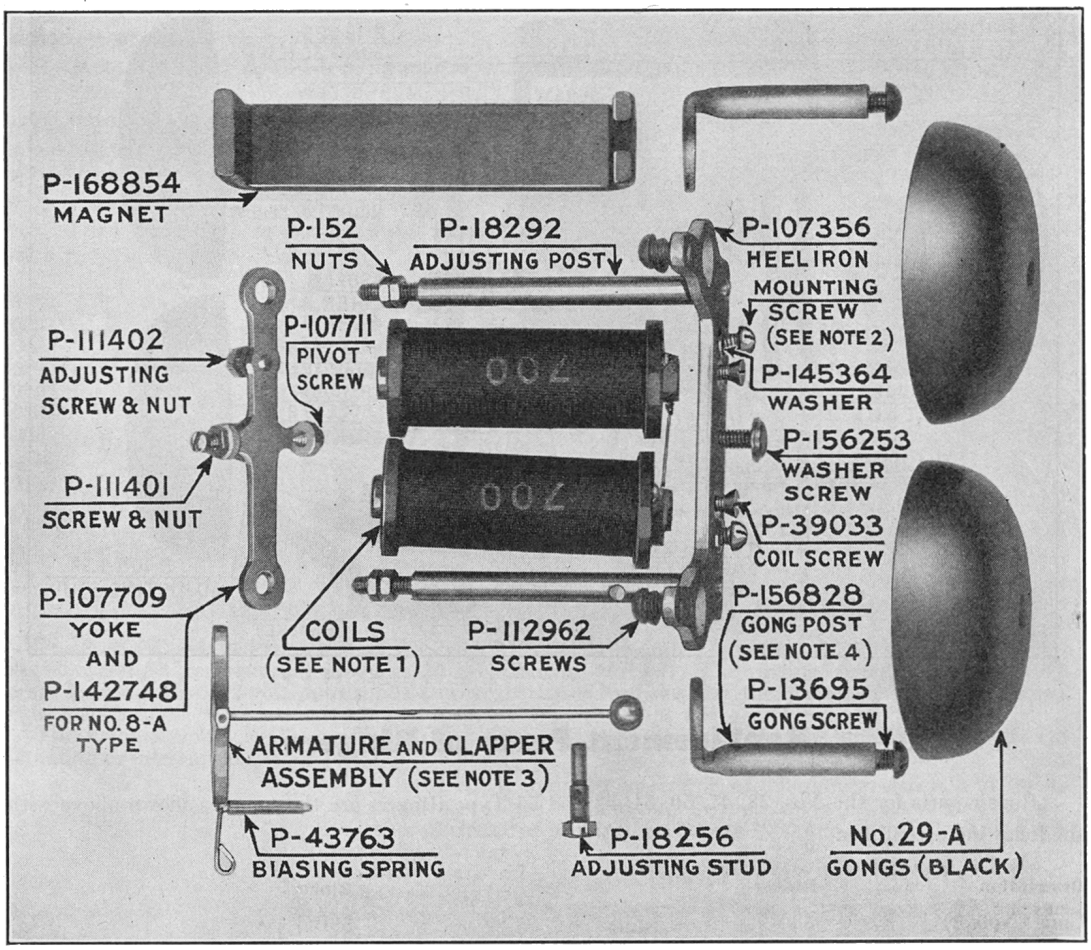
RINGER INDICATOR

Code No. 1A—A manually restored indicator, consisting of a metal frame with a slide which is arranged to engage the clapper rod or a ringer.

Operation of ringer exposes a white surface on the frame.

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RINGERS—Continued

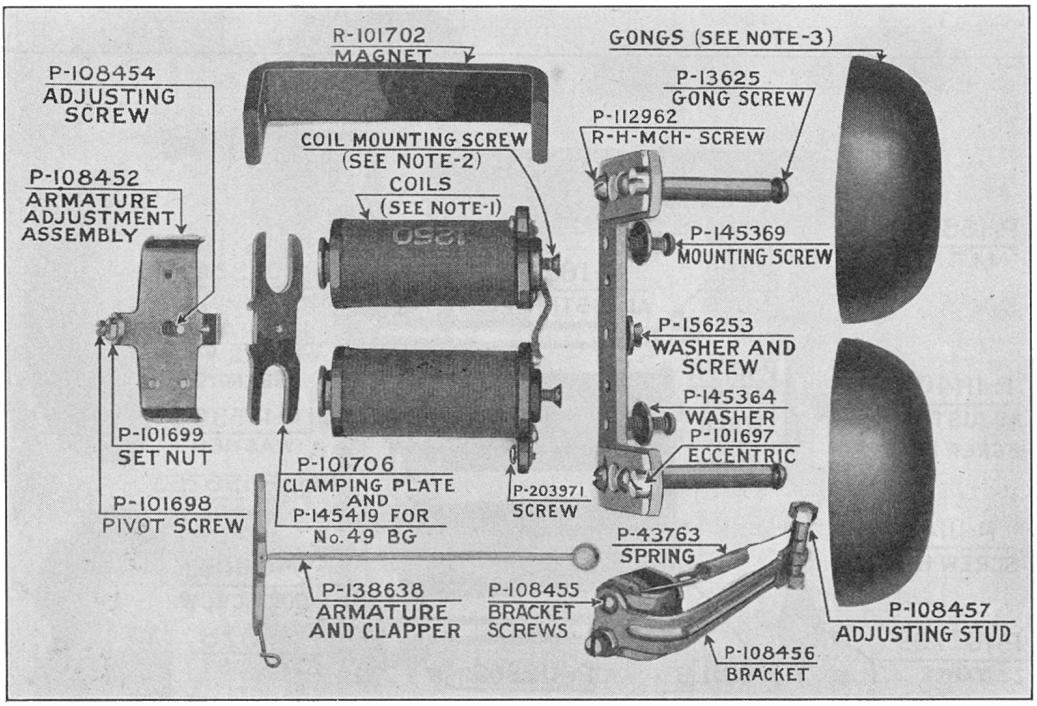


Replacement Parts of Ringers

	Ringer Nos.				
	6AG	6FG	8AG	42AG	52AG
Coils (Note 1)	P-143018 (700 ohms)	P-127016 (800 ohms)	P-214148 (700 ohms)	P-127418 (500 ohms) P-206552 (500–3000 ohms)	P-127418 (500 ohms) P-214154 (500–3000 ohms)
Mounting Screw (Note 2)	P-145365	P-145365	P-145367	P-145366	P-145369
Armature and Clapper Assembly (Note 3)	P-110884	P-110884	P-146329	P-146329	P-146328
Gong Post (Note 4)	P-156828	P-156828	P-153242	P-153242	P-156829

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RINGERS—Continued



Replacement Parts of Ringers

Repair parts for the Nos. 38, 47, 50, 51, 53 and 55 Type Ringers are the same as shown above with the following exceptions:

Description	Ringer		Ringer	
Coils (Note 1)	38AG, 47AG, 51AG, 53AG	P-133726 (500 ohms ea.)	38BG, 47BG, 49BG, 50BG, 51BG, 53BG, 54BG	P-133727 (1250 ohms)
	55AG	P-214144 (500 ohms)	55BG	P-214145 (1250 ohms)
	38FG, 47FG, 51FG, 53FG, 55FG	P-133729 (800 ohms)	51JG	P-127280 (25 ohms)
Coil Mounting Screw (Note 2)				
35 Type P-109804	38 Type, 51 Type, 53 Type	P-40837	47, 49 Types, 50, 54 Types, 55 Type	P-38973

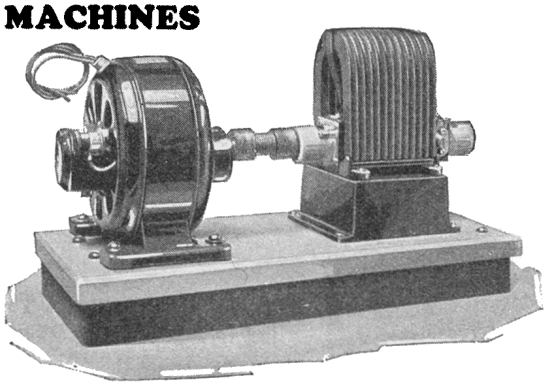
Gongs (Note 3) for various type ringers are listed with the code numbers.

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RINGING MACHINES

Magneto Motor Generator Ringing Sets

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.



Motor Generator Ringing Set

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

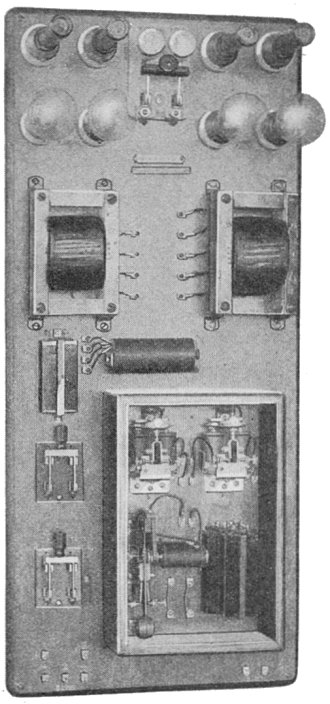
List No.	No. Bars	Output Watts	Type
310110	12	15	Magneto Generator—80 volts, 19 cycles, single phase, 1150 R.P.M. Belt tightening sub-base and 2½ x 1⅛ inches plain pulley.

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

Combined Ringing and Charging Machine

The 21-RA Combined Ringing and Charging Machine is mounted on an oak backboard. It uses 115 volts 60 cycles A.C. current and produces 20 cycle ringing current. The ringing current is furnished by storage batteries (two 12-volt automobile storage batteries furnished by the customer) that are charged by the machine.

This combination is really a reliable power plant furnishing ringing current unaffected by voltage fluctuation or interruption.

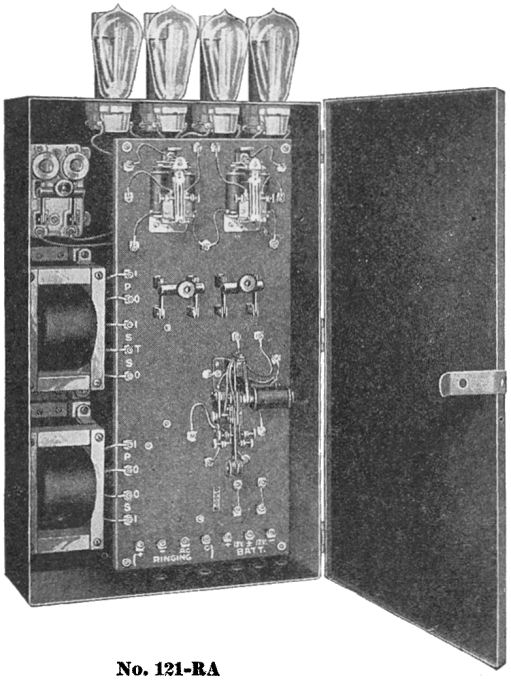


No. 21-RA

The 21-RA is equipped with duplicate charging rectifiers and resistance control. Either rectifier may be used singly or the two may be used together to charge at a maximum rate of 2.6 amperes at 24 volts. Each rectifying unit automatically cuts off battery during power interruption. If only one rectifier is used the charging rate is 1.3 amperes at 24 volts, the second rectifier may be held in reserve for emergency cases.

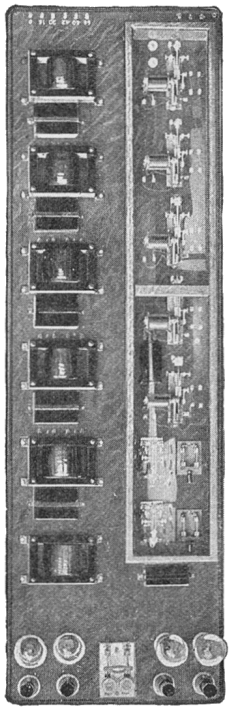
The 121-RA Combined Ringing and Charging Machine is the same as the 21-RA with the exception that the apparatus is assembled in a steel cabinet complying with the regulations of the National Board of Fire Underwriters.

Eliminators are provided to prevent interference with radio reception.



No. 121-RA

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No. 27

RINGING MACHINES AND FREQUENCY CONVERTERS

Harmonic Ringing Machines

The No. 27 Harmonic Ringing Machine uses 115 volts 60 cycles A.C. current and furnishes 16⅔, 33⅓, 50, 66⅔ cycle ringing current. This machine is similar in some respects to the 21-RA Combined Ringing and Charging Machines in that it uses two 12-volt automobile batteries (furnished by the customer) that are charged from duplicate charging vibrators and in this manner maintains a uniform voltage without appreciable variation between the charge and non-charging periods. This uniform battery output is used to operate tuned reed vibrators to produce ringing current at the harmonic frequencies required for a selective ringing system.

The No. 26 Ringing Machine is similar to the No. 27 except that it produces frequencies of 30, 42, 54, and 66 cycles.

The No. 28 Ringing Machine is similar to the 26 and 27 except that it produces frequencies of 16, 30, 42, 54 and 66 cycles.

Eliminators are provided to prevent interference with radio reception.

Frequency Converters

The 47A Frequency Converter operates from 110 volts 60 cycles lighting current and delivers 20 cycle ringing current at 90 and 110 volts. Apparatus is assembled in a black enameled steel case.

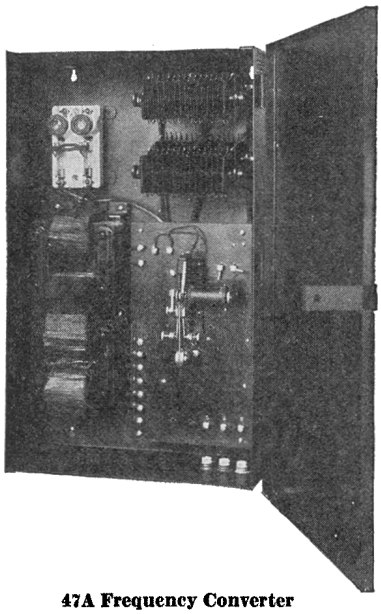
The operation is as follows:

A transformer steps the voltage down to supply current to the dry plate rectifiers which separate the alternating current into two pulsating currents of equal value. These two pulsating currents are interrupted through the contacts of the 20 cycle vibrator and the primary windings of the ringing transformer to produce a 20 cycle current in the transformer secondary which is used for exchange ringing purposes.

A standard entrance switch is used to control the connection to the lighting circuit.

Dry plate rectifiers are used which eliminates the objectionable hum or vibration of the mechanical type rectifier. The converter is noiseless in operation and requires very little attention. Only three current carrying contacts are used and these require little attention.

The equipment is free from radio interference with radio sets in common use at this time.



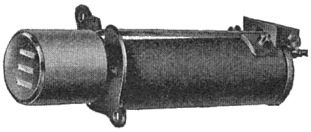
47A Frequency Converter

Interference Eliminator

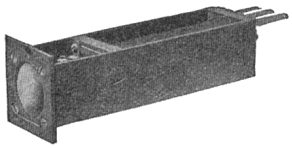
The No. 3A Eliminator is used with combined ringing and charging machines to suppress the frequencies that interfere with radio reception.

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SIGNALS



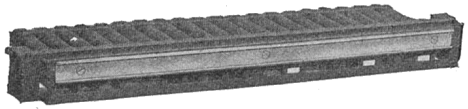
No. 32A



No. 34A shown in the operated position



No. 4E, No. 2 Mounting



No. 42A Signal on No. 79 Mounting

NO. 4 TYPE

The No. 4 Type Signal has two coils. When operated, an aluminum signal is lifted into a visible position, it being covered by the mounting when unoperated. The aluminum signal target is supplied numbered in black as per order but will be supplied unnumbered unless otherwise specified. The No. 4A and No. 4E have a local contact which is closed when the signal is operated. The No. 4J is not provided with a local contact; the armature of the No. 4J is provided with a counterweight to balance the target.

This type is used principally as a line signal in private branch exchanges employing magnetic signals and operating on a central battery basis. Mounts on 1⅜ inch centers.

Code No.	Resistance (Ohms)	Used with Signal Mounting
4A	98	Nos. 2, 3, 94A, 95A
4E	500	
4J	400	

NO. 32 TYPE

The face of the No. 32 Type Signal is entirely black in the unoperated positions. When operated, a target is lifted into position so as to register white in the slots in the signal face, thus giving visible indication of operation. These signals have no local contacts. Mounts on 1 1/16 inch centers.

The Nos. 32B and 32C have a single winding; the No. 32A has two windings, one inner inductive winding of 50 ohms and an outer non-inductive winding of 100 ohms. The resistance value given in the table below is for both windings in parallel.

Code No.	Resistance (Ohms)
32A	33
32B	50
32C	525

NO. 34 TYPE

The No. 34 Type Signal has one coil with a single winding. When operated, an aluminum target is displayed as shown in the illustration. In the unoperated position, the opening in the signal face is not filled by the target. The signals will be furnished unnumbered unless otherwise specified, but, if so ordered, they will be supplied with black numbers on the aluminum target. When so desired, No. 129 Type Number Plates may be used with these signals and the number on the target omitted.

Each No. 34 Type Signal has a single local contact which is closed in the operated position.

These signals are used as line signals in the No. 9 Switchboard and in the trunk circuits of the old No. 105 Magneto Switchboard. They will mount on 1⅛ inch horizontal and 1⅜ inch vertical centers.

Code No.	Resistance (Ohms)	Used with Signal Mounting
34A	86	Nos. 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 5/16 inch horizontal and 1⅜ 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 Switchboards.

Code No.	Resistance (Ohms)	Used with Signal Mounting
41A	30 (each)	No. 60
41B	100 (each)	

NO. 42A TYPE

The No. 42 Type Signal has one coil with a single winding. There are no local contacts. The illustration shows all but three of the signals in the No. 79 Mounting in their unoperated position. The aluminum target is lifted into place when the signal is operated as shown in the cut. A designation strip on the mounting is used for numbering the signals.

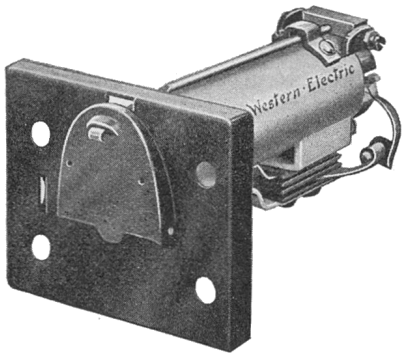
The mounting centers are: horizontal, 7/16 inch; vertical, ⅞ inch.

The No. 42 Type is used as a busy signal with multiple toll line jacks; they mount in the same centers as the jacks.

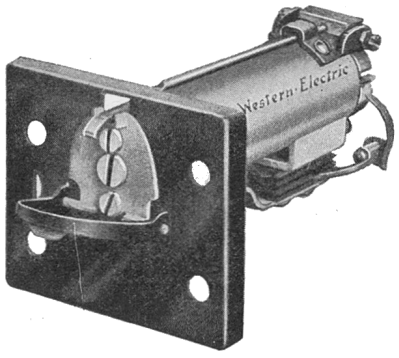
Code No.	Resistance (Ohms)	Used with Signal Mounting
42A	100	Nos. 75, 77, 78, 79, 82, 83, 105

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SUPERVISORY SIGNALS AND SIGNAL MOUNTINGS



No. 34C Supervisory Signal Shutter Restored (on No. 93A Mounting)



No. 34C Supervisory Signal Shutter Operated

Supervisory Signals

Code No.	Approximate Resistance Ohms	Description	Mountings No.
34C	330	A manually restored, electrically operated shutter type magneto supervisory signal, to be used in connection with No. 22 Type Combined Jack and Signal or as a line signal.	90A, B, C, 93A, 99A

Note. For replacement parts, refer to No. 22 Type "Combined Jack and Signal" shown elsewhere.

Signal Mountings

The following mountings are those commonly used with the various classes of signals as listed. They are metal mountings with black finish faces.

Code No.	For Signals	No. of Signals per Strip	Size of Plate, Inches
2	4 type	10	15 x 9/16
61	34 type	20	24 9/16 x 1 3/8
95A	(Mounts 3 No. 56 Drops and 7 No. 4 Type Signals)		13 3/16 x 1 3/8
97	34 type	15	21 3/4 x 1 3/8
	FOR COMBINED JACKS AND SIGNALS		
80B	2, 3, 6, 7, 8, 9, 12	1	1 1/8 x 2 1/4
80C	4, 5, 11	1	1 1/8 x 2 1/4
80E	9D	1	1 1/8 x 2 1/4
81E	2, 3, 6, 7, 8, 9, 12	5	6 23/32 x 1 3/4
88B	2, 3, 6, 7, 8, 9, 12	10	11 31/32 x 1 7/8
89B	22, 23, 26, 27	5	6 23/32 x 1 3/4
92B	22, 23, 26, 27	1	1 1/8 x 2 1/4
92C	24, 31	1	1 1/8 x 2 1/4
	FOR SUPERVISORY SIGNALS		
80D	10, 13	1	1 1/8 x 2 1/4
90C	34C	5	6 23/32 x 1 3/4
99A	34C	10	11 7/32 x 1 1/4

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SIGNAL PLUGS AND SWITCHBOARD WIRE

Signal Plugs



Nos. 1, 2, 3 and 4 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.



Nos. 5 and 6 Type Signal Plug

Code No.	Color of Head	Dimensions, Inches: Diameter of Head	Dimensions, Inches: Overall Length
FOR NO. 49 AND NO. 193 JACKS			
1A	White	27/64	35/64
2B	Red	23/64	
2D	Black	23/64	
2E	Yellow	23/64	
2H	Light Green	23/64	
FOR NO. 92 JACKS			
3A	White	23/64	33/64
4B	Red	5/16	
4D	Black	5/16	
4E	Yellow	5/16	
4H	Light Green	5/16	

The Nos. 5 and 6 Type Signal Plugs are used as line markers for indicating lines in trouble, spare jacks, etc. The metal shank is slotted in two directions and the head has a white celluloid face which may be written upon. The sides of the plug head are colored as indicated in the table.

The No. 7A Signal Plug has black finish face and is engraved with one or two letters, 5/32 in. high, or three letters, 1/8 in. high as per order. Engraving is filled white.

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	1/2	13/32	11/32
5B	White	White	1/2	13/32	11/32
5C	White	Blue	1/2	13/32	11/32
7A	Black	.....	..	21/32	11/32
FOR NO. 92 JACKS					
6A	White	Red	1/2	13/32	11/32
6B	White	White	1/2	13/32	11/32
6C	White	Blue	1/2	13/32	11/32

Switchboard Wire

DOUBLE SILK AND SINGLE COTTON, IMPREGNATED

Single conductors are furnished in 14, 16, 18, 19, 22, and 24 B. & S. Gauge sizes.

Twisted pairs are furnished in 16, 18, 19, 22, and 24 B. & S. Gauge sizes.

Triple conductors are furnished in 19, 22, and 24 B. & S. Gauge sizes.

Quadruple conductors are furnished in 18, 22, and 24 B. & S. Gauge sizes.

BRAIDED BLACK ENAMELED

Furnished in 16 and 20 B. & S. Gauge sizes, single, paired, triple and quadruple.

Cross-Connecting or Distributing Frame Wire

JUMPER WIRE

This wire, usually known as jumper wire, is made in single, twisted pair, triple and quadruple conductors.

This cross-connecting wire is made in No. 20 and No. 22 B. & S. Gauge tinned enameled, silk covered, moisture-proofed copper wire having a flame-proof cotton braid.

Furnished in 200 ft. to 1000 ft. coils for single conductors and in 200 ft. to 1500 ft. coils for pairs, triples and quads.

Code No.	Size (B. & S. Gauge)	Number of Conductors	Color
E-20S	20	1	Brown
E-20P	20	*2	Brown, Black
E-20T	20	*3	Brown, Black, Red
E-20F	20	*4	Brown, Black, Red, Green
E-22S	22	1	White
E-22P	22	*2	White, Black
E-22T	22	*3	White, Black, Red
E-22F	22	*4	White, Black, Red, Green

* Conductors are twisted together.

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SWITCHBOARDS

Telephone Switchboards and Systems

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

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

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

AUDIBLE CODE SIGNALING

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

CENTRAL OFFICE SELECTIVE SIGNALING

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

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

COMBINED JACK AND SIGNAL

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

CORD CIRCUIT, COMBINATION

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

CORD CIRCUIT, UNIVERSAL

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

CORD CIRCUIT, JACK LISTENING TYPE

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

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SWITCHBOARDS

Telephone Switchboards and Systems

(Continued)

CORD CIRCUIT, KEY LISTENING TYPE

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

CORD CIRCUIT, NON-HANG-UP TYPE

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

CORD CIRCUIT, NON-RING-THROUGH TYPE

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

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

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

LINES WITH LINE RELAYS

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

REPEATING COILS IN MAGNETO SWITCHBOARDS

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

RINGERS USED AS SWITCHBOARD LINE SIGNALS

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

RINGER INDICATORS

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

RINGING, ONE WAY

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

RINGING, TWO WAY

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

RINGING KEYS, INDIVIDUAL, FOR PARTY LINES

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

RINGING KEYS, MASTER, FOR PARTY LINES

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

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SWITCHBOARDS

Telephone Switchboards and Systems

(Continued)

RINGING COMBINATIONS

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

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

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

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

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

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

Four-party, 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.

SUPERVISION, DOUBLE

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

THROUGH TOLL LINES

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

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

TRANSFER CIRCUITS

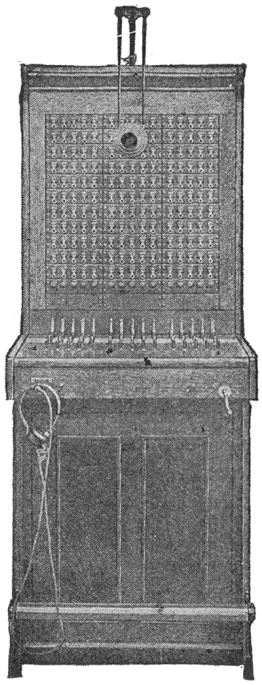
These are used where a switchboard consists of two or more positions and a number of the subscriber line jacks are out of the reach of any one operator. The transfer circuits provide a means of extending the cord circuits to the positions in which the jacks appear.

TRUNK, RECORDING TOLL

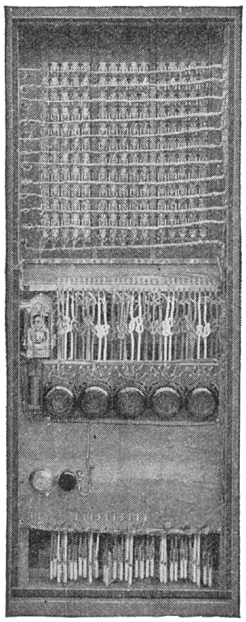
This is a trunk circuit between the local switchboard and the toll switchboard that makes it possible for subscribers desiring toll connections to get in direct communication with the recording toll operator. When it is known that it will take some time to complete the toll call, the operator tells the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

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SWITCHBOARDS—MAGNETO NON-MULTIPLE



Front View



Rear View

No. 1240D Switchboard

CAPACITY 165 LINES 15 CORD CIRCUITS

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

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

The operation of the No. 1240D 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.

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SWITCHBOARDS—MAGNETIC NON-MULTIPLE

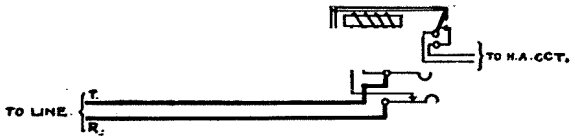
No. 1240D Switchboard—Continued

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

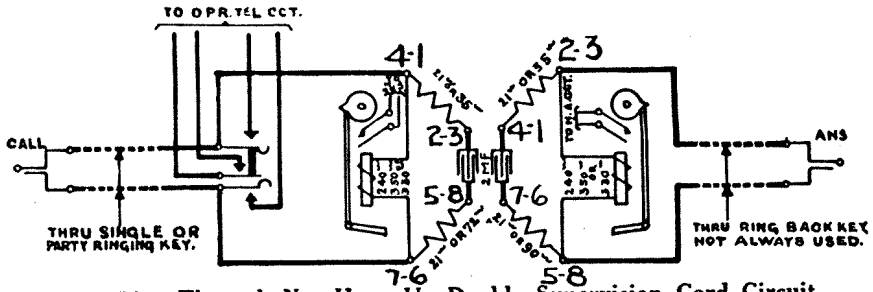
An apparatus and terminal board is mounted in the rear of the switchboard on which are mounted the repeating coils, night alarm bell, and large screw terminals where all power wiring such as power ringing, transmitter battery, night alarm battery, monitor tops, etc., are terminated.

THE LINE CIRCUITS

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



Line Circuit No. 1240-D Switchboard



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

THE CORD CIRCUITS

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

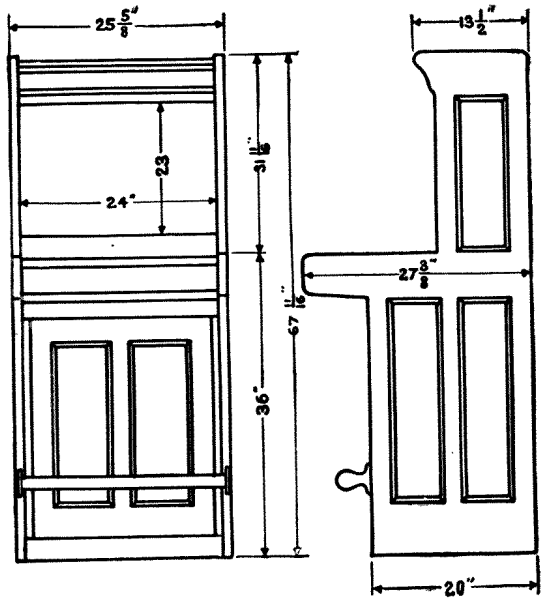
Single supervision, without repeating coil.
Single supervision, with repeating coil and cutout key (cords No. 1 to 5).
Double supervision, "non-ring through," "non-hang-up" with repeating coil.
Double supervision, practically "non-ring through," "non-hang-up" without repeating coil.

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

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

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SWITCHBOARDS—MAGNETO NON-MULTIPLE



Dimensions No. 1240-D Switchboard

No. 1240D Switchboard—Continued

OTHER CIRCUITS

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

Single party, two way
Two party, one way selective, individual key
Two party, two way, master key
Four party, one way, pulsating, individual key
Four party, two way, pulsating master key
Four party, one way, harmonic, individual key
Four party, two way, harmonic, master 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 operator's 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

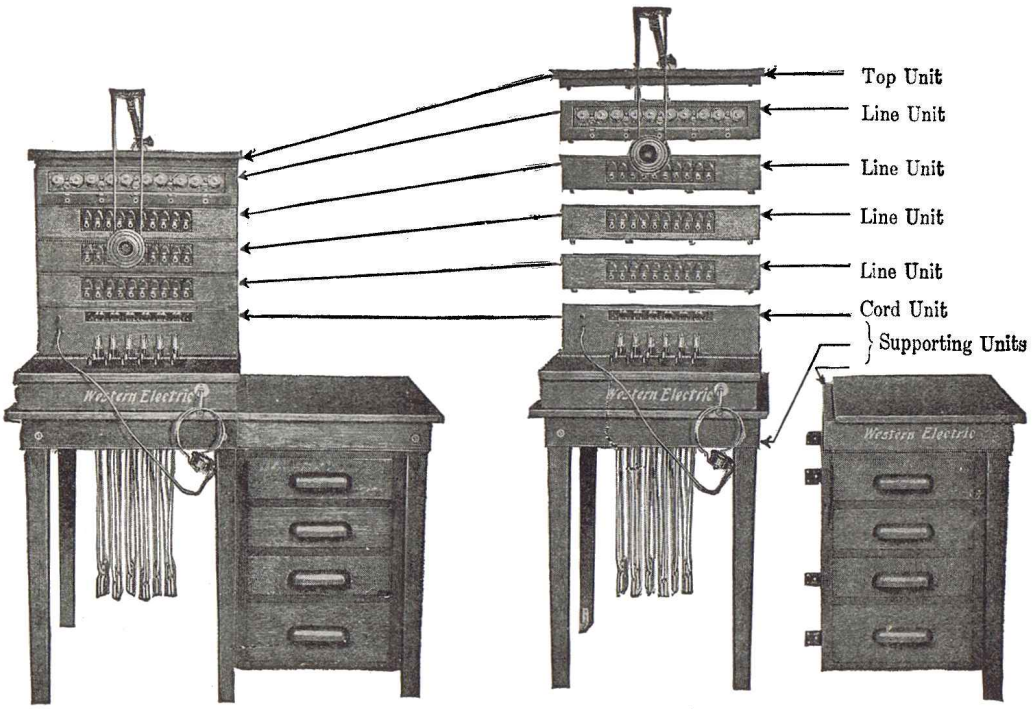
Battery current for the operator's telephone circuit is supplied from three dry cells or five Edison primary batteries and for the night alarm circuit from five dry cells or eight Edison primary batteries.

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.

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SWITCHBOARDS—MAGNETO NON-MULTIPLE



Method of assembling No. 1800 Switchboard to 35 line capacity

No. 1800 Sectional Unit Type Switchboard

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

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

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

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

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

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

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

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

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SWITCHBOARDS—MAGNETO NON-MULTIPLE



No. D-3 Supporting Unit



No. D-4 Supporting Unit

No. 1800 Sectional Unit Type Switchboard

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 (Nos. 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 insure 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.

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.

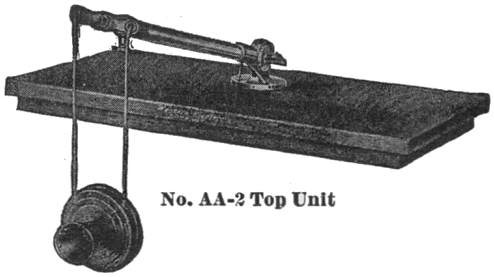
Code No. of Unit	Code No. of Ringer	Resistance of Ringer in Ohms	Code No. of Jacks
BA-7	40BG	2500	168
BB-7	40FG	1600	168
BC-7	40AG	1000	168

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
BA-12	22C	330
BA-13	26C	330

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SWITCHBOARDS—MAGNETO NON-MULTIPLE



No. AA-2 Top Unit



No. AA-1 Top Unit

No. 1800 Sectional Unit Type—Continued

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

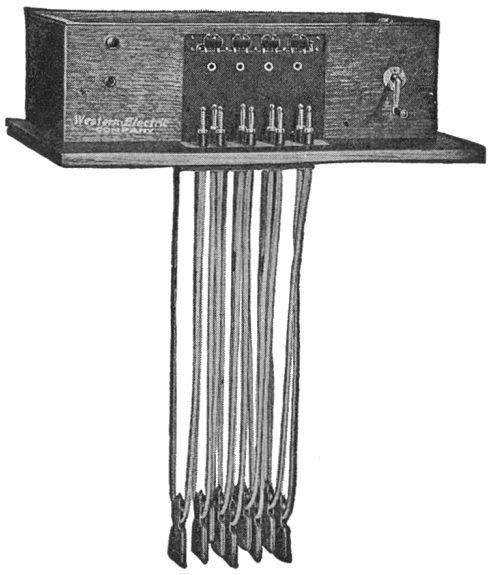
The No. AA-1 Unit is merely a "cover" for the line units and is intended for use when the cord circuits are arranged for a handset or desk set.

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. 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 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.

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SWITCHBOARDS—MAGNETO NON-MULTIPLE

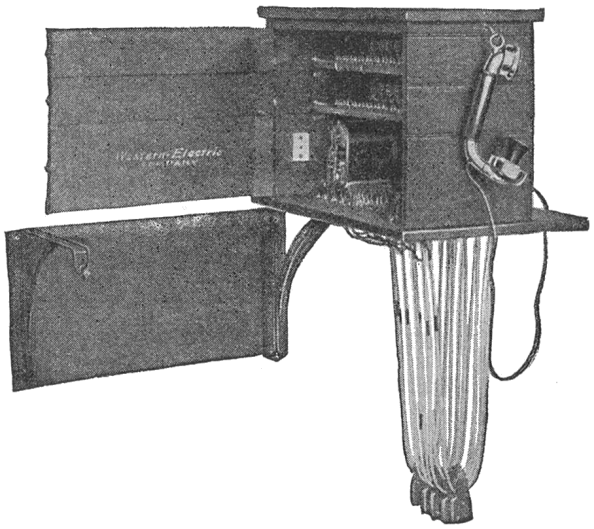
No. 1800 Sectional Unit Type—Continued

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 operator's 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 handset 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.

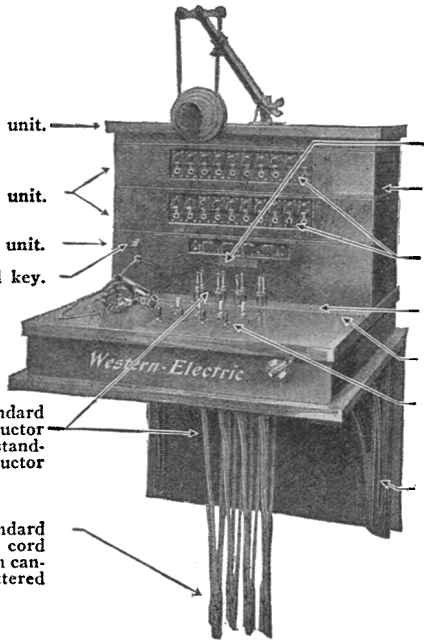
The No. CB-6 Unit is the same as the No. CA-6 except the telephone circuit is arranged for use with hand set or desk telephone.

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.

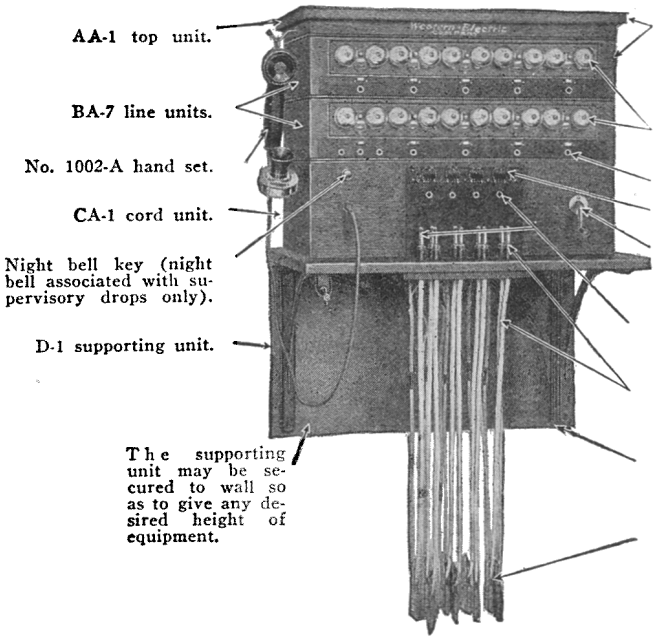
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SWITCHBOARDS—MAGNETO NON-MULTIPLE

No. 1800 Sectional Unit Type—Continued



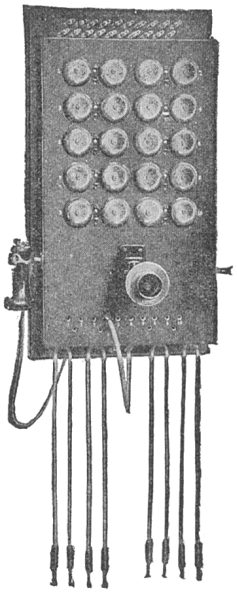
No. 1800 Sectional Switchboard



No. 1800 Sectional Switchboard

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SWITCHBOARDS—MAGNETO WALL



No. 1012 Switchboard

No. 1012 "Ringer Type"

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

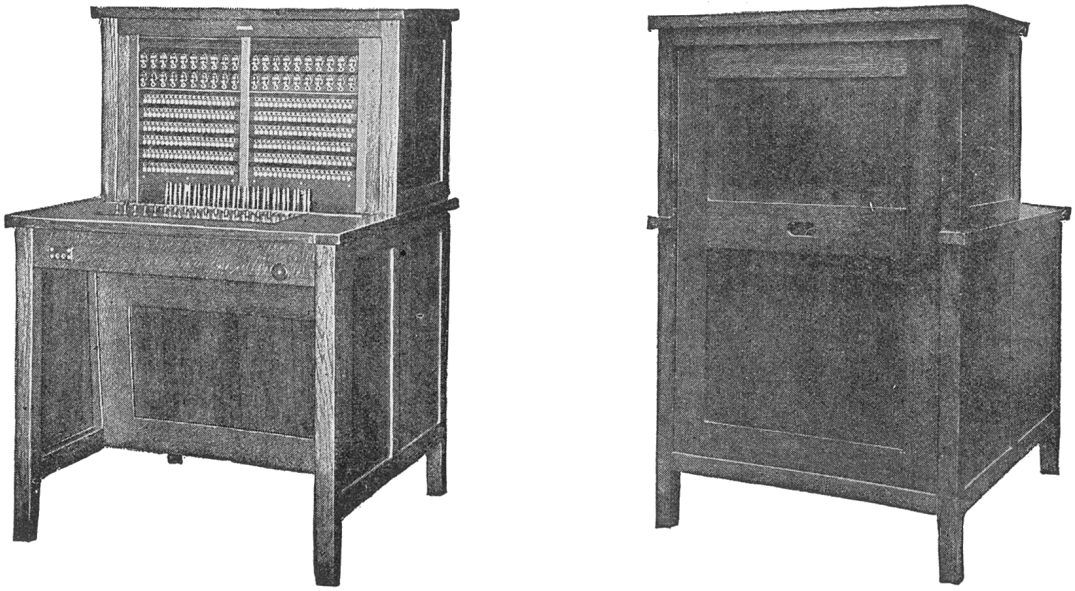
The cabinet is well constructed of thoroughly seasoned, quarter sawed oak, which is given a durable light finish. The front is hinged and the apparatus and wiring is within easy reach for inspection or maintenance.

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

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

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SWITCHBOARDS—CENTRAL OFFICE



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

No. 1948 "Sanitary Type"

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

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

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

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SWITCHBOARDS—CENTRAL OFFICE

No. 1948 Sanitary Type—Continued

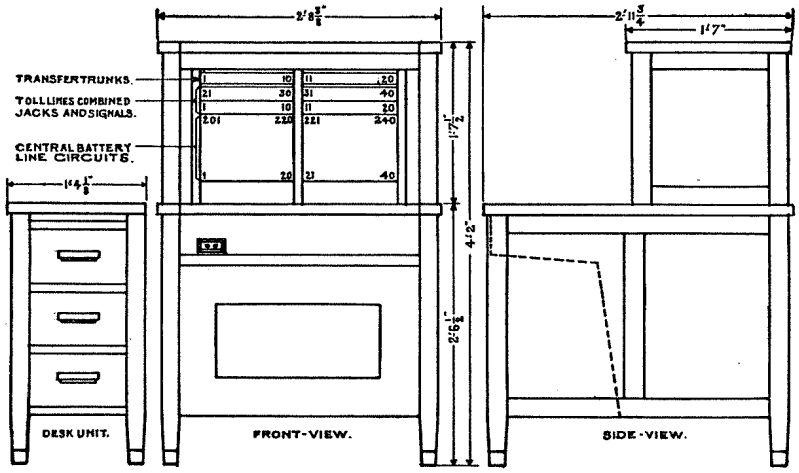
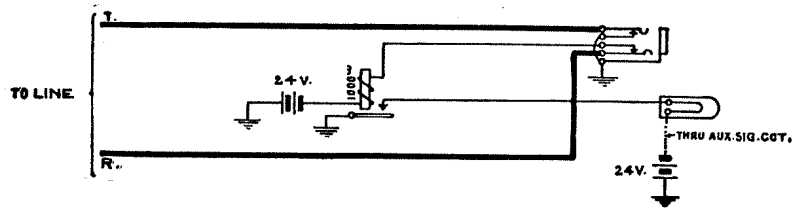


DIAGRAM SHOWING DIMENSIONS OF NO. 1948 SWITCHBOARD.

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



LINE CIRCUIT 1948 SWITCHBOARD.

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

(a) Subscribers central battery cord circuits.

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

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

Single party, two-way.

Two party, two-way, master key.

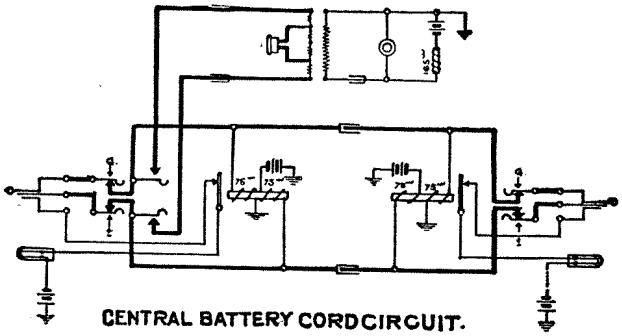
Four party, two-way, master key (pulsating).

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

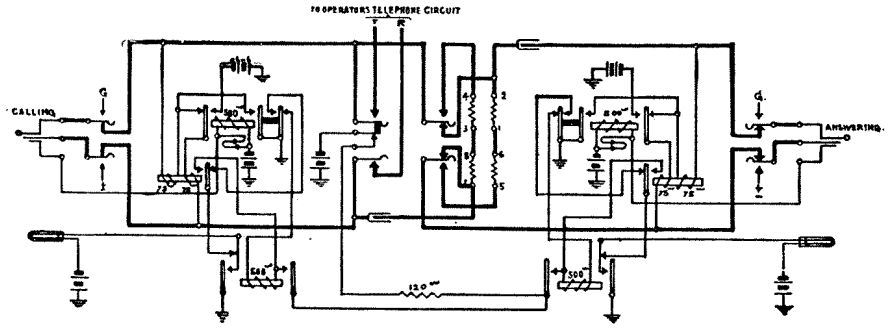
Eight party, two-way, master key (harmonic).

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SWITCHBOARDS—CENTRAL OFFICE
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 regard to its reliability. In ordinary cases provide not less than 36 hours reserve and up to 72 hours in cases of questionable power.

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

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

5000
1000

15.000 current in ampere hours for calls in 24 hours.

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

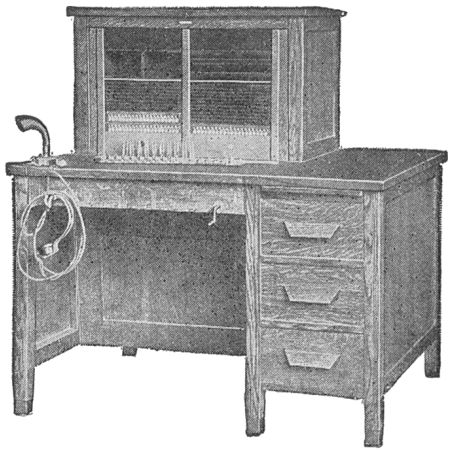
Thus 15.000 current in ampere hours for calls in 24 hours divided by 8-hour capacity
Equals 1.875 ampere = ampere rating for battery 24 hours
Plus .1875 10% safety factor
Equals 2.0625 battery rating (basis 8-hour discharge rate)
2

4.1250 Ampere rating for battery 48-hour supply (nearest battery E. S. B. Co.'s Type ET couple, 4½ amp.).

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

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SWITCHBOARDS—PRIVATE BRANCH EXCHANGE



Front View No. 1962 Board—Showing Desk Unit

No. 1962 "Sanitary Type"

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

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

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

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

Capacity

Central Battery Local Lines	200
Trunk Lines	8
Cord Circuits	12

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

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

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

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

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SWITCHBOARDS—PRIVATE BRANCH EXCHANGE

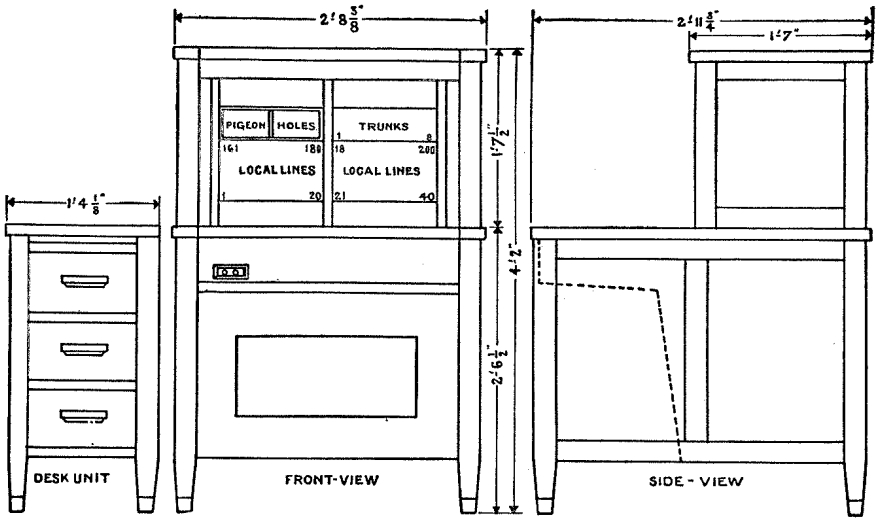
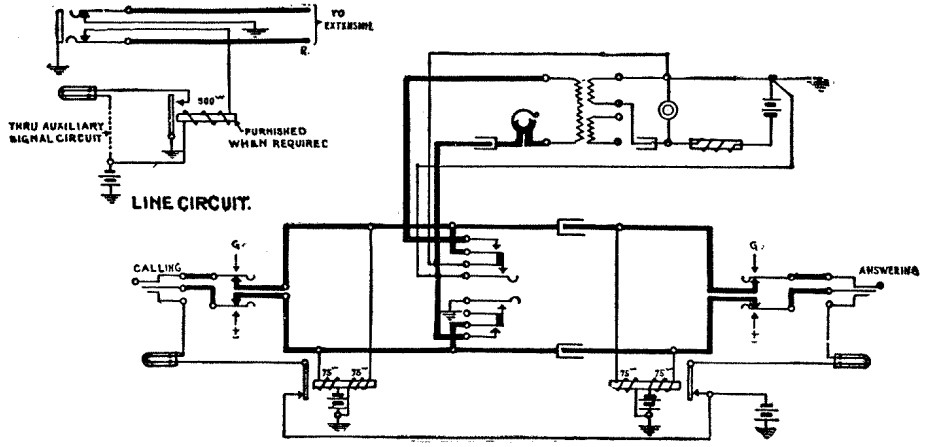


Diagram Showing Dimensions of No. 1962 Switchboard

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.



Cord Circuit

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

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

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

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

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SWITCHBOARDS—PRIVATE BRANCH EXCHANGE

No. 1962 "Sanitary Type"—Continued

The Trunk Circuits. The trunk circuits are universally wired and can be equipped to meet the most exacting service requirements. Plug or jack ended trunks can be selected from the following data to meet any local condition which may arise. The advantage, to the telephone company or the individual owner, of universally wired trunk circuits can be readily recognized if the possibility of a change in type of equipment for the main central office is taken into consideration.

In cases where the telephone company's present equipment is of the magneto type and a cut-over to central battery equipment, which is right in line with the trend of modern telephony, is contemplated, it is a distinct advantage to have the trunks arranged so that the conversion to central battery trunks involves very little labor.

With the individual owner, who is not informed regarding the plans of the telephone company with whose switchboard a connection is desired, the advantages of universally wired trunks are manifold, in that facilities are provided to take care of any future change.

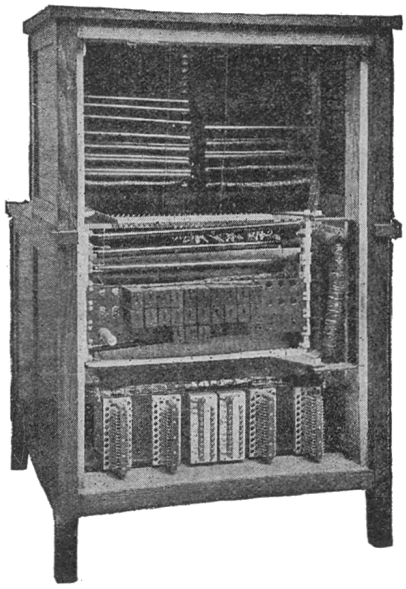
Type of trunk circuits for which the No. 1962 Board is wired:

Plug Ended Trunks

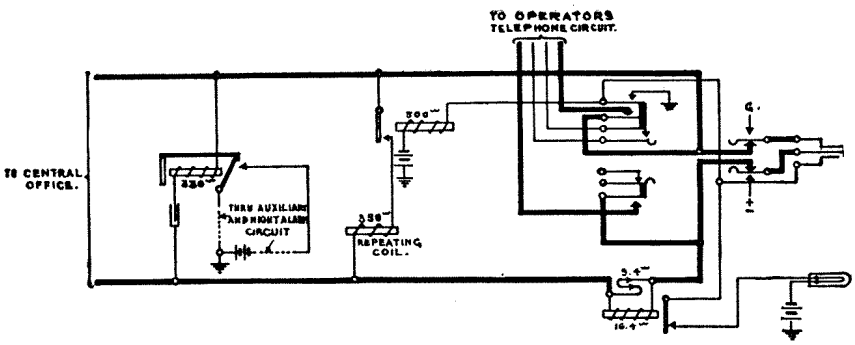
To central battery office
To central battery office with night service
To central battery office arranged to trip machine ringing
To central battery office arranged to trip machine ringing and with night service
To magneto office
To magneto office with night service
With flash recall to central battery office
With flash recall to central battery office and night service
With flash recall to central battery office arranged to trip machine ringing
With flash recall to central battery office arranged to trip machine ringing and with night service
With flash recall to magneto office
With flash recall to magneto office with night service.

Jack Ended Trunks

To central battery office
To central battery office with night jacks
To magneto office
To magneto office with night jacks
To automatic office
To automatic office with night jacks.



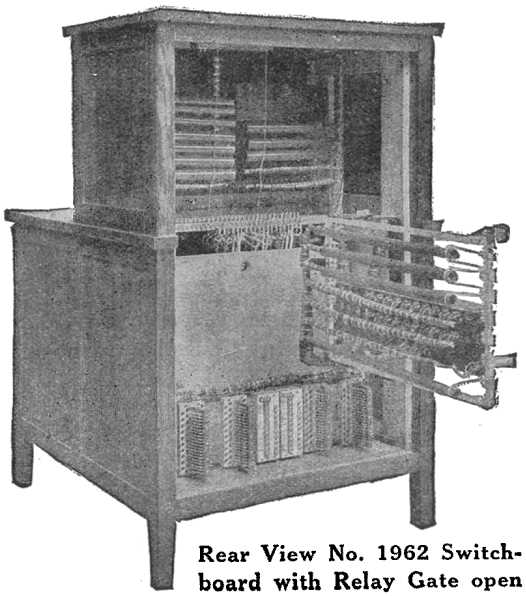
Rear View No. 1962 Switchboard



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SWITCHBOARDS—PRIVATE BRANCH EXCHANGE

No. 1962 "Sanitary Type"—Continued



Rear View No. 1962 Switchboard with Relay Gate open

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

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

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

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

1000	Total trunk and local connections per 24 hour day
.015	Current in ampere hours per call (based on call of ordinary duration)
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 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
Equals	2.0625	Battery rating (basis 8-hour discharge rate)
	2	
	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.

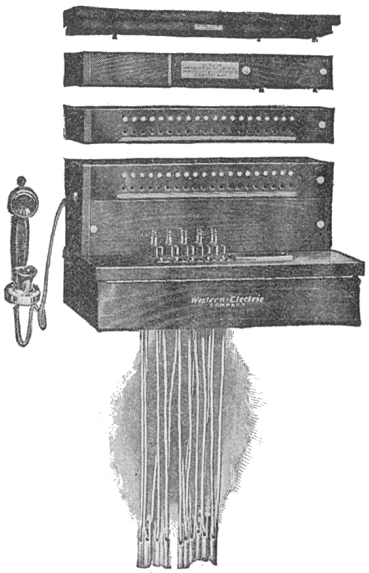
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SWITCHBOARDS—PRIVATE EXCHANGE

No. 1801 Sectional Unit Type

The No. 1801 Sectional Unit Type Switchboard (like the No. 1800) was originated by the Western Electric Company, and introduced to the telephone trade to supply the demand for a small flexible and economical switchboard. Adaptable to many conditions, this switchboard has been installed by small telephone companies, as private branch exchanges, for hotels, factories, public schools and institutions or any place where telephone service was required and the ultimate capacity could not be definitely determined.

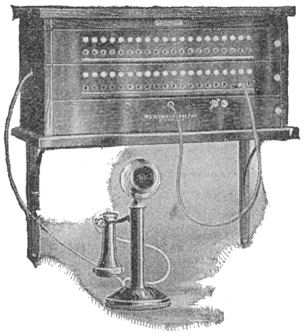
Being of the unit type, with construction somewhat similar to the sectional book case, and so arranged that additional units may be readily added when required, this switchboard is adaptable to many line and traffic conditions, which are met on the small exchange. The rear of the units is permanently closed. The front panels of all units are held in place with thumb screw locks and are hinged to permit access to the wiring, terminals and apparatus. All connections are made under screw terminals.



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.



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

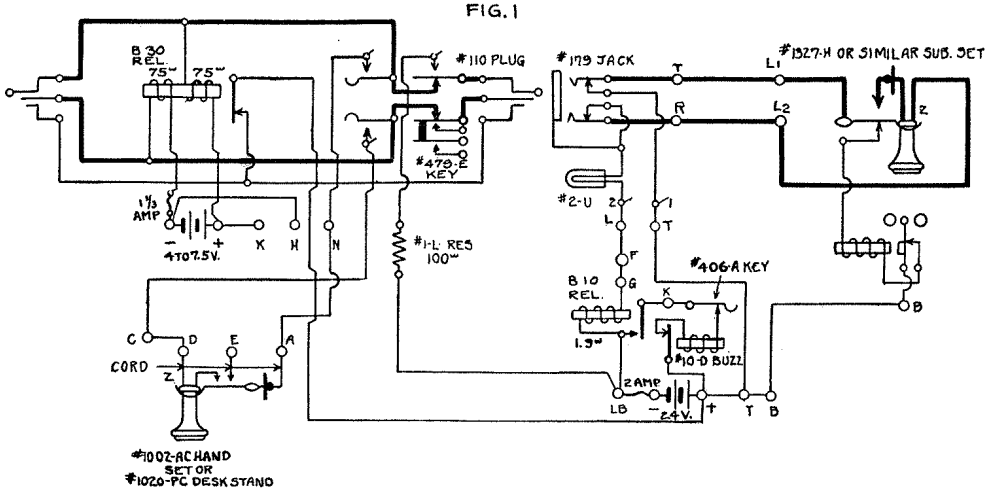
SYSTEM "A"

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.

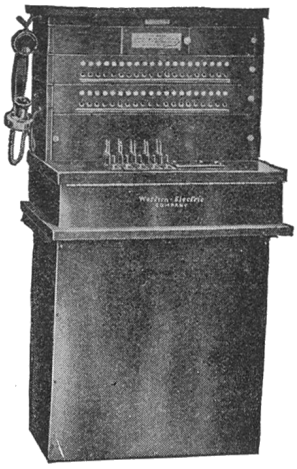
This is a three-wire system, a third wire common to all sets being required in addition to the two wires individual to each station. When a station is being rung, ringing current passes out over the tip side of the line through the bell in the telephone and back over the third wire.

FIG. 1



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SWITCHBOARDS—PRIVATE EXCHANGE



No. 1801 Switchboard System "B"

Consisting of:

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

No. 1801 Sectional Unit Type Continued

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

The telephone 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.

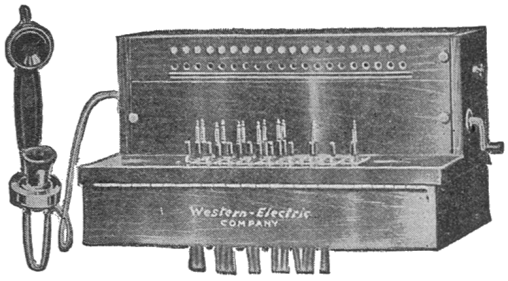
Simultaneous ringing and talking feature can be furnished with this system.

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.

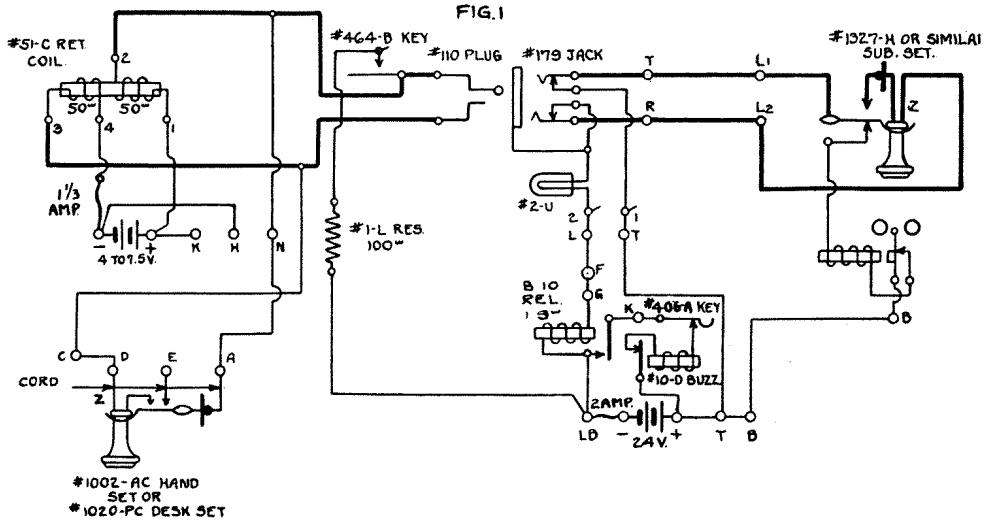
These trunk circuits are provided with holding, ringing, and listening keys and the operators' telephone circuit is equipped with an induction coil to insure good transmission on trunk connections. The stations are rung, and supervision obtained in the same manner as in System "B."

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

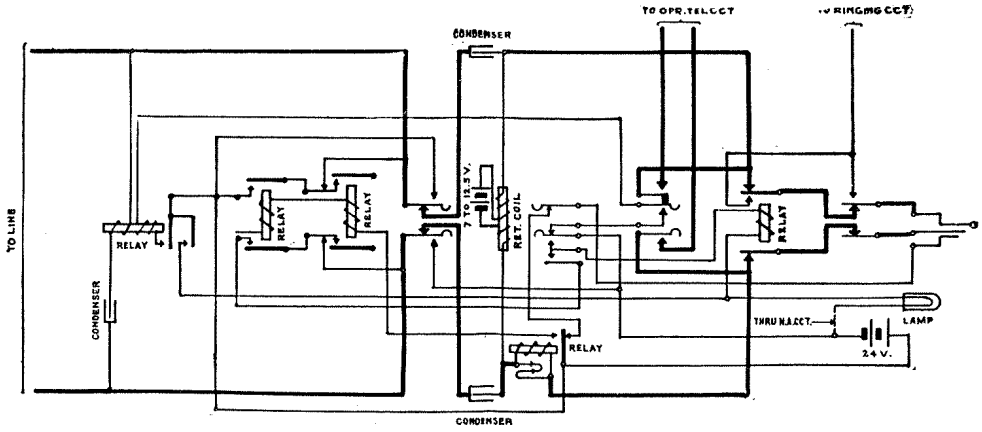
FIG. 1



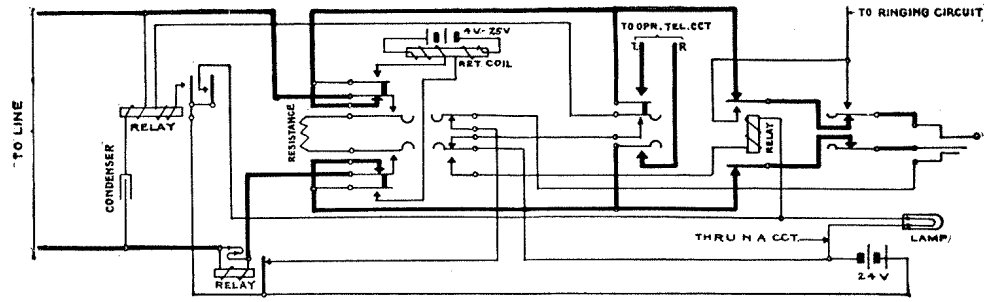
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SWITCHBOARDS—PRIVATE EXCHANGE

No. 1801 Sectional Unit Type—Continued



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



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

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

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

A night key is provided to prevent battery from flowing when the trunk is set up for night or through 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 through or night connection the action of removing the receiver from the hook will kick down the drop at the central office.

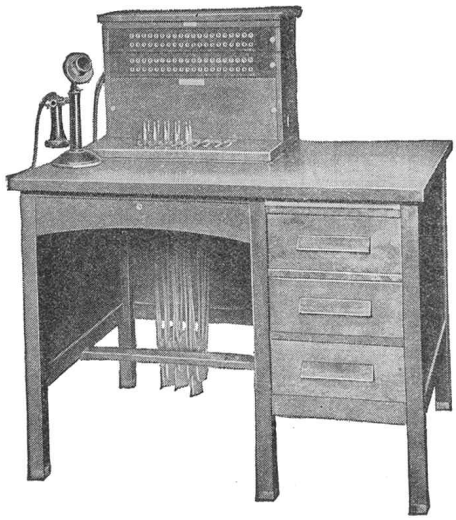
The telephone sets used with this system are similar to those used with systems "A" and "B" except that they are also equipped with an induction coil.

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

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SWITCHBOARDS—PRIVATE EXCHANGE

No. 1801 Sectional Unit Type—Continued



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

SYSTEM "D"

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 interrupter 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)

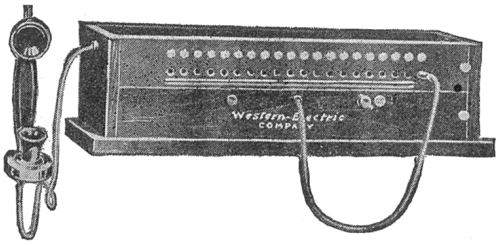
Line Units. The line units are all wired for twenty lines, the only difference being in the number that are equipped. All unequipped jack and lamp positions are plugged with apparatus blanks. The jacks and lamp sockets are singly mounted and are easily installed when a few lines are to be added. The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

Code No.

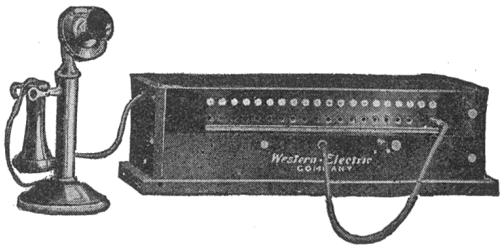
HA-1 wired for 20 lamp signal line circuits, with equipment for 5
HB-1 wired for 20 lamp signal line circuits, with equipment for 10
HC-1 wired for 20 lamp signal line circuits, with equipment for 15
HD-1 wired and equipped for 20 lamp signal line circuits.

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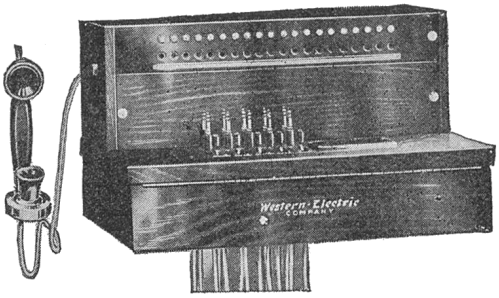
SWITCHBOARDS—PRIVATE EXCHANGE
No. 1801 Sectional Unit Type—Continued



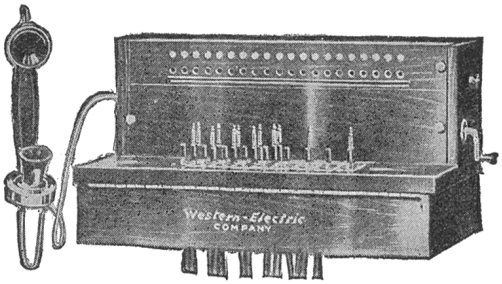
JC-1 Cord Unit



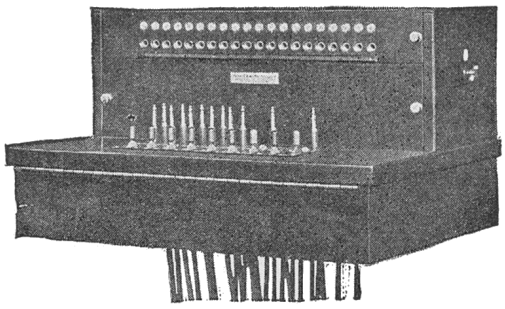
JD-1 Cord Unit



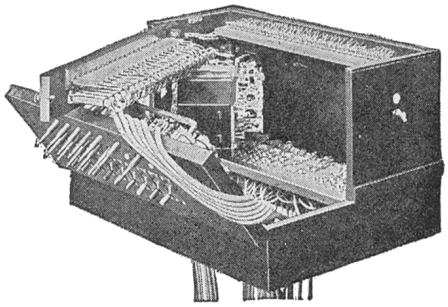
JC-2 Cord Unit



JC-4 Cord Unit



JD-3 Cord Unit



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 Cets. with 1 Way Ring and List Keys	Operator's Set Type	Central Battery Lines	Plug Ended Trks. to C.B. Exchange	Plug Ended Trks. to Mag. Exchange
JC-1	A	1	...	Hand Set	20	...	...
JD-1	A	1	...	Desk Stand	20	...	...
JC-2	B	...	5	Hand Set	20	...	...
JD-2	B	...	5	Desk Stand	20	...	...
JC-3	C	...	5	Hand Set	20	2	...
JD-3	C	...	5	Desk Stand	20	2	...
JC-4	D	...	5	Hand Set	20	2	...
JD-4	D	...	5	Desk Stand	20	2	...
JC-5	C	...	5	Hand Set	20	...	2
JD-5	C	...	5	Desk Stand	20	...	2
JC-6	D	...	5	Hand Set	20	...	2
JD-6	D	...	5	Desk Stand	20	...	2
JC-7	D	...	5	Hand Set	20	...	...
JD-7	D	...	5	Desk Stand	20	...	...

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SWITCHBOARDS—PRIVATE EXCHANGE

No. 1801 Sectional Unit Type—Continued



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



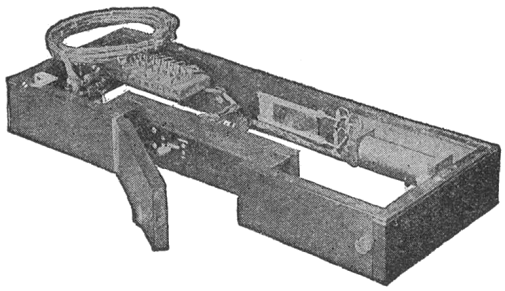
No. HA-7 Simultaneous Ringing And Talking Unit, Closed

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

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

Line Relay Unit. The question of furnishing adequate service, particularly signaling, to stations located a considerable distance (over 800 ft.) from the switchboard frequently arises. The HA-2 Line Relay Unit takes care of this condition. Five relays constitute the equipment in each unit and since the first five line 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 japanned 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 cords are concealed by a wooden panel.

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SWITCHBOARDS—PRIVATE EXCHANGE

No. 1801 Sectional Unit Type—Continued

TABLE OF UNITS AND PARTS

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

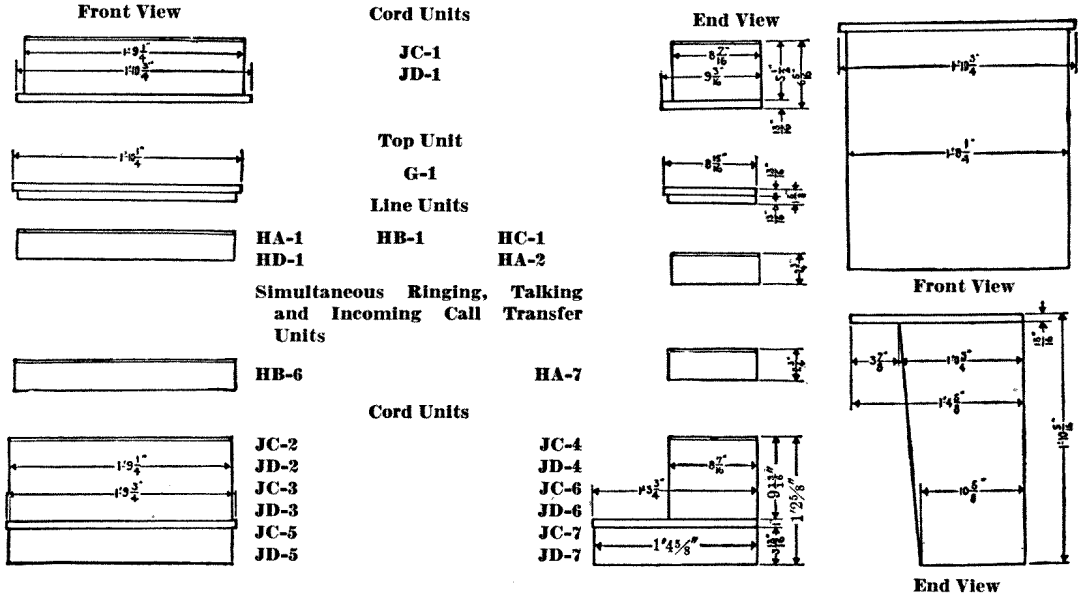
* While the K-1 Unit can be used with systems "B," "C" and "D," it does not conceal the cords and one of the other units is recommended.

† If 60 to 100 lines are equipped, furnish 2 strings connected in parallel, each string consisting of 20 cells in series.

° Line lamp battery only.

‡ 8 cells in series (instead of 6) should be provided if trunks to magneto central office are equipped.

Cord units used with system "D" are equipped with a No. 22 Hand Generator for ringing.

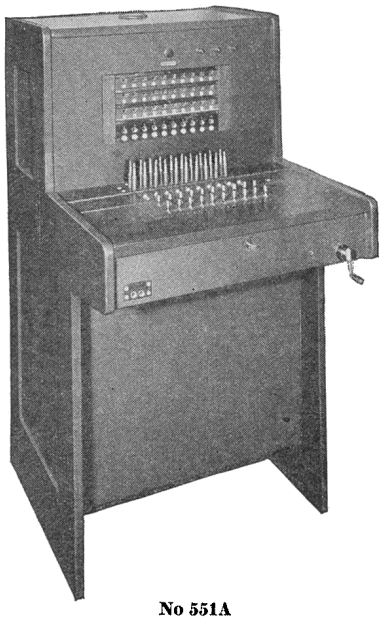


Dimensions No. 1801 Switchboard Units

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SWITCHBOARDS—PRIVATE EXCHANGE

No. 551 Type PBX Switchboard



No 551A

NO. 551A PBX

General

The No. 551A PBX Switchboard is of the single position, non-multiple type and is arranged for operation with either a manual or a dial central office and may be operated on battery obtained over cable pairs from a central office. Ringing current is usually obtained from the central office. This PBX employs circuits identical with those which were used in the No. 550C, 30 line PBX. The framework however is an improved type designed to facilitate the maintenance of the board.

The woodwork is of birch finished in either mahogany or oak. The lumber is kiln dried and thoroughly seasoned to prevent warping and cracking.

Capacity

The capacity of the No. 551A PBX is as follows:

Station Line Circuits	40
Trunk Circuits	10
Cord Circuits	10

Provision is made so that ten of the station line circuits may be equipped with line relays when the conductor resistance of certain of the station lines is high.

Any desired number of station lines, trunks and cord circuits within the capacity of the board can be equipped as specified. Complete switchboards with definite amounts of equipment to meet average conditions are listed below.

	List No. 1	List. No. 2	List No. 3	List No. 4
Station Line Circuits regular			10	20
Station Line Circuits arranged for but not equipped with line relays	10	10	10	10
Trunk Circuits	4	5	6	8
Cord Circuits	5	6	8	10

Although this switchboard is usually furnished as a single unit, two switchboards may be lined up together by placing them end to end without removing the end panels.

Framework

The framework for the switchboard is arranged with a hinged gate upon which all of the relay equipment is mounted. The gate extends only to the height of the cord shelf so that the cords may be tested, and if necessary changed, without opening the gate.

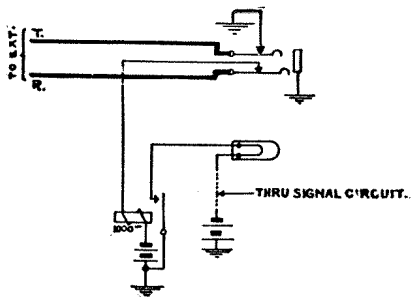
The terminal strips on which the station line and trunk circuits are terminated are so located that they are fully exposed for maintenance purposes when the rear door is removed from the switchboard.

The keyshelf, lockrail and front panel are covered with black phenol fibre. The plug rail is covered with black semi-hard rubber.

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SWITCHBOARDS—PRIVATE EXCHANGE

No. 551 Type PBX Switchboard—(Continued)



Line Circuit of Nos. 551A and B Switchboards

Line Circuits

The station line circuits are terminated on strip mounted jacks. Lamp signals are directly associated with these jacks. Connections are established between these lines or between a line and trunk by means of cords arranged for double supervision on calls between station lines and for through supervision on outgoing and incoming calls completed over central office trunks.

Trunk Circuits

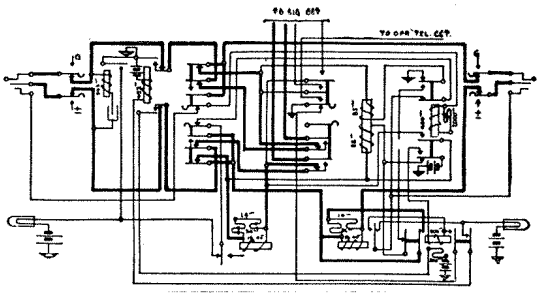
Trunk circuits are terminated on individually mounted jacks. Lamp signals are directly associated with these jacks.

Cord Circuits

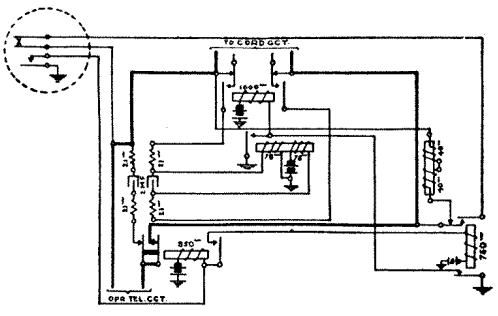
The cord circuits embody all of the features required for the successful operation of the private branch exchange. Each cord circuit is arranged for dialing by the operator from the board and through dialing from any station on the private branch exchange to the machine switching exchange. This through dialing is accomplished by the operator throwing the "Night and Through Dial" key.

Dial Circuit

Provision is made for a dial should there be need for one.

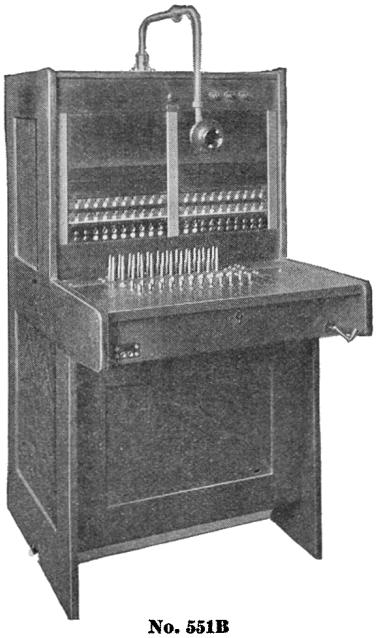


Cord Circuit of Nos. 551A and B Boards



Dialing Circuit of Nos. 551A and B Boards

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No. 551B

SWITCHBOARDS—PRIVATE EXCHANGE

No. 551B PBX

The No. 551B PBX is similar to the No. 551A except in regard to the capacity. The No. 551B has a larger capacity as shown below.

Station Line Circuits	320
Trunk Circuits	15
Cord Circuits	15

Provision is made so that 20 of the station line circuits may be equipped with line relays when the conductor resistance of certain of the station lines is high.

This switchboard has a maximum capacity of 320 lines but may be had with a capacity of 80 lines, the different capacities being arranged for by the use of different local cables.

Should there be a need for a capacity greater than the maximum of one section it is possible to line up two or more sections and bolt them together without removing the sides.

Complete switchboards with definite amounts of equipment to meet average conditions are given in the following table.

List 1—Equipped for 40 lines, 6 trunks and 10 cord circuits

	Wiring	Equip.
Station Line Circuits, regular	60	20
Station Line Circuits equipped with line r		
Trunk Circuits	15	6
Cord Circuits	15	10

List 2—Equipped for 40 lines, 8 trunks and 12 cord circuits

Station Line Circuits, regular	60	20
Station Line Circuits arranged for but not equipped with line relays	20	20
Trunk Circuits	15	8
Cord Circuits	15	12

List 3—Equipped for 40 lines, 10 trunks and 15 cord circuits

Station Line Circuits, regular	60	20
Station Line Circuits arranged for but not equipped with line relays	20	20
Trunk Circuits	15	10
Cord Circuits	15	15

List 4—Equipped for 120 lines, 8 trunks and 10 cord circuits

Station Line Circuits, regular	300	100
Station Line Circuits arranged for but not equipped with line relays	20	20
Trunk Circuits	15	8
Cord Circuits	15	10

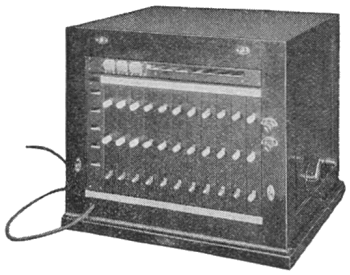
List 5—Equipped for 140 lines, 10 trunks and 15 cord circuits

Station Line Circuits, regular	300	120
Station Line Circuits arranged for but not equipped with line relays	20	20
Trunk Circuits	15	10
Cord Circuits	15	15

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SWITCHBOARDS—PRIVATE EXCHANGE

No. 506 Type Cordless PBX Switchboards



No. 506A

NO. 506A CORDLESS PBX SWITCHBOARD

General

This switchboard is a single position turret of the cordless type, all connections being made by the operation of keys.

The circuits are arranged for local manual service and for operation into either manual or machine switching central offices. The wiring and equipment are the same for all three systems.

Through dialing to a central office from stations may be provided for by equipping the station telephone set with a dial. The through dial connection is established to the central office by operating a station key and a trunk key in the same connecting circuit. When the PBX is unattended a through connection to the central office (either manual or dial) may be left set up for a certain station line.

A desk stand is provided for the use of the attendant and when required, a dial is furnished with the desk stand so that connections may be made to a dial central office.

Ordinarily the ringing supply is obtained from the central office. Where the ringing current is not obtained from this source, a hand generator is used for ringing the stations. It also serves as an emergency ringing supply in case of a central office ringing supply failure.

The talking battery is obtained over cable pairs from the central office for local connections and over the trunk conductors on trunk connections. One cable pair is usually provided in each PBX for battery supply.

Capacity

The switchboard has the following capacity based on one framework.

Positions	1
Trunk Circuits	3
Connecting Circuits	5
Station Line Circuits	7
Attendants Telephone Circuit	1
Ringing and Buzzer Circuits	1

Framework

The framework consists of a wooden base upon which is mounted a wooden key front and all of the relay equipment associated with the switchboard. The key front is mounted in a vertical position near the forward edge of the base and is hinged at the bottom so that it may be dropped down in order to facilitate maintenance. Two triangular shaped gusset plates are mounted on the base and serve as a support for the apparatus mounting plates. A removeable wooden cover which slides on metal runners fastened to the base, is provided to protect the apparatus and wiring and to facilitate maintenance.

Finish

This board may be obtained in oak or in mahogany with a walnut finish.

NO. 506B CORDLESS PBX SWITCHBOARD

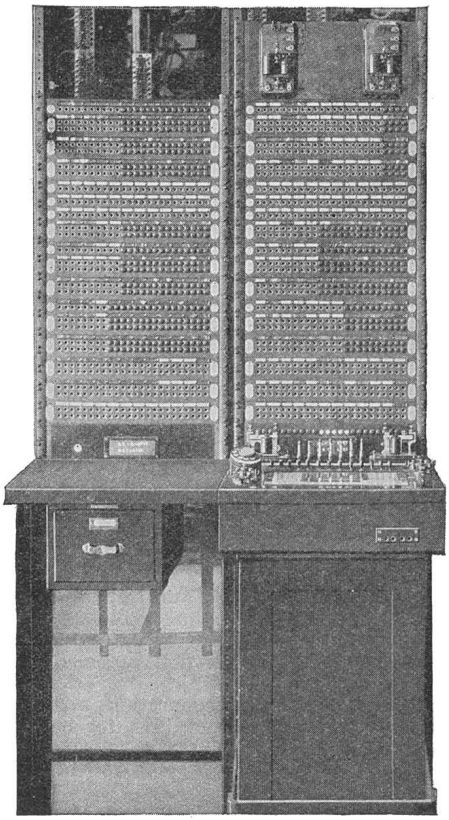
This switchboard is similar to the No. 506A with the exception of greater capacity which is as follows:

Positions	1
Trunk Circuits	5
Connecting Circuits	5
Station Line Circuits	12
Attendants Telephone Circuit	1
Ringing and Buzzer Circuit	1

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SWITCHBOARDS—TOLL TEST

No. 5 Toll Test Board



No. 5 Toll Test Board

The No. 5 Toll Test Board is a board arranged for testing and patching toll lines and associated equipment and for patching and connecting telegraph equipment in a manner similar to that used in No. 4 Toll Test and Morse Boards.

It consists essentially of two parts, a lower and an upper unit. The lower unit consists of a framework upon which is mounted a keyshelf, rear equipment cordshelf, together with associated apparatus and wiring for testing circuits, or where required a blank writing shelf. It mounts on the lower part of the relay rack framework.

The upper unit consists of a framework upon which is mounted the terminal strips for connecting to outside equipment, apparatus mounting board, piling rail, and jack field.

Upper units may be obtained in various combinations according to requirements.

On the lower unit is mounted such testing equipment as is specified, such as Voltmeter Test Unit, Wheatstone Bridge Unit, or Telegraph Test Unit. It is not necessary that each bay be equipped with a lower unit.

Some standard combinations are as follows. Other combinations are available and further information will be furnished on application.

Upper Unit for 4 Jack Cable Circuits

132—4 Jack Cable Circuits
36—Interposition Trunks
72—Miscellaneous Jacks

Upper Unit for 6 Jack Terminating Toll Line Circuits

84—6 Jack Terminating Toll Line Circuits
24—Interposition Trunks
72—Miscellaneous Jacks

Upper Unit for Terminating 4 Wire Toll Line Circuits

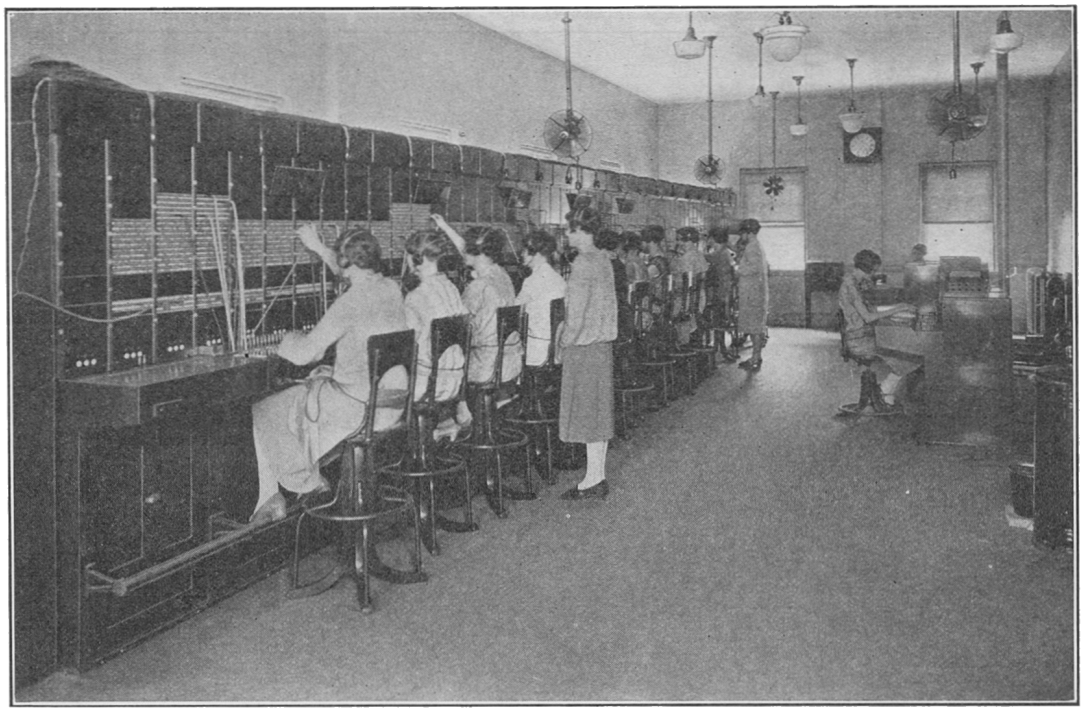
36—Terminating 4 Wire Toll Line Circuits
24—Interposition Trunks
72—Miscellaneous Jacks

Upper Unit for 10 Jack Open Wire Toll Line Circuits
6 Jack Phantom Circuits and 2 Jack Telegraph Lines

24—10 Jack Open Wire Toll Line Circuits
12—6 Jack Phantom Circuits
48—Telegraph Lines
24—Interposition Trunks
48—Miscellaneous Jacks

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SWITCHBOARDS—CENTRAL BATTERY MULTIPLE



No. 11 Multiple Switchboard in Operation

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 10400 lines.

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. The No. 11 Multiple Switchboard was designed with this in mind. The upper and lower units being separate, additions and readjustments may be made to meet changing conditions with a minimum of time and expense. The lower units come from the factory wired and equipped and ready to be added to the original equipment.

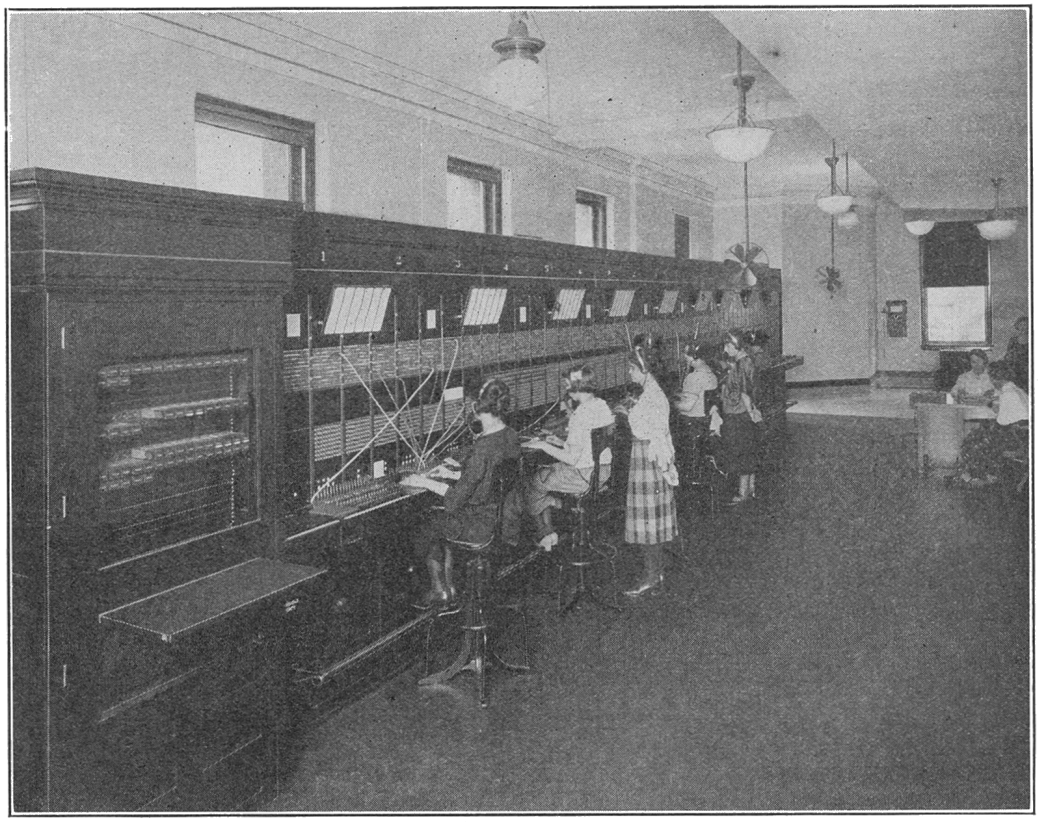
Switchboard Framework

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 birch thoroughly seasoned and kiln dried to prevent warping or cracking is used for the cabinet enclosing the steel framework.

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SWITCHBOARDS—CENTRAL BATTERY MULTIPLE

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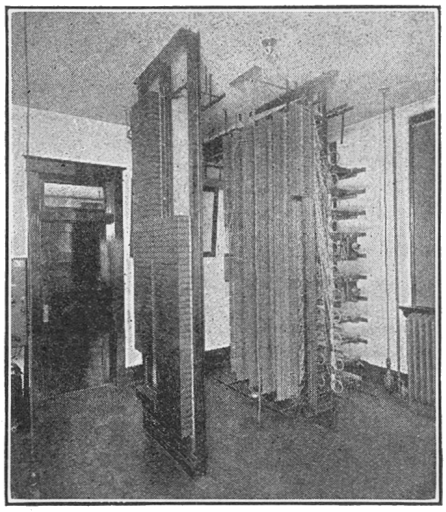


Operating Room Showing Main Switchboard and Chief Operator's Desk

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 section.



Terminal Room

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.

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SWITCHBOARDS—CENTRAL BATTERY MULTIPLE

(Continued)

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 plug shelf and piling rail are covered with durable, non-reflecting phenol fibre.

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 to 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.

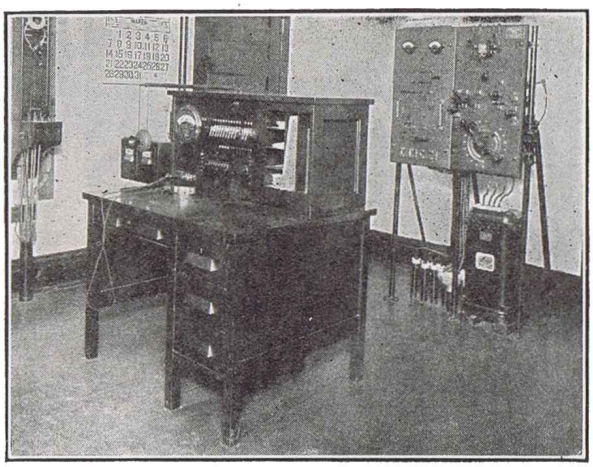
The Western Electric design of main frames takes all these factors into consideration. The framework proper is of steel bars and angles carefully riveted and bolted together and finished with a rust resisting paint. The protectors afford uniform protection to all lines while all terminals of both protectors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

Intermediate distributing frames are not required with the No. 11 Switchboard.

Relay Rack

The relays for the line circuits are mounted on a separate relay rack associated with the main distributing frame.

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.



Wire Chief's Desk, and Power Plant

Power Plant

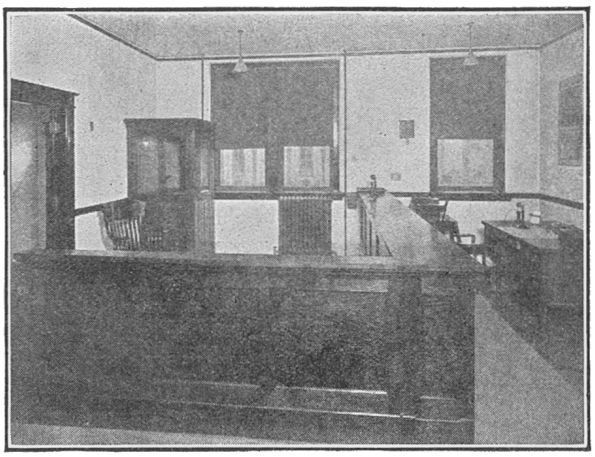
A power plant for a multiple switchboard comprises—motor generator or rectifier charging equipment —power board—storage battery—ringing equipment—conduit and wiring, representing the heart of the entire exchange. Careful attention is given to ample capacity of all units as providing for the ultimate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

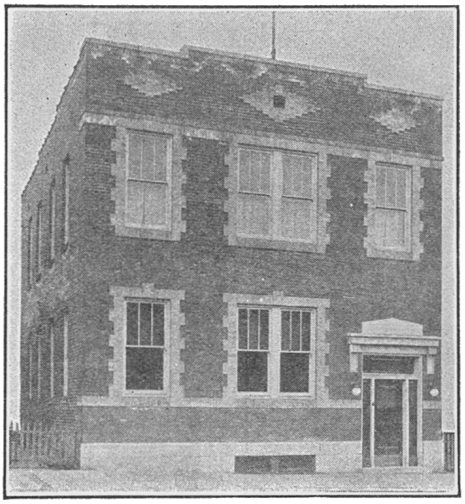
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SWITCHBOARDS—CENTRAL BATTERY MULTIPLE

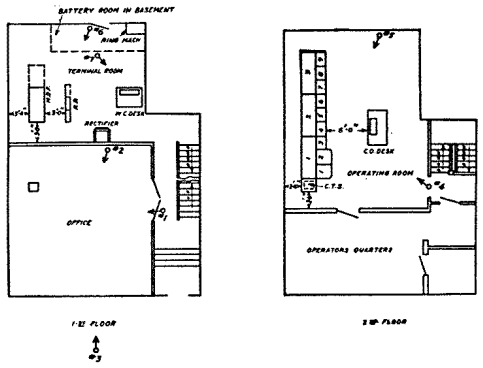
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A Typical Central Office—Business Office



Exchange Building



Floor Plan

Testing Equipment

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

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

Chief Operator's and Other Similar Desks

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

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

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SWITCHBOARDS—CENTRAL BATTERY MULTIPLE

(Continued)

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 Operation

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SWITCHBOARDS—CENTRAL BATTERY MULTIPLE

(Continued)

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 subscriber's 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 subscriber's 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.

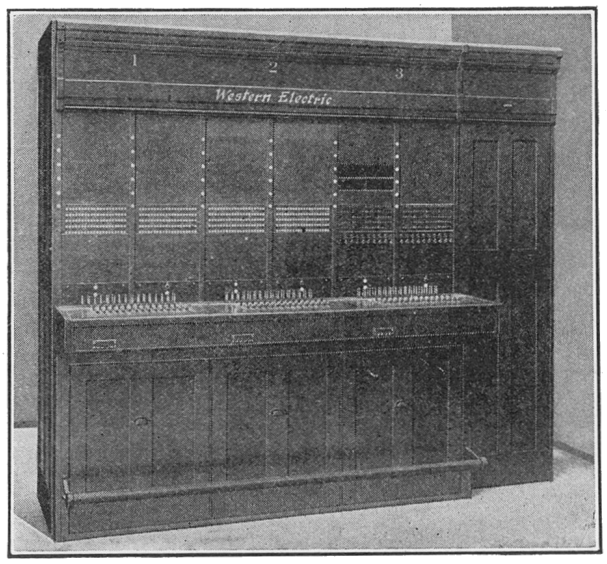
Automatic flashing recall feature has become so popular with telephone users and telephone companies that it is considered indispensable in the modern switchboard. The flashing recall feature provides a persistent signal, demanding instant attention, by flashing the cord circuit supervisory lamp. A calling 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.

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SWITCHBOARDS—CONVERTIBLE MULTIPLE



View of Convertible Multiple Switchboard

Convertible Multiple Switchboards

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

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

Any line or group of lines can then be changed over to central battery operation whenever desired by simply changing the telephone set at the subscriber's 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.

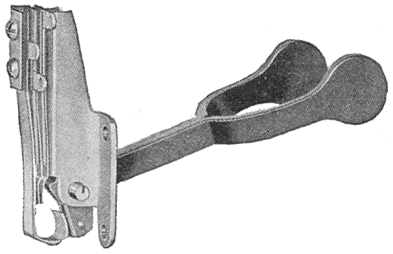
In appearance and design the convertible multiple switchboard is identical with a central battery multiple equipment except that the line relays are designed so that by a simple change in the connections they will provide a central battery or a magneto line operation depending on the way these connections 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.

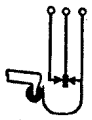
Multiple convertible switchboards are manufactured in various sizes to care for small and medium sized exchanges, requiring multiple switchboard equipment.

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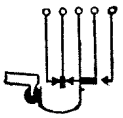
SWITCH HOOKS



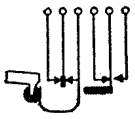
No. 143Y Switch Hook



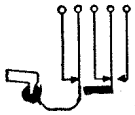
No. 140S
Nos. 143J, Y & AE



No. 140W
No. 143AB



No. 140AG



No. 143AA

Nos. 140 and 143 Types

The Nos. 140 and 143 Type Switch Hooks are simple, compact and self-contained. The switch hook lever is made of brass with black finish and is designed to withstand rough usage. The bracket is made of steel and is extremely rigid. The springs are of nickel silver and are backed up with brass stop springs. The movement of the lever is limited by stops, making it impossible for the springs to be damaged. The switch lever pivots on a fulcrum pin which is normally locked in position by means of a retaining spring. This pin may be readily removed with the fingers, when desired.

All iron and steel parts have an electro-galvanized finish to thoroughly protect them against rusting.

Mechanical contact is made between the lever and the tension spring through a hard rubber roller to minimize friction. All current carrying parts are insulated from the bracket.

Except for the No. 143AE these switch hooks are designed for use with standard hand receivers (Nos. 143 and 144).

The No. 140 Type Switch Hooks are intended for use in metal telephones (Nos. 1533 and 1553 Types) and, therefore, no escutcheons are provided.

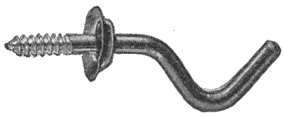
The No. 143 Type Switch Hooks mount by means of four machine screws which pass through clearance holes in the escutcheon and thread into tapped holes in the switch hook bracket. Screws of suitable length for mounting in ½ inch woodwork are furnished unless otherwise specified.

†Code Nos.	140S	140W	140AG	143J*	143Y	143AA	143AB	143AE‡

* No. 143J is treated to resist action of moisture and fumes.

† Refer to spring contact arrangements above.

‡ No. 143AE is equipped with special lever for use with head band receiver only.

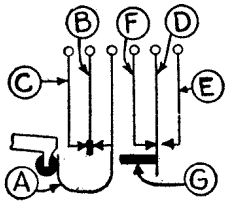


No. 141A Switch Hook

Code No.	Use and Description
141A	A nickel plated brass hook having a wood screw thread at one end and provided with a stop escutcheon. Overall length, 2⅞ inches. Intended for use with No. 1002 and No. 1003 Type Hand Sets.

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SWITCH HOOKS



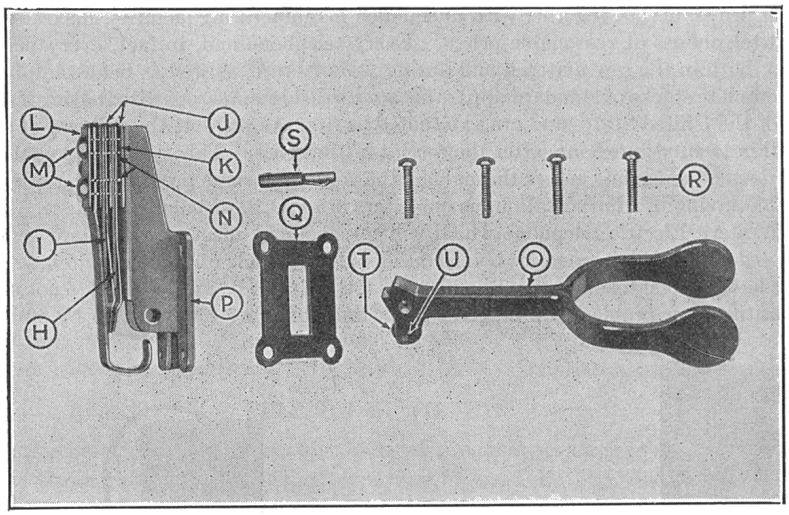
Symbols

Switch Hook Replacement Parts

CONTACT SPRING PARTS

Switch Hook Code Numbers

Symbol	140S	140W	140AG	143J	143Y	143AA	143AB	143AE
A	P-121484	P-121484	P-121484	P-121484	P-145644	P-145644	P-145644	P-162207
B	P-145633	P-145633	P-145633	P-145633	P-145633	P-114095	P-145633	P-145633
C	P-114097	P-114097	P-114097	P-114097	P-114097	.....	P-114097	P-114097
D	.....	P-114098	P-145831	.....	.....	P-145827	P-145825	.....
E	.....	P-114097	P-114095	.....	.....	P-114095	P-114097	.....
F	.....	.....	P-114095	.....	.....	P-114095	.....	.....



Symbol		Switch Hook Code Numbers							
		140S	140W	140AG	143J	143Y	143AA	143AB	143AE
G	Spring Separator	.....	P- 44454	P-106219	.....	.....	P-106219	P- 44454	.....
H	Stop Spring.....	P-112938	P-112938	P-112938	P-112938	P-112937	P-112692	P-112937	P-112937
I	Stop Spring.....	P-112693	P-112693 (2)	P-112693 (3)	P-112693	P-112692	P-112694 (2)	P-112692 (2)	P-112692
J	Insulators.....	P- 44448 (4)	P -44448 (5)	P- 44448 (7)	P- 44448 (4)	P- 44448 (4)	P- 44448 (6)	P- 44448 (5)	P- 44448 (4)
K	Steel Spacers....	P-157542 (4)	P-157542 (5)	P-157542 (7)	P-157542 (4)	P-157542 (4)	P-157542 (9)	P-157542 (5)	P-157542 (4)
L	Steel Spacer....	P-157541	P-157541	P-157541	P-157541	P-157541	P-157541	P-157541	P-157541
M	R.H.M. Screw..	P-147761 (2)	P-157544 (2)	P-114035 (2)	P-147761 (2)	P-147761 (2)	P-114035 (2)	P-157544 (2)	P-147761 (2)
N	Bushings.....	P-139186 (2)	P-129907 (2)	P-111760 (2)	P-139186 (2)	P-139186 (2)	P-157547 (2)	P-129907 (2)	P-139186 (2)
O	Switchhook.....	P-123514	P-123514	P-123514	P-123514	P-123514	P-123514	P-123514	P-139256
P	Bracket and Springs, Complete.....	P-145648	P-145812	P-161134	P-145802	P-145646	P-145806	P-145807	P-158821
Q	Escutcheon.....	.....	.....	.....	P-139277	P-136748	P-136748	P-136748	P-136748
R	Mtg. Screws....	P- 38335 (4)	P- 38335 (4)	P- 38335 (4)	P-107892 (4)	P- 40830 (4)	P- 40830 (4)	P- 40830 (4)	P- 40830 (4)
S	Fulcrum Pin....	P-218066	P-218066	P-218066	P-218066	P-218066	P-218066	P-218066	P-218066
T	Roller and	P-128282	P-128282	P-128282	P-128282	P-128282	P-128282	P-128282	P-128282
U-1	Rivet and	P-128283	P-128283	P-128283	P-128283	P-128283	P-128283	P-128283	P-128283
U-2	Sleeve.....	P-111165	P-111165	P-111165	P-111165	P-111165	P-111165	P-111165	P-111165

Note. Numbers in parentheses indicate total number of parts required.

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TELEPHONES—GENERAL



Wall Telephone
Central Battery Dial Type



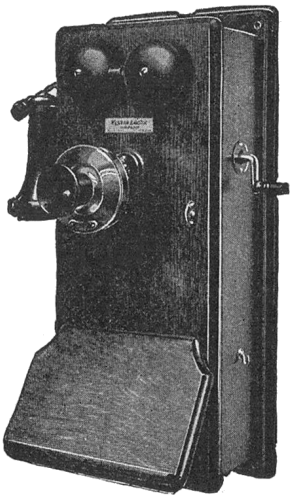
Desk Telephone
Central Battery Type

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.

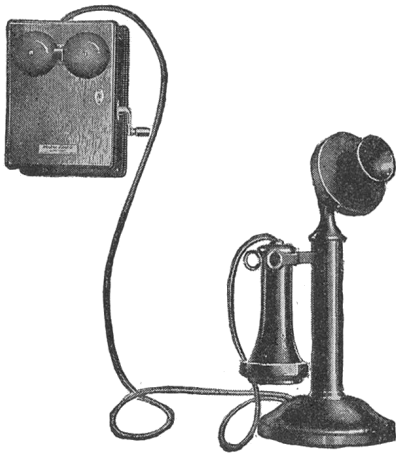
Our large output enables us to purchase raw materials under rigid specifications in large quantities at the lowest market prices. This, together with unequalled manufacturing facilities, makes it possible for us to offer standard telephones at reasonable prices. Every telephone and, in fact, every part 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 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



Desk Telephone
Magneto Type

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TELEPHONES—GENERAL

Definitions of General Telephone Terms

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

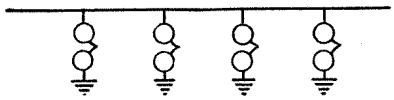
TELEPHONE LINES

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

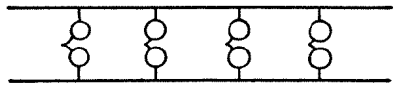
Grounded lines give fairly good results, when properly constructed, provided there are no electric light, power or trolley wires in the immediate vicinity. The presence of such power wires is likely to cause objectionable humming and buzzing in the receivers, when the line is in use. Grounded lines are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

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

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.

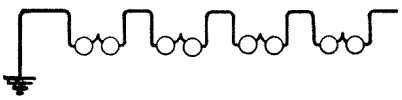


4 Ringers "Bridged" from the line to ground of a Ground Circuit



4 Ringers "Bridged" across the two Conductors of a Metallic Circuit

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 in series with a Grounded Circuit

TELEPHONE SYSTEMS

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

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

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

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TELEPHONES—GENERAL

Definitions of General Telephone Terms (Continued)

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

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

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

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

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

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

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

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

As in the case of telephones for a railway train dispatching system, the instruments used in intercommunicating systems do not fall under either the magneto or central battery classification and they are best described and known as "Inter-phones." On the preceding pages will be found an outline of the various systems under the heading "Inter-phones."

EXCHANGE LINES

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

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

GENERATOR RINGING CURRENTS

Alternating Current. At each revolution of the armature of an alternating current magneto generator or a bipolar ringing machine, current of one polarity is generated the first half of the revolution and current of the opposite polarity of the other half of the revolution; this current rising from a zero value to maximum and then dropping again to zero, then building up in the opposite direction to the maximum and again dying out to zero as the cycle is completed. This is an alternating current. For ringing telephone bells, an average frequency of 16 to 20 cycles per second (in other words, 16 to 20 revolutions of the armature) has been found to give the best results.

Pulsating Current. A generator arranged to produce "pulsating" ringing current is in general the same as an alternating current one except that a two segment commutator and two brushes are added. These are arranged so that during one-half of the cycle, positive pulsating current is delivered to the positive brush and during the other half of the cycle, no current is delivered to that brush (or else it is grounded). Negative pulsating current is delivered to the negative brush in the same manner.

Superimposed Ringing Current. "Superimposed" current is obtained by connecting a storage battery in series with a generator delivering alternating current. The storage battery reduces the A.C. wave during one-half of each cycle and increases it the other half. This current is used for operating ringers selectively in the same manner as pulsating current. Ringers adjusted for operation on pulsating current will operate satisfactorily on superimposed current.

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TELEPHONES—GENERAL

Definitions of General Telephone Terms (Continued)

RINGERS

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

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

Transmission Circuits ("Talking Circuits")

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

	Type	One of the Various Transmitters Used for this Service	Receivers	Induction Coil	One Telephone Employing this Type of Transmission Circuit
A	Central Battery	323	143 144	46	1533A
B	Local Battery	323	143 144	13	1317N
C	Local Battery Talking Central Battery Signalling	323	143 144	13	1533Y
D	Series Central Battery	323	171W ("Magnetless" receiver)	None	1533K

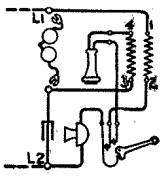
The circuit designated "A" in the above table is the Western Electric "standard" for Central Battery Service. This is the highest efficiency circuit for long line service and is used in all "standard" Western Electric central battery telephones.

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

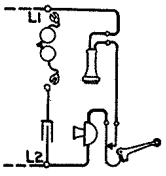
The circuit "C" is used on central battery lines which are so long that the current from the central office battery is not sufficient to provide satisfactory transmission. This circuit is the same as the standard local battery circuit except that no generator is employed and that a condenser is used, as in the standard central battery circuit, to prevent the flow of current from the central office battery through the ringer. The conditions under which this circuit is required are exceptional and it is therefore considered special.

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

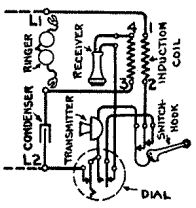
The following are diagrams of telephones employing the above transmission circuits.



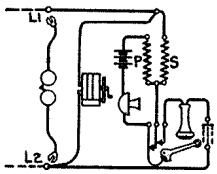
Standard Central Battery Telephone Circuit (Induction Coil Type)



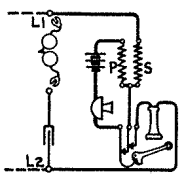
Series Type



Standard Central Battery Telephone Circuit with Dial



Standard Local Battery Telephone Circuit



Local Battery Talking and Central Battery Signalling Circuit

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TELEPHONES—MAGNETO

Magneto Telephone Systems

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

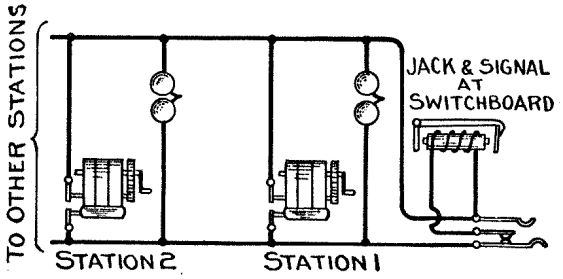
The following definitions of what may be considered a lightly loaded, medium or heavily loaded line are submitted with the thought that the limits are conservative enough so that under all but extreme conditions the figures given can be relied upon. In the following pages will be found a complete catalog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

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

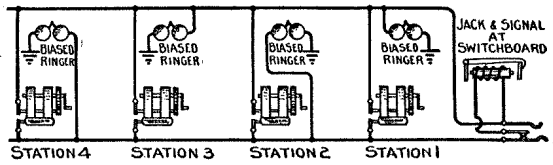
Light Loaded Lines. A light loaded line is one less than 15 miles in length, and not equipped with more than twelve telephones.

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

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



Code Ringing—Magneto Line



Pulsating Current 4 Party Selective Signalling—Magneto Systems

Code Ringing Non-Selective

The most universal method of signalling parties on a magneto telephone line is by code ringing. In the code ringing system, rings of different codes are employed for signalling each telephone, such as 2 short, 3 short, or 1 long and a short, 2 long and 2 short rings or other combinations. This system has the advantage that it can be used with a large number of telephones on the same line, any number in fact, the number which can be placed on a line depending on conditions other than ringing. Again, it is a simple system, as no special apparatus has to be used, the undesirable feature being that when one telephone is called, all the other telephones on the line are also rung, making it necessary for the user to count every signal in order to know when he is being called. This system is most commonly used on rural or farmers' telephone lines.

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TELEPHONES—MAGNETO

Magneto Telephone Systems

FOUR PARTY SELECTIVE—EMPLOYING PULSATING CURRENT

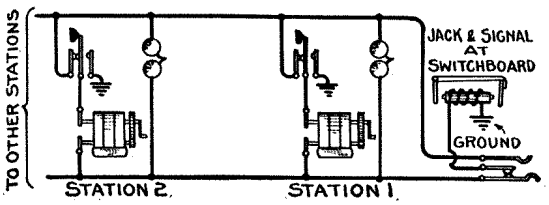
In this system, any one of four telephones on the same line may be rung without ringing the others. This is accomplished by sending positive or negative pulsating current out over either side of the line (through the ringers connected to that side of the line), to ground. In other words, the central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

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

CENTRAL OFFICE SELECTIVE SIGNALLING

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

Central Office Selective Signalling the 1006A Push Button and A.C. Generator. Operating this push button connects the generator to one side of the line and to the ground. These telephones can be used only on metallic lines and where the switchboard drop is singly wound and has one terminal of its winding connected (or arranged so that it can be connected) to ground. When the generator is operated without pressing the push button, all the other telephones on the line are rung without operating the drop at the exchange. When the push button is pressed when turning the generator crank, the drop is "thrown" (operated) but none of the other telephone ringers on the line are rung.



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

CONDENSERS—"LISTENING IN" TROUBLE

On rural lines trouble is frequently experienced, due to receivers being carelessly left off the switchhook or due to parties "listening in," whenever their telephone rings, regardless of whether or not the call is for them. When a number of receivers are off the hook it is usually impossible to ring as they form a lower resistance path for the ringing current than the ringers. To overcome this it is customary to use telephones equipped with a condenser wired in series with the receiver. (The presence of the condenser does not appreciably affect the receiver circuit as far as voice currents are concerned, but it increases the resistance to ringing current to such an extent that the ringers receive the amount of current they require for operation.)

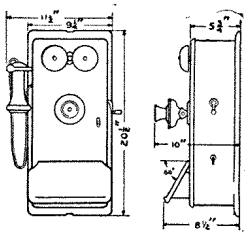
Practically all of our magneto telephones, arranged for code ringing, have terminals provided so that a condenser may be readily connected in the receiver circuit at any time and certain telephones are equipped with a condenser in the receiver circuit as standard. (See descriptive list of telephones.)

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TELEPHONES—MAGNETO



3 Cell, Closed View



Dimensions of 3 Cell No. 1317 Sets

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

The standard No. 1317 Type Telephone Set operates on 3 dry cells and is equipped with a No. 48 Type (5 bar) Generator. This set is designed to meet the exacting requirements of heavily loaded lines.

A smaller set of the same type using the same circuits and equipment except the generator and operating on 2 dry cells is available for medium loaded lines. The No. 50 Type (3 bar) Generator is used in this set.

Although both sets are almost identical, the additional power of the 3 cell type gives greater transmission advantages and the two cell type should only be considered when circuit conditions are favorable.

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.

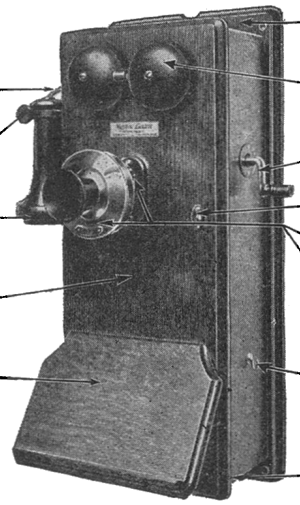
A complete and explanatory circuit label is pasted on the inside of the door of each telephone in addition to which a booklet is furnished giving complete instructions for installation and maintenance.

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.

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TELEPHONES—MAGNETO



No. 1317 Magneto Type

NO. 1317 THREE-CELL TYPE

Code No.	Ringer Code No.	Ringer Resistance, Ohms	Generator Code No.	Condenser Code No.	Class of Signal Service: Telephone to Central Office	Class of Signal Service: Central Office to Telephone	Line Conditions as Regards Load
1317AH	38AG	1000	22A	....	Code	Code	Lightly
1317N	38FG	1600	48A	....	Code	Code	Medium
1317R	38FG	1600	48A	21W	Code	Code	Medium
1317P	38BG	2500	48A	....	Code	Code	Heavily
1317S	38BG	2500	48A	21W	Code	Code	Heavily
1317BA	38FG	1600	48A	....	* C.O. Selective	Code	Medium

NO. 1317C TWO-CELL TYPE

1317CH	53AG	1000	22BA	....	Code	Code	Lightly
1317CN	53FG	1600	50F	....	Code	Code	Medium
1317CR	53FG	1600	50F	21W	Code	Code	Medium
1317CP	53BG	2500	50F	....	Code	Code	Heavily
1317CS	53BG	2500	50F	21W	Code	Code	Heavily

In addition to the above-mentioned apparatus, these 1317-Type Telephones are equipped with the following:

Transmitter	323	Induction Coil	No. 13
Receiver	143	Transmitter Bracket	No. 8A
Receiver Cord	No. 521 (30 ins.)	Switch-hook	No. 143Y
Transmitter Cord	T1A (6 ins.)		

* Equipped with No. 1006A Push Button. Telephone user can signal central office secretly or not, as desired, and can signal other parties on the same line by code ringing (see pages describing "Magneto Telephones—Definition of Terms").

NO. 1317 TELEPHONES FOR RAILROADS

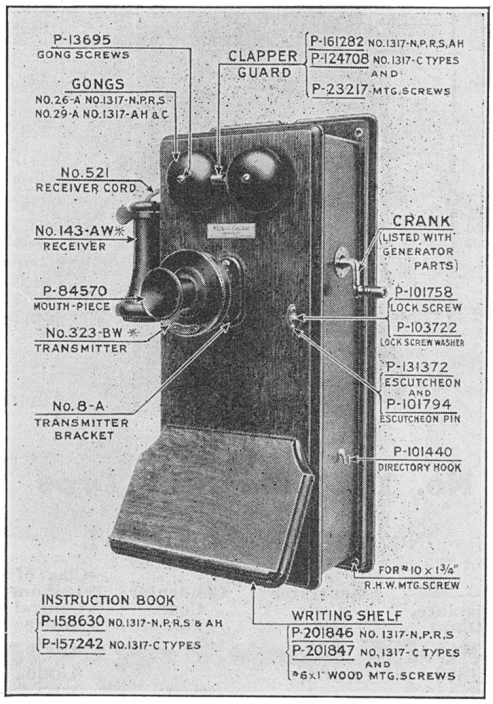
1317W Wall type telephone set for use on standard railway dispatcher's telephone circuits at sidings and similar places for use of conductors and trainmen. Provided with high efficiency transmission circuit. Employs push button for use when talking, 5 bar A.C. generator and 2500 ohm unbiased ringer. Contains:

1 No. 48A Generator
1 No. 38BG Ringer
1 No. 21AA Condenser
1 No. 29 Induction Coil
1 No. 51A Retardation Coil
1 No. 143AA Switch-Hook
1 No. 8A Transmitter Bracket
1 No. 1003A Push Button for $\frac{9}{16}$ inch woodwork
1 2-foot No. 446 Receiver Cord
1 No. 349 Transmitter
1 No. 508W Receiver
1 No. 547 Cord } 2—T1A
1 No. 548 Cord. }
2 No. 540 Cords

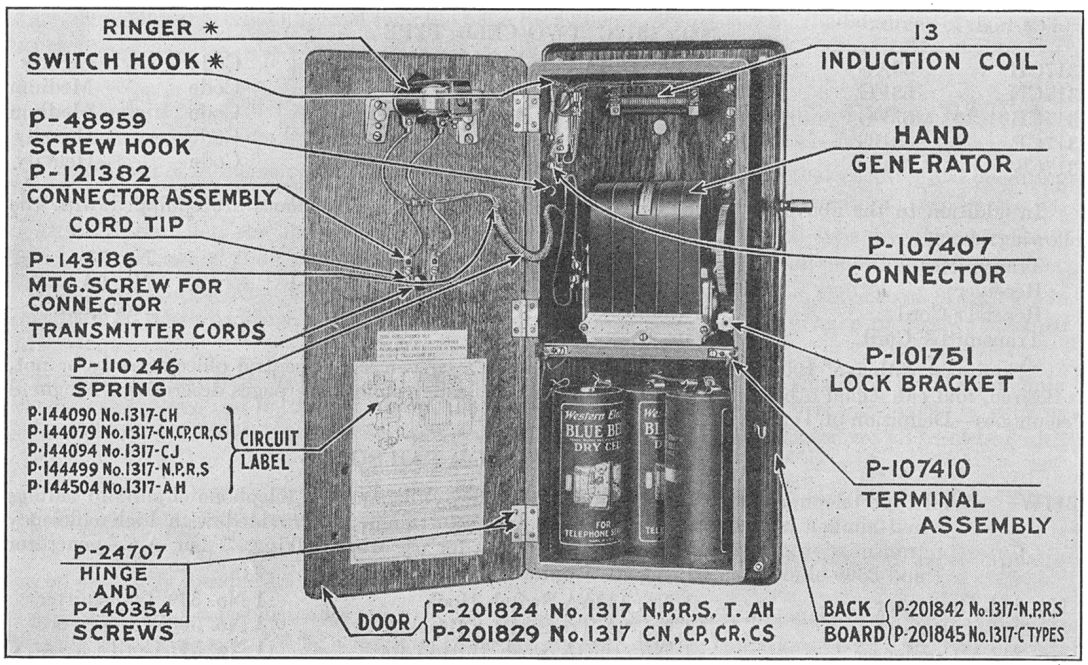
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TELEPHONES—MAGNETO

No. 1317 Type Magneto Telephones—(Continued)



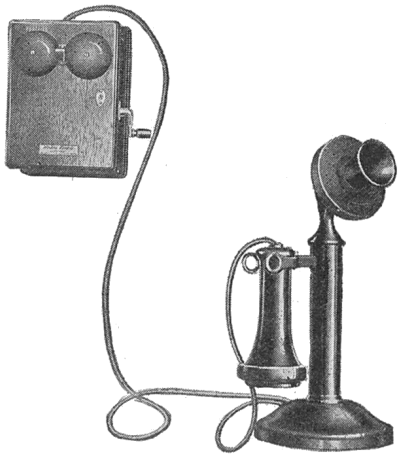
No. 1317 Telephone Closed View



No. 1317 Telephone Open View

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TELEPHONES—MAGNETO



Desk Telephone, Magneto Type

Desk Types

NOS. 6003 AND 6004 TYPE

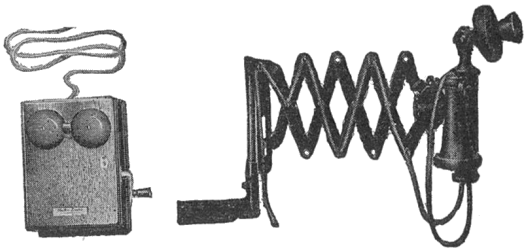
The Nos. 6003 and 6004 Type Desk Telephones consist of a No. 1040AL Desk Stand and a No. 300 or 315 Type Desk Set Box. These telephones comprise the combinations of desk stands and desk set boxes that are most used, and therefore, for convenience in ordering, are covered by a single code number.

Combinations of apparatus differing from those covered by these code numbers listed may be obtained by ordering the separate items that will make up the desk telephone desired. The following items of apparatus are the electrical equivalent of the No. 1040AL Desk Stand and may therefore be used in connection with any of the desk set boxes listed below.

No. 1020CC Telephone Arm	No. 1048AB Telephone Arm	No. 1001C and H Hand Sets
No. 1048AA Telephone Arm	No. 1048AC Telephone Arm	No. 1002AC Hand Set



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



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

Code No.	Desk Stand No.	Desk Set Box No.	Desk Set Box Includes—Ringer Code No.	Ringer Res. Ohms	Operates On	Generator Code No.	Class of Signal Service—Tel. to Central Office	Central Office to Tel.	Used on Lines as Regards Load
6003B	1040AL	315H	51AG	1020	A.C.	22A	Code	Code	Lightly
6003C	1040AL	315J	49BG	2500	P.C.	22E	C.O. only	4 Party Selective	Lightly
6004B	1040AL	300K	51BG	2500	A.C.	48A	Code	Code	Heavily
6004C	1040AL	300L	51FG	1620	A.C.	48A	Code	Code	Medium
6004D	1040AL	300AA	51BG	2500	A.C.	50A	Code	Code	Heavily
6004E	1040AL	300AB	51FG	1620	A.C.	50A	Code	Code	Medium

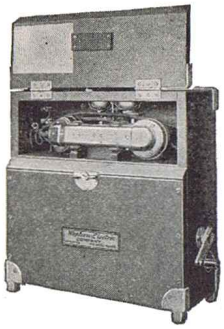
Note 2. Repair parts for the above desk set boxes and desk stands are shown under their respective headings.

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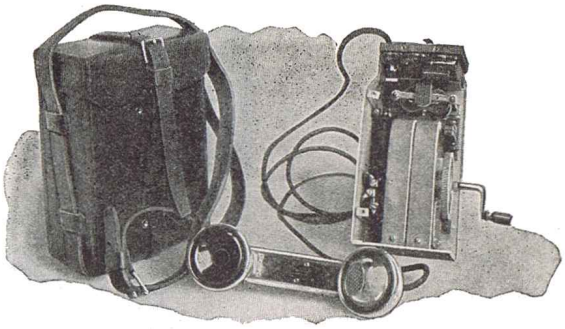
TELEPHONES—MAGNETO



No. 1330E



No. 1330E



No. 1375B
Apparatus Removed from Case

Portable Magneto Telephones

NOS. 1330 AND 1331 TYPES

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

The No. 1330F is equipped with a six-foot waterproof cord and No. 146 Plug for connecting it to a telephone line through a No. 186 Pole Jack.

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

The No. 1330 Type Telephones are for use on heavily loaded lines.

The No. 1331 Type Telephones are for use on light loaded lines.

Code No.	Hand Set No.	Plug No.	Plug Cord No.	Ringer or Buzzer No.	Ringer or Buzzer Ohms	Condenser No.	Generator No.	Approx. Weight, Lbs.	Overall Dimensions	Battery Used*
1330E	1001C	...	...	32BG	2500	21F	48A	28	12½ x 13½ x 5¼	2 Dry Cells*
1330F	1001C	146	509	32BG	2500	...	48A	28	12½ x 13½ x 5¼	2 Dry Cells*
1331E	1001C	...	...	3B	2500	21F	22A	17	11½ x 10½ x 4¾	2 No. 790*

Each set also contains a No. 29 Induction Coil.

NO. 1375 TYPE

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

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

Code No.	Hand Set No.	Buzzer No.	Buzzer Ohms	Generator	Ind. Coil	Approx. Weight, Lbs.	Overall Dimensions	Battery Used
1375B	1001H	D-21141	2150	29E	D-17624	10½	9¾ x 7¼ x 4¼	1 No. 703 Eveready*

REPLACEMENT PARTS FOR NO. 1375B TELEPHONE

Leather case only	P-139726	Generator mounting screws	P-123826
Case mounting screws	P-117156	Top wood block only	P-125285
Aluminum frame	P-141455	Line binding posts	P-122930
Circuit Label	P-114789		

*Batteries are not included in the code number of the set, and will be furnished only when specified.

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TELEPHONES—MAGNETO

Portable Railway Telephone Sets

Code No.	Description
1332A	Telephone set in portable leather case with a shoulder carrying strap for use in connection with Nos. 3 or 5 Line Poles on train dispatching circuits. Contains: 1 No. 29 Induction Coil 1 No. 21BW Condenser 3 No. 792 Eveready Dry Batteries furnished only when ordered. 2 No. 2C Binding Posts 1 No. 1001C Hand Set The complete sets weighs approximately 6 lbs. The size is $9\frac{5}{16}$ x $7\frac{1}{8}$ x 4 inches.
1332E	Same as No. 1332A, excepting that it is equipped with a No. 3B (2500) ohm Buzzer.

Mine Telephones

General

Since the workings of a mine necessarily are remotely located from the management, mine telephones are essential to successful operation. Reports of conditions may be obtained and orders given promptly by telephone with definite assurance that these messages have been received and understood. The time and money which the telephone saves daily under ordinary conditions are indeed large but in emergencies the saving of lives and property which the telephone may effect is of inestimable value.

Mine Laws

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.

For use in mines where explosive gas is present the Western Electric Company has developed a telephone set which in the words of the United States Bureau of Mines "is permissible for use in mines or other locations where methane or other explosive gases or coal dust are or are likely to be present in dangerous proportions." This is the No. 1536E Telephone Set, hereinafter described in detail.

For use at exposed stations above ground and at stations below ground where there is no danger of explosive gases, the No. 1336 Type Telephone Set 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. 1536E Telephones for service below ground where there is danger from explosve gases.

No. 1336J Telephones for service below ground where there is no danger from explosive gases and in exposed locations above ground.

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

No. 6004B Telephones (desk type).

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TELEPHONES—MAGNETO

Mine Telephones (Continued)

In cases where it is warranted by the size of the plant, 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 will not tie up the rest of the system until the trouble is cleared.

In cases where a switchboard is employed, the telephones below ground should be of the No. 1336 or 1536 Type as required but the lines above ground may be equipped with telephones having three bar generators if there are only a very few stations on each line. Sets recommended for such conditions are the No. 1317AH (wall type) and the No. 6003B (desk type).



1336 Type Mine Telephone

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 where danger from explosive gases is not present, 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.

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

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

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

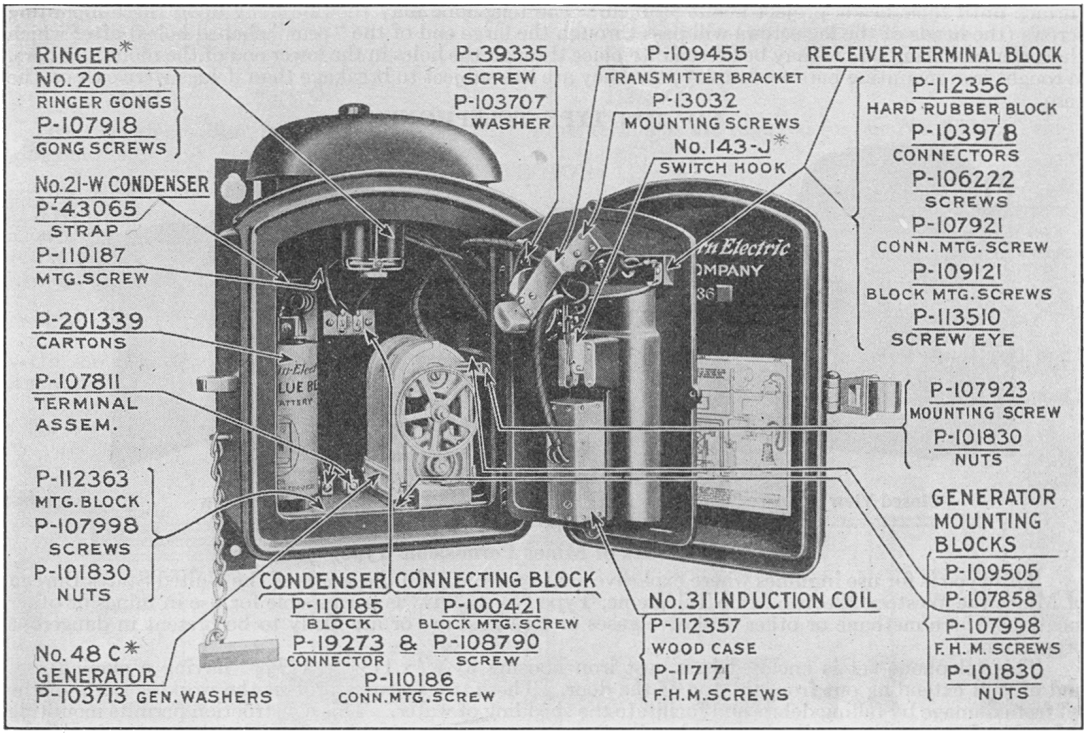
Entrance for Line Wires. The line wires may be brought in either at the top or the bottom of the case. A short length of pipe is screwed into the top of the case and is covered with a pipe cap. This cap prevents water running into the set by following the line wires. In case the line wire is to be run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

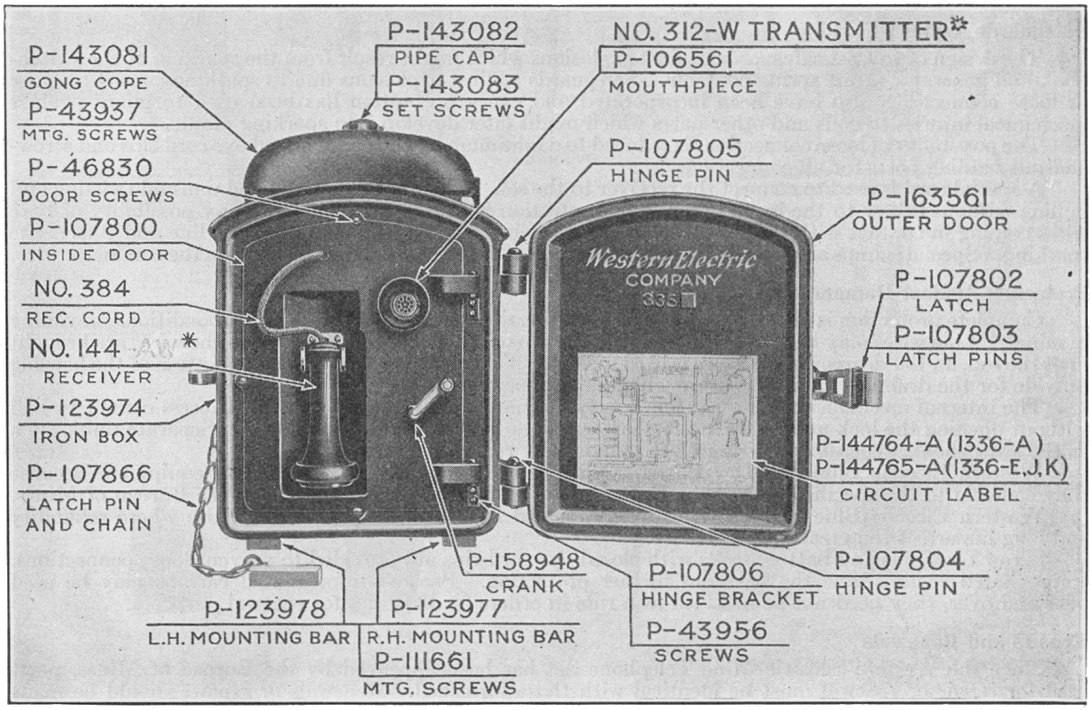
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TELEPHONES—MAGNETO

Mine Telephones (Continued)

REPLACEMENT PARTS FOR NOS. 1336A, E, J, AND K MINE TELEPHONE SETS





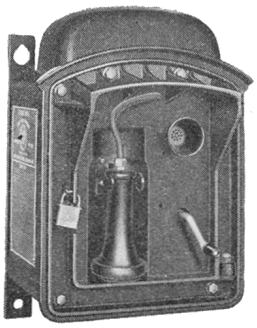
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TELEPHONES—MAGNETO

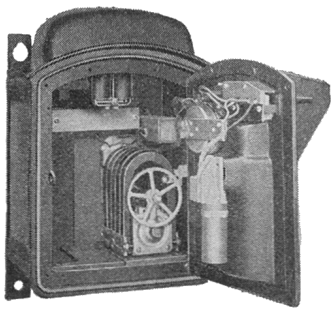
Mine Telephones (Continued)

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 ½ 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.

NO. 1536 TYPE TELEPHONES



Closed View



Open View

No. 1536E Mine Telephone Set
(U. S. Bureau of Mines Permissible Type)

This type is for use in mines where explosive gas is present. In the words of the United States Bureau of Mines the Western Electric Mine Telephone, Type No. 1536E "is permissible for use in mines or other locations where methane or other explosive gases or coal dust are or are likely to be present in dangerous proportions."

This telephone set is enclosed in a cast iron housing $8\frac{7}{16}$" x $11\frac{1}{4}$" x $17\frac{5}{32}$" having a sloping roof and a hood extending out from the top of the door. These two features protect the working parts of the set from damage by falling debris and facilitate the shedding of water. This construction permits mounting the transmitter, receiver and generator-handle entirely exposed on the door but under the protection of the hood. The set is therefore under all conditions immediately recognizable as a telephone.

Safeguards Against Sparking

The design of this set safeguards against explosions which might result from the sparking of the switchhook and generator shunt spring contacts. Safeguards against explosions due to sparking caused by poor or loose connections also have been incorporated and every precaution has been used to guard against mechanical injuries to coils and other parts which might later develop into sparking points.

The possibility of loose connections is reduced to a minimum by the use of closed eye cord tips and screw-and-nut binding posts for all connections.

A special cord is used to connect the receiver to the set. This cord will withstand unusual twisting and pulling without injury to the insulation. This protection is provided to eliminate any possibility of bare wires coming in contact with the telephone housing when the ringing current is on the line and thus cause sparking. Special clamps are provided on both ends of the cord to prevent undue strain on the conductor wire.

Protection Against Dampness

Complete protection is given to all parts in the set against the usual moist or damp conditions prevailing in mines. Line wires may be brought in at either the top or bottom of the set. When the wires are brought in at the top, an 180-degree angle fixture is used to keep out the moisture. Holes in the bottom of the housing provide for the drainage of any moisture which might accumulate.

The internal mechanism, batteries, line connections, etc., are carefully housed. Access cannot be had without opening the lock and removing the cap screws around the sides of the door. Separate units, such as the switchhook, generator and ringer are individually removable for repair.

Western Electric Blue Bell Dry Batteries with screw terminals are furnished as equipment because they conform to the specifications of the U. S. Bureau of Standards, as required by the Bureau of Mines.

Western Electric Blue Bell Batteries were designed by telephone engineers for use where reliability and long life are of the greatest importance.

Screw terminals and battery leads with closed-eye cord tips are provided to prevent loose connections. Impregnated cartons give the batteries further protection. Because impregnated cartons may be used over and over, they need not be included as a rule in orders for batteries for renewal purposes.

Repairs and Renewals

Since the Western Electric Mine Telephone Set has been approved by the Bureau of Mines, parts used for repair or renewal must be identical with those furnished. Renewals or repairs should be made only by an experienced and a competent person. A person who does not understand the many protective features of the set might, by tampering, endanger the lives of many persons.

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TELEPHONES—MAGNETO

Mine Telephones (Continued)

Parts List

The parts which have been approved for replacement are:

Western Electric Blue Bell Dry Batteries with Screw Terminals	149-A Switchhook
P-201339 Impregnated Cartons	04606 Eagle Padlock with two Keys
51-A Generator	558W Receiver
63-B Ringer	312W Transmitter
	R2AD Cord

Dry Batteries. Blue Bell Batteries which have screw terminals are required for the No. 1536E Telephone Set.

PROTECTORS

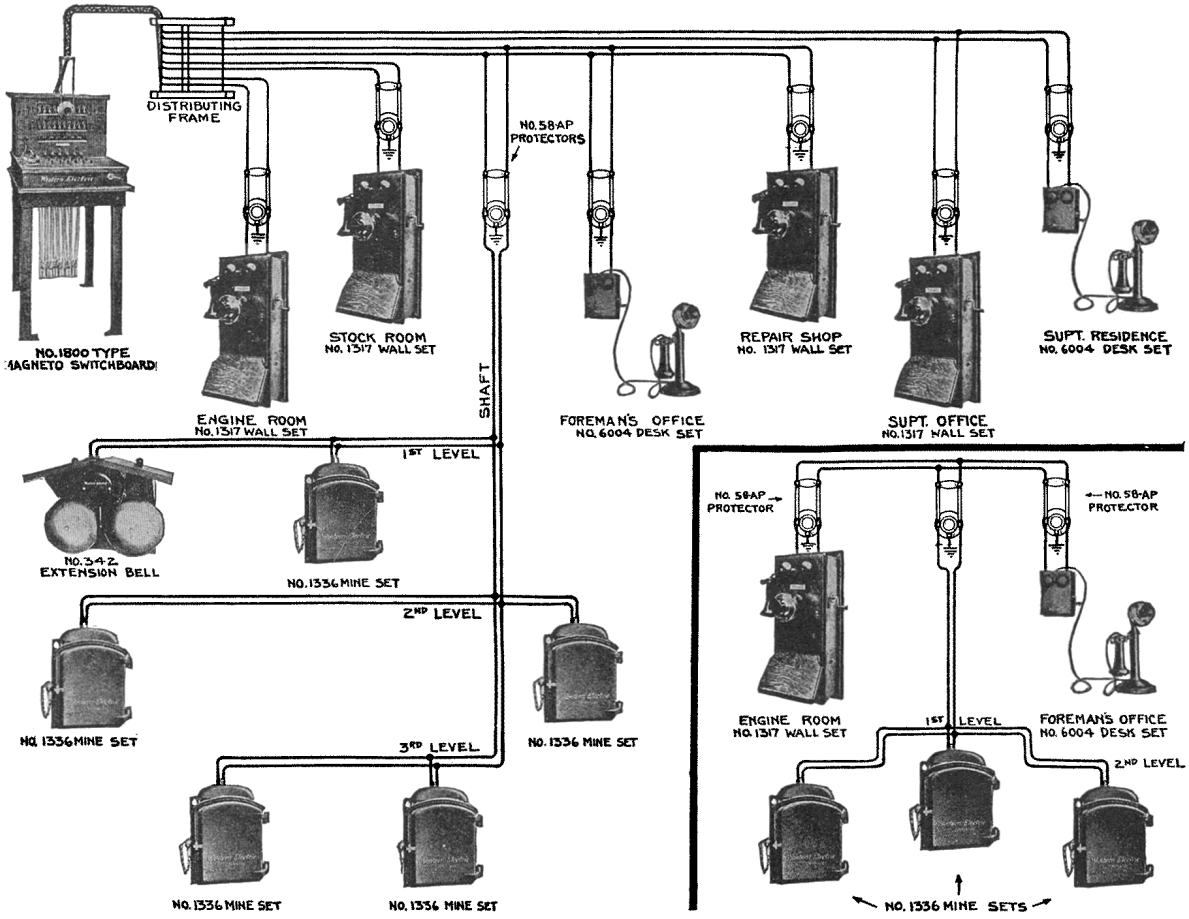
The telephones installed above ground should be equipped with protectors consisting of open space cut outs (for example the No. 60AP Protector) to prevent damage to the telephone by lightning. In case there is a chance of contact between the telephone line and a power circuit protectors consisting of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

TYPICAL WESTERN ELECTRIC MINE TELEPHONE SYSTEMS

In the following illustration are shown two types of mine telephone installations, one with and one without a switchboard.

The No. 1336 Type Telephone Set is used in this illustration but as stated previously should be replaced by the No. 1536E Type where there is danger from explosive gases.

Typical Western Electric Mine Telephone Systems



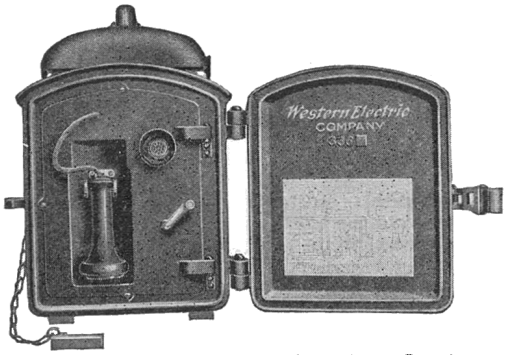
Typical Diagram Showing Method of Connecting Telephones to a Switchboard.

Typical Party Line Mine Telephone System.

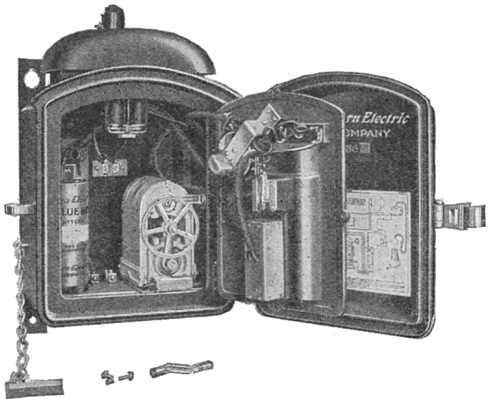
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TELEPHONES—MAGNETO

Mine Telephones (Continued)



No. 1336 Mine Telephone (Outer Door Open)



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

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

The Nos. 1336E and K differ from the No. 1336A in that they are equipped with a ringer and an iron hood for protecting the gongs.

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

Code No.	Transmitter	Receiver	Receiver Cord	Condenser	Ringer Code No.	Ringer Resistance	Generator	Signalling Service	For Line Load
1336A	312W	144	384	None	None		48C	Code Ringing	Heavily Loaded
1336E				None	45BG	2500			
1336J			10½ in.	21W	45BG	2500			
1336K				21W	(Spl.) 45BG	1600			Medium Loaded

In addition to the apparatus listed above the No. 1336 Type Telephones are equipped with a No. 143J Switchhook and a No. 31 Induction Coil.

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

No. 1336 Type for Railroads

Code No.

1336F For use out-of-doors on train dispatching circuits. Provided with high efficiency transmission circuit. Employs push button for use when talking. Five-bar A.C. generator and 2500 ohm unbiased ringer. Contains:

- 1 No. 48C Generator
- 1 No. 143K Switchhook
- 1 No. 45BG Ringer
- 1 No. 32 Induction Coil
- 1 No. 51B Retardation Coil
- 1 No. 21AA Condenser
- 1 Spl. No. 1002A Push Button
- 1 No. 292W Transmitter
- 1 No. 508W Receiver
- 2 No. 385 Transmitter Cords
- 1 No. 384 Receiver Cord
- 1 No. 540 Cord
- 3 1/32 x 3/8 x 2¼ Inch Leather Cable Holders
- 2 Blue Bell Dry Cells (when specified in order)

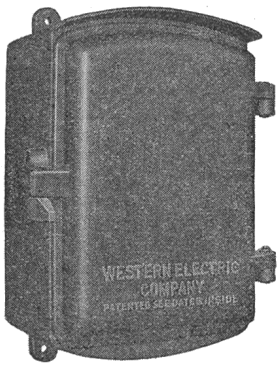
1336H Circuits are arranged so that it is unnecessary to use a push button for talking. Contains:

- 1 No. 144 Receiver
- 1 No. 292W Transmitter
- 1 No. 540 Cord
- 1 No. 384 Cord, 10½ ins.
- 2 No. 385 Cords, 7 ins.
- 1 No. 48C Generator
- 1 No. 45BG Ringer
- 1 No. 21AA Condenser
- 1 Special No. 30 Induction Coil
- 1 No. 143AA Switchhook

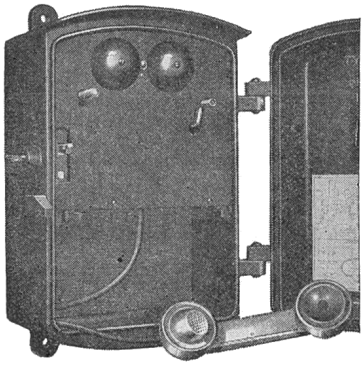
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TELEPHONES

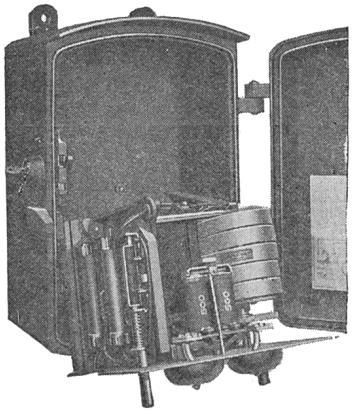
Street Railway Magneto and Central Battery Types



No. 1278G Telephone



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 ½ inch conduit.

The telephones are equipped with a lock which is arranged so that the key cannot be removed until the door of the telephone is closed.

Code No.	Hand Set	Ringer Code No.	Ringer Resistance (Ohms)	Generator	Ind. Coil	Repeating Coil	Lock	Class of Signal Service	For Line Load
				For Magneto Service					
1278G	1001H	51AG	1000	*48C	29	25E	5B	†Code	Medium

In addition to the apparatus listed above this telephone is equipped with: A special door switch and a special protector.

2 D. & W. No. 5001 Type C Fuses—500 volt 1 ampere.
2 No. 2 Protector Blocks.
2 No. 1 Protector Blocks.
2 No. 3 Protector Micas.

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

* Generators have special mounting brackets.

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

TELEPHONE SET FOR ELEVATOR CARS

This consists of a 525A Subscriber's Set, a 323 Transmitter and a 559 Receiver. The Subscriber's Set contains the following apparatus:

1—150A Switchhook
1—46 Induction Coil
1—21BW Condenser
2—T1A Cords, 3″ long
2—29B Gongs
1—8A Ringer

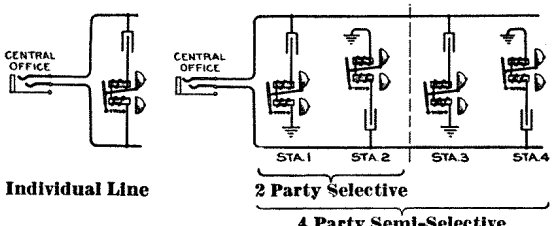
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TELEPHONES—CENTRAL BATTERY

Central Battery Telephone Systems

SINGLE PARTY, 2 PARTY SELECTIVE OR 4 PARTY SEMI-SELECTIVE SYSTEMS EMPLOYING ALTERNATING CURRENT

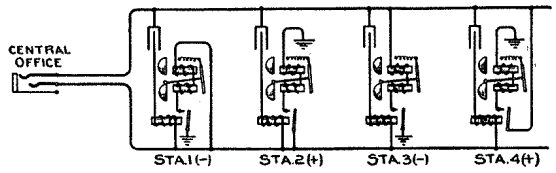
On an individual line, the ringer is bridged across the two line wires. (In the case of central battery systems, condensers are connected in series with the ringers, except in the case of ringers operated on pulsating or superimposed ringing current, as described below). On a two-party selective line, 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.")



Central Battery Systems

FOUR PARTY SELECTIVE—EMPLOYING PULSATING OR SUPERIMPOSED CURRENT

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



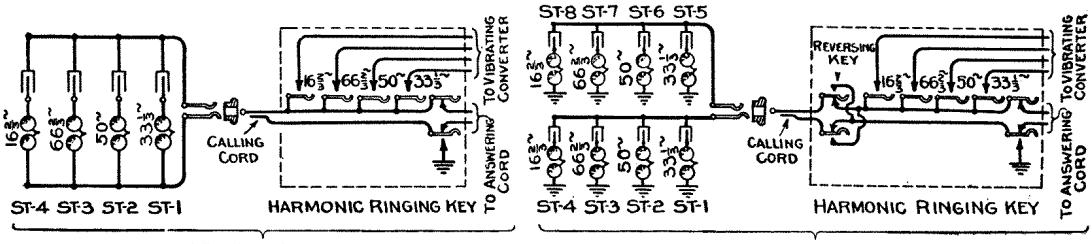
Pulsating or Superimposed 4 party Selective Signalling Central Battery System

HARMONIC—4 AND 8 PARTY SELECTIVE

The telephones used with this system are equipped with special ringers which are so made that they will ring only when alternating current of a given frequency is sent out over the line. The frequencies employed are 16⅔, 33⅓, 50 and 66⅔ 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.



Harmonic Selective Signalling—Central Battery Systems

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TELEPHONES—CENTRAL BATTERY

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:

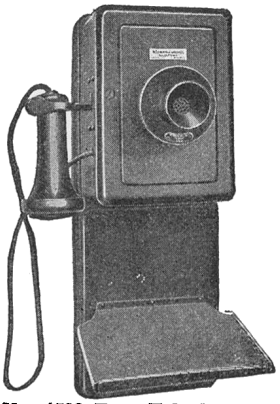
Ringer and gongs are enclosed within the case thereby preventing tampering, reducing maintenance and greatly improving the appearance.

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.

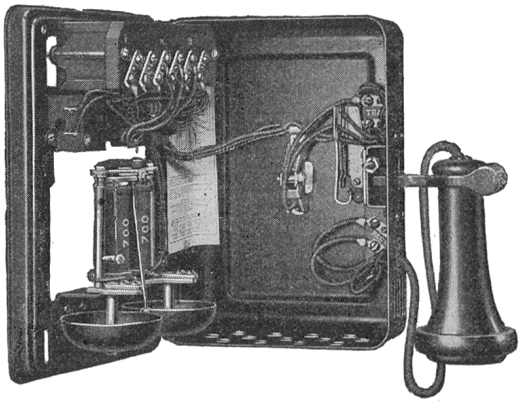
Unit type of construction and universal terminal block employed. This permits of the telephone being readily converted from one class of service to another. This also permits of a desk set box being converted into a wall telephone or vice versa by a substitution of covers.



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



No. 1533A Type Telephone



Inside View of No. 1533A Type Telephone

No. 1533 and No. 6054 Type Telephones

The No. 1533A and No. 6054A Telephones are arranged for single-party, two-party, selective or four-party semi-selective ringing service from the central office.

The No. 1533K and No. 6054K are series type telephones as described under "Transmission Circuits" elsewhere, otherwise used for same service as described above for the Nos. 1533A and 6054A Telephones.

The No. 1533Y Telephone is arranged for central battery ringing service as outlined for the No. 1533A but it is equipped for local battery talking.

The No. 1533AR and No. 6054AR Telephones are equipped with pulsating current type ringers for use in four-party selective signalling from the central office.

The Nos. 1533E, F, G, and H and 6054E, F, G, and H Telephones are arranged for four-party selective or eight-party semi-selective ringing service from the central office.

No. 1533 Wall Type Telephones

Code No.	Transmitter	Receiver	Ringer No.	Resistance	Condenser	Induction Coil	For Ringing Current
1533A	323	143	8AG	1400	21AP	46	A.C.
1533K	323	171W	8AG	1400	21F	..	A.C.
1533Y	323	143	8AG	1400	21AP	13	A.C.
*1533AR	323	143	42AG	1000 and 3000	21AP	46	P.C.
1533E, 1533F, 1533G, 1533H	323	143	41SG, 41TG, 41UG, 41RG	33⅓ cycles, 50 cycles, 66⅔ cycles, 16⅔ cycles		46	Harmonic

* Equipped with No. 85J Relay.

See separate listings of central battery telephones for 1801 Switchboard on following pages.

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TELEPHONES—CENTRAL BATTERY

No. 6054 Desk Type Telephones



Desk Telephone Central Battery Type

The No. 6054 Desk Type Telephones consists of a No. 1040 Type Desk Stand and a desk set box.

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

For example, any of the desk set boxes that will function with the No. 1040AL Desk Stand will also function with the following:

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

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

The Nos. 6054A, AR, K, and E, F, G, H Desk Type Telephones are used for the same class of service as described for the corresponding Nos. 1533A, AR, K and E, F, G, H Wall Type Telephones.

Code No.	Desk Stand	Desk Set Box	Desk Set Box Contains: Ringer No.	Res.	Condenser	Induction Coil	For Ringing Current
6054A	1040AL	534A	8AG	1400	21BW	46	A.C.
6054AR	1040AL	*534AR	42AG	1000 and 3000	21BW	46	P.C.
6054K	1040AH	534K	8AG	1400	21F	..	A.C.
6054E	1040AL	534E	41SG	33⅓ cycles	.....	46	Harmonic
6054F		534F	41TG	50 cycles			
6054G		534G	41UG	66⅔ cycles			
6054H		534H	41RG	16⅔ cycles			

* Equipped with No. 85J Relay.

See separate listings of No. 534 Desk Set Boxes and No. 1040 Type Desk Stands for replacement parts, etc.

See separate listings of central battery telephones for No. 1801 Switchboards on following pages.

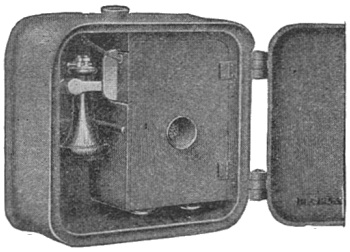
No. 1320 Central Battery Type for Police Service



Special No. 1320A

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

The apparatus is mounted on a metal frame which is removable as a unit from the case. An inner door protects the apparatus from the weather when the outer door is open. The overall dimensions are 6 9/16 inches deep by 13⅛ inches high by 12¾ inches wide.



No. 1320A with Outer Door Open

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

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

A No. 1320A Telephone includes the following apparatus and equipment:

No. 143 Receiver
No. 357 Receiver Cord, 20 ins. long
No. 21AN Condenser
No. 1CG Ringer (alternating current—1000 ohms)
No. 323 Transmitter
Special Switchhook (2 make contacts)
No. 46 Induction Coil
No. 0357W Special Lock

Cast iron case with inner and outer door.

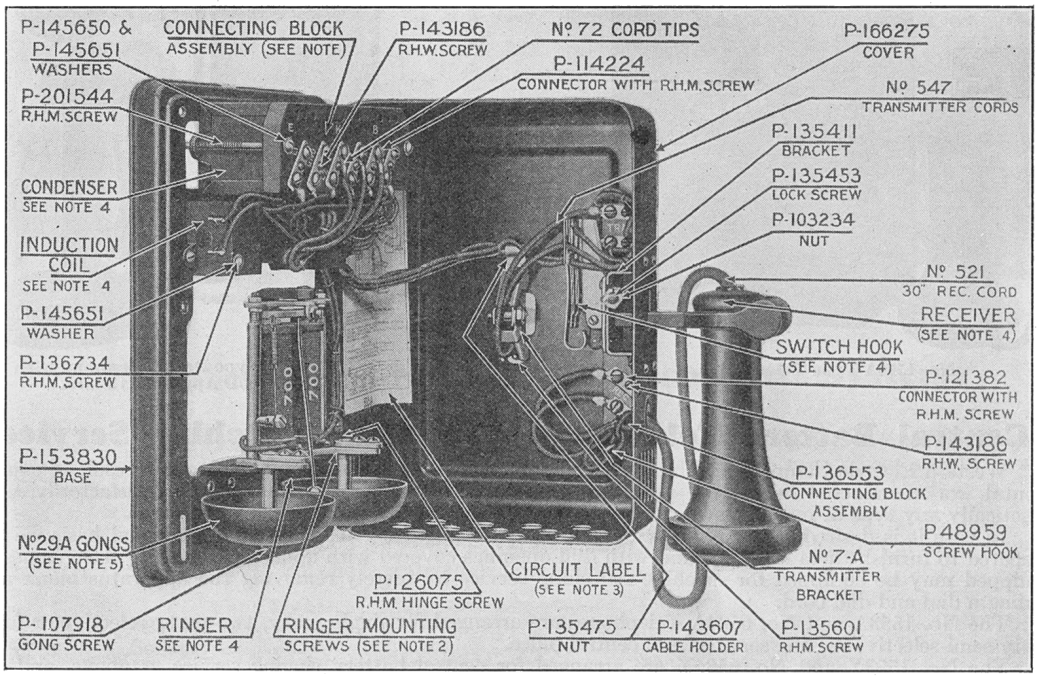
Outer door is not marked. Standard finish, gray paint.

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

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TELEPHONES—CENTRAL BATTERY

No. 1553 Type Telephones (Continued)



Replacement Parts

Note 1. Connecting block assembly for:

Code No.	Part No.
1533A and E	P-158349
1533K	P-158351
1533Y	P-158354
1533AR	P-158355

Note 2. Ringer mounting screws for:

Code No.	Part No.
1533A, K, Y and AR	P-153832
1533E, F, G and H	P-145368

Note 3. Circuit label for:

Code No.	Part No.
1533A	P-144936
1533E, F, G and H	P-144606
1533K	P-144938
1533Y	P-144942
1533AR	P-244024

Note 4. These parts are shown with the code number listings.

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

The replacement parts for ringers, etc., are shown elsewhere under their respective headings.

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TELEPHONES—MACHINE SWITCHING



No. 1553A Type Telephone



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

Central Battery Telephones—Machine Switching Service

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

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

The No. 1553A and No. 6534A Telephones are arranged for single party, two-party selective or four-party semi-selective ringing service from central office.

The No. 1553Y and No. 6534Y are arranged for central battery ringing service as above, and are equipped for local battery talking.

The Nos. 1553E, F, G, H, and 6534E, F, G, H Telephones are arranged for four-party selective or eight-party semi-selective ringing service from central office.

NO. 1553 WALL TYPE

Code No.	Dial	Ringer Code No.	Ringer	Ringer Resistance	Ind. Coil	Condenser	Ringing Current
1553A	As specified in order	8AG		1400	46	21AP	A.C.
1553E		41SG	(33⅓ cycles)	....	46	21F	Harmonic
1553F		41TG	(50 cycles)	....	46	21F	
1553G		41UG	(66⅔ cycles)	....	46	21F	
1553H		41RG	(16⅔ cycles)	....	46	21F	
1553Y		8AG		1400	13	21AP	A.C.

The following apparatus is common to the wall type telephone listed above:

One—No. 140S Switch Hook
One—No. 323 Transmitter
One—No. 143 Receiver
One—No. 521 Receiver Cord—18 inches long
Two—No. 547 Transmitter Cords—8 inches long

NO. 6534 DESK TYPE

Code No.	Desk Stand	Desk Set Box	Ringer Code No.	Ringer Resistance	Ind. Coil	Condenser	Ringing Current
6534A	1051AL	534A	8AG	1400	46	21AP	A.C.
6534E	1051AL	534E	41SG	460	46	21F	Harmonic
6534F	1051AL	534F	41TG	285	46	21F	
6534G	1051AL	534G	41UG	200	46	21F	
6534H	1051AL	534H	41RG	1800	46	21F	
6534Y	1151CN	534Y	8AG	1400	13	21AP	A.C.

INSTRUCTION FOR ORDERING MACHINE SWITCHING TELEPHONES

In addition to specifying the code number of the telephone desired, information must be given as to the dial that is to be furnished as the dial is not included as a part of these telephones (nor is it included in their price). For example, orders should read as follows:

10—No. 1553A Telephones
10—No. 2AA Dials
or
10—No. 6534A Telephones
10—No. 2AA Dials

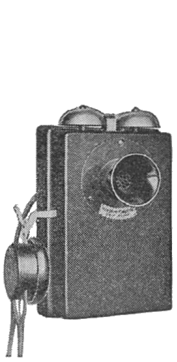
In case the machine switching feature is not desired, the order should read as follows:

10—No. 1553A Telephones, less dial cord
10—No. 50B Apparatus Blanks
or
10—No. 1051AL or CM Desk Stands with
10—No. 50D Apparatus Blanks

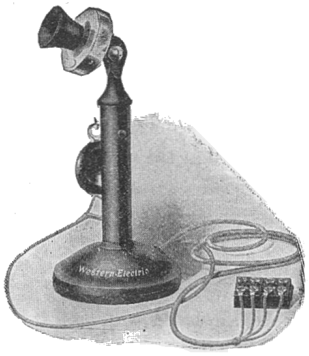
See separate listings of dials, desk stands, desk set boxes and protectors.

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TELEPHONES—CENTRAL BATTERY



No. 1527A



No. 6034AU



No. 6000AE



No. 1539A

Telephones for No. 1801 Switchboard Systems

Systems A and B

The telephones for the No. 1801 Switchboard Systems A and B are of the series talking circuit type and equipped with 140 ohm vibrating bells or buzzers (in accordance with the type of set selected), which operate on direct current.

WALL TELEPHONES

These are black finished metal sets with nickel trimmings for surface or flush mounting as required. The Nos. 1527A and 1539A Sets have watch case type receivers.

Code No.	Mounting	Transmitter	Receiver No.	Receiver Cord	Ringer No.	Switch-Hook	Dimensions Overall, Inches
1527A	Surface	362W	179W	773	12062	P-14150	7½ x 5 x 2⅝
1539A	Flush	362W	179W	773	12062	P-14150	9 x 5 5/16
1533N	Surface	297W	171W	92	116958	140AB	9 3/16 x 6¾ x 3⅝

DESK TELEPHONE

This consists of a black finished desk stand with nickel trimmings having a 140 ohm buzzer in the base and equipped with a watch case type receiver.

Code No.	Desk Stand	Connecting Block	Desk Stand Contains: Trans.	Receiver	Rec. Cord	Stand Cord
6034AU	1043-BJ	2–11A	323	179W	773	534

HAND SET TELEPHONE

Code No.	Hand Set	Apparatus Box	Hand Set Contains: Trans.	Rec.	Cord	Apparatus Box Contains
6043R	1003AC	383H	368W	183W	506	No. 1D Buzzer

System C

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

WALL TELEPHONES

Code No.	Transmitter	Receiver No.	Cord	Ringer No.	Condenser	Induction Coil	Switch Hook	Overall Dimensions
1533M	325W	143	521	116958	21BW	46	140W	9 3/16 x 6¾ x 3⅝

DESK TELEPHONE

Code No.	Desk Stand	Desk Set Box	Desk Stand Contains: Trans.	Rec.	Rec. Cord	Stand Cord	Box Contains: Bell	Cond.	Coil
6000AE	1140CN	295AU	323	143	412	355	101398	21D	20

System D

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

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TELEPHONE (TRANSMITTER) ARMS

Telephone arms are preferred to desk stands by some telephone users as they save space and eliminate the possibility of overturning desk articles and disarranging papers, etc.

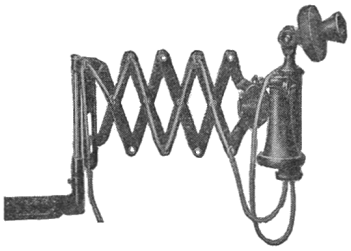
Where a desk telephone has to be used by two or more persons seated at opposite sides of a desk or table the use of a telephone arm is of great convenience and in some cases almost indispensable. Where desk stands are apt to be subjected to particularly rough handling, the cost of maintaining desk telephones can be lessened by the use of transmitter arms, but this is of course true only when the telephone arm employed is of such design as to require very little maintenance.

NO. 147 TYPE

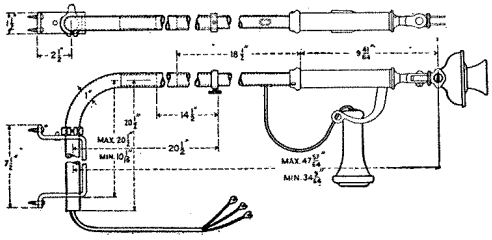
The No. 147 Type is an adjustable folding arm carrying a clamp adapting it to mount a No. 20, 40, or similar Type Deskstand.

The arm is finished in black with nickel trimmings. Equipped with a 2 Type Transmitter Bracket.

	Consists of		
Code No.	Transmitter Arm	Transmitter Arm Bracket	Mounts On
147CA	47C	2A	Either side of roll top desk
147CB	47C	2B	Wall or side of flat top desk
147CC	47C	2C	Top of flat top desk



No. 1048AA



No. 1020CC Telephone Arm

Telephone (Transmitter) Arms For Standard Central And Local Battery Service

The No. 1020 Type Telephone Arm is recommended where a non-collapsible rotating type of arm is required.

The No. 1048 Type Telephone Arm is a collapsible gate type and can also be rotated in a horizontal plane. The highest grade of materials and construction are employed to assure that the arm will not sag materially even after extensive service.

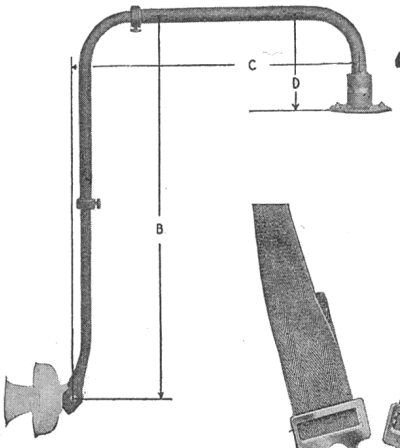
These telephone arms have rust-proof black finish with nickel-plated trimmings. In addition to the component parts listed in the following, each telephone arm includes the No. 323 Transmitter and No. 143 Receiver.

	Consists of					
		Cord Nos.				
Code No.	Tel. Arm Bracket	Rec.	Trans.	Tel.	Mounting	Equivalent to Deskstand
1020CC	....	549 2 ft. 6 ins.	2T1A 9⅞ ins.	550 8 ft. 0 ins.	.....	1040AL
1048AA	2A	549 2 ft. 6 ins.	2T1A 9⅞ ins.	550 5 ft. 6 ins.	Either side of roll top desk	1040AL

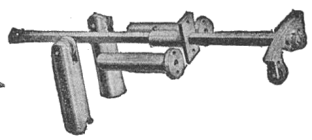
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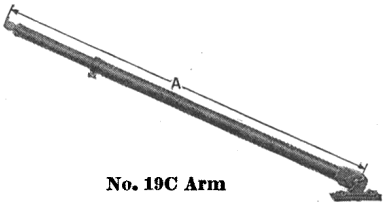
TELEPHONE TRANSMITTER ARMS, ATTACHMENTS AND BRACKETS

Code No.	Tel. Arm Bracket	Consists of — Cord Nos. — Rec.	Trans.	Tel.	Mounting	Equivalent to Deskstand
1048AB	2B	549, 2 ft. 6 ins.	2T1A, 9⅞ ins.	550, 5 ft. 6 ins.	Wall or side of flat top desk	1040AL
1048AC	2C	549, 2 ft. 6 ins.	2T1A, 9⅞ ins.	550, 5 ft. 6 ins.	Top of flat top desk	1040AL
1048BA	2A	196, 2 ft. 6 ins.	2T1A, 9⅞ ins.	287, 5 ft. 6 ins.	Either side of roll top desk	1040CN
1048BB	2B	196, 2 ft. 6 ins.	2T1A, 9⅞ ins.	287, 5 ft. 6 ins	Wall or side of flat top desk	1040CN
1048BC	2C	196, 2 ft. 6 ins.	2T1A, 9⅞ ins.	287, 5 ft. 6 ins.	Top of flat top desk	1040CN

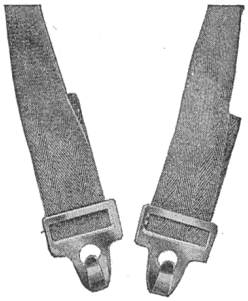


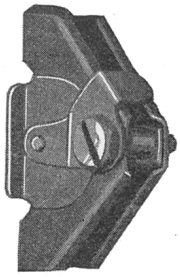
No. 50 & 51 Type Arms

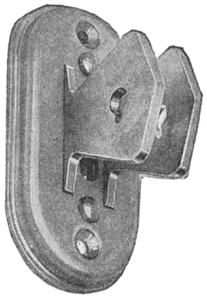

No. 7A Arm



No. 19C Arm


No. 3A Attachment


No. 7A Bracket


No. 8A Bracket

Transmitter Arms

FOR SWITCHBOARDS

Using Suspended Transmitters

The code number does not include transmitter or cords.

Code No.	Description
7A	Consists of one arm, two cord escutcheons with tubes, and two No. 103 Cord Weights. Furnished in brass, lacquered finish, unless otherwise specified. In ordering, specify whether 7 in. or 13 in. cord escutcheon tubes are desired.
7G	Same as No. 7A, except has a black lacquer finish.
19C	Oxidized copper finish. Dimensions A: maximum, 28¾ ins., minimum, 16 ins.
19D	Oxidized copper finish. Dimensions A: maximum, 19$^{7}/_{16}$ ins., minimum, 11$^{5}/_{16}$ ins.

USING TRANSMITTER WITH A LUG

The code number does not include transmitter or cords.
No. 50 and No. 51 Types have a black finish.

NO. 50 TYPE

Code No.	Dimensions, Ins. B Max.	B Min.	C Max.	C Min.	D
50A	25¼	18¾	22¼	14¼	5¼
50B	18¼	12	22¼	14¼	5¼
50C	14¾	12	22¼	14¼	*

NO. 51 TYPE

Code No.	Dimensions, Ins. B Max.	B Min.	C	D
51B	18	12¾	17	10½

* Minimum, 5¼ ins., but may be increased by 1 in. steps to a maximum of 12¼ ins.

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TELEPHONE ATTACHMENTS AND BRACKETS

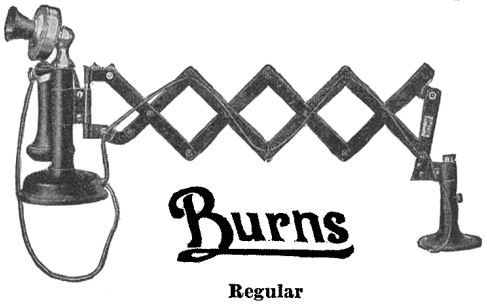
Transmitter Attachments

Code No.	Color of Strap	Description
2A	.....	Nickel plated buckle used in connection with the No. 3 Type Transmitter Attachments.
3A	Slate	These transmitter attachments consist of a tape strap equipped with two No. 2A Transmitter Attachments. They are used for supporting operator's chest type transmitters. Overall length, 21½ inches. (For use with No. 234 Transmitter.)
3B	Black	
3C	White	

Transmitter Brackets

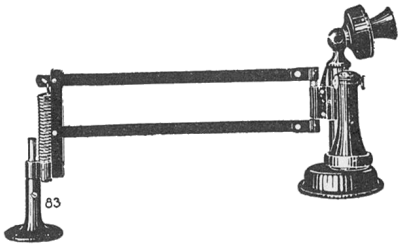
These transmitter brackets will mount any Western Electric transmitter that is equipped with a mounting lug and screw, for example the 323 Transmitter.

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.



Regular

Burns Brackets



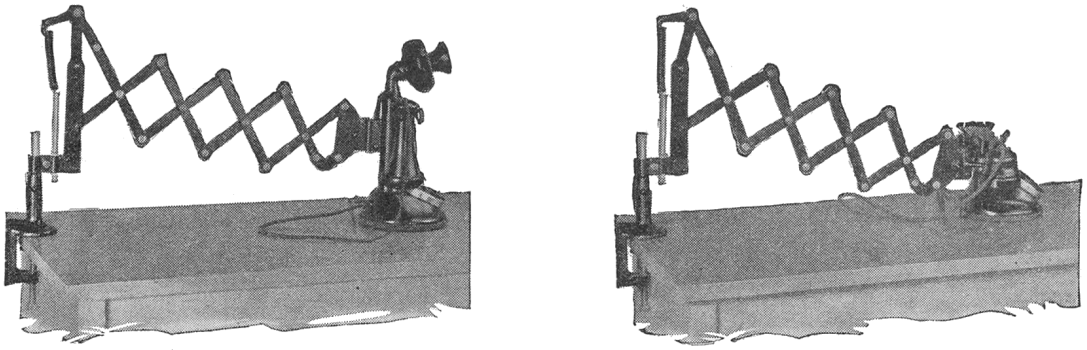
No. 95 "EZ" Equipped with No. 83 Mounting and "B" Clamp

Regular Burns Brackets are adjustable in-and-out. The telephone swivels on the front rod, the bracket revolves on the base. Easily mounted on desk, wall or other convenient place.

Number	*Length of Bracket Extended	Approximate Shipping Weight	Number	*Length of Bracket Extended	Approximate Shipping Weight
87	26 in.	5 lbs.	147	38 in.	5¾ lbs.
107	30 in.	5¼ lbs.	167	42 in.	6 lbs.
127	34 in.	5½ lbs.			

* Measuring from center of mounting to mouthpiece.

Burns Dial Bracket



Especially designed for use with automatic telephone. Special hinged arm allows base to rest firmly on desk when dialing. Adjustable to different lengths. Furnished with any mounting or clamp desired.

D-87 28″ Burns Dial Bracket D-127 32″ Burns Dial Bracket D-147 38″ Burns Dial Bracket

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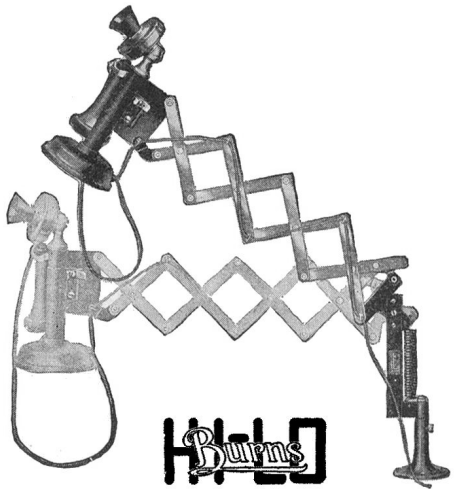
TELEPHONE BRACKETS AND BRACKET MOUNTINGS

Burns HI-LO Brackets

Burns HI-LO Brackets are adjustable in-and-out, up-and-down, and down-and-up. The arm is self-balancing and permits use of telephone from a standing or sitting position.

Number	*Length of Bracket Extended	Approximate Shipping Weight
H87	28 in.	6 lbs.
H127	32 in.	6½ lbs.
H147	38 in.	7 lbs.

* Measuring from center of mounting to mouthpiece.

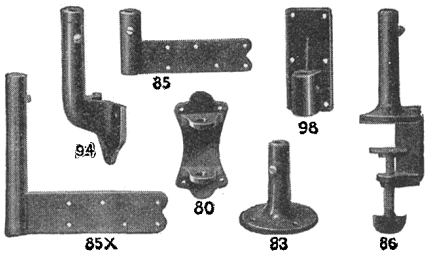


"EZ" Telephone Brackets Type

The "EZ" Telephone Bracket permits of a deskstand being instantly adjusted to a height convenient to the user. In addition to this the arm is pivoted on its mounting and may therefore be rotated in a horizontal plane. (24-in. radius.)

An "EZ" Telephone Bracket consists of:

1 Arm.
1 Mounting as specified in the order.
1 Clamp as specified in the order.



Mountings

Mountings for Telephone Brackets

No. 80 for wall, post, window frame.
No. 83 for top of flat top desk.
No. 85, 85X for side of roll top desk.
No. 86 for clamping to edge of desk.
No. 94 for desk or for wall.
No. 98 for window ledge, railing, etc.

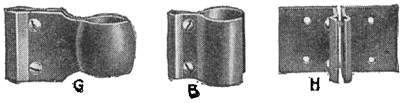
Brackets complete with 80, 83, 85, 85X, 94 or 98 Mounting and any style clamp are standard complete equipment. Brackets equipped with No. 86 Mounting are furnished at extra charge. Standard finish is black enamel.

Clamps for Burns Telephone Brackets

CLAMPS

For holding desk stands of different designs the following types of clamps are provided:

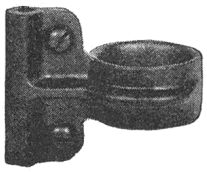
"B" for any desk telephone with straight stem.



"G" for old style automatic stand with bulging stem.

"H" clamp for box telephone or for attaching to flat surface.

"C" clamp for W. E. Cradle Set.

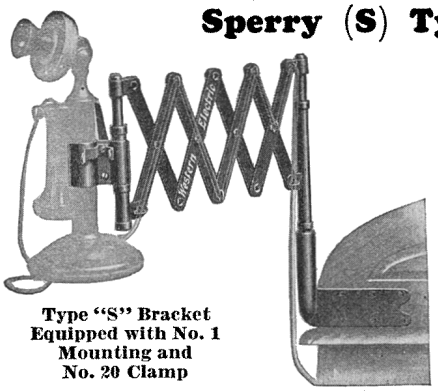


"C"

TCI Library- http://www.telephonecollectors.info/

TELEPHONE BRACKETS

Sperry (S) Type Telephone Brackets



Type "S" Bracket Equipped with No. 1 Mounting and No. 20 Clamp

This bracket is of the "folding gate" type, and is arranged so as to revolve on its base. The desk stand swivels on the front rod. The bracket will be furnished with any of the mountings described below and with the No. 20 Clamp.

When ordering specify the letter of the clamp and mounting that is wanted in addition to the code number of the telephone bracket.

Code No.	Length of Bracket Extended, Ins.	Approximate Shipping Weight
S-8	26	5½ lbs.
S-10	30	6 lbs.
S-12	34	6½ lbs.
S-14	38	6½ lbs.
S-16	42	7 lbs.

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.

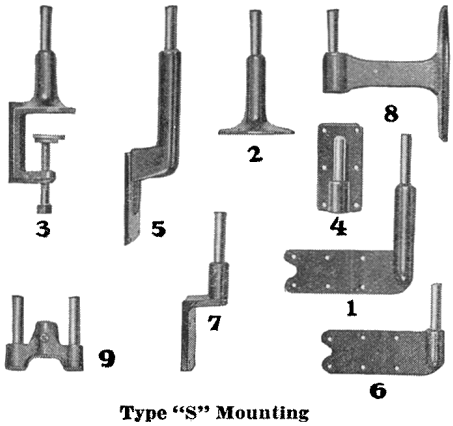
Mountings For "S" Type Telephone Brackets

Code No.	Use
1	For use on side of flat or roll top desk.
2	For use on top of flat top desk.
3	Clamps on edge of flat top desk.*
4	For use on wall or partition.
5	For use on side of flat top desk.*
6A	For use on side of flat or roll top desk.*
7	For use on side of flat top desk.*

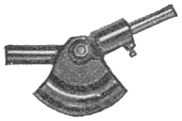
Clamps for "S" Type Telephone Brackets

Code No.	Use
20	This clamp fits telephones with a cylindrical stem such as the Nos. 1020 and 1040 Types.
21	This clamp fits telephones with convex shaped stems.*

* Not stocked. Furnished on order only.



Type "S" Mounting



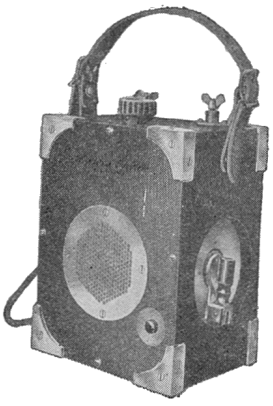
Universal Attachment

Universal Attachment

The Universal Attachment fits any standard "S" Arm and can be installed between the arm and mounting. It readily adapts the standard bracket so that the telephone can be used from a standing or sitting position.

LINEMEN'S TEST SETS

No. 1017 Type



No. 1017B Test Set

The No. 1017B Lineman's Test Set contains a two-position dial switch actuated by a knob and located at the top of the cabinet. A push-button is located on the front of the cabinet. The dial switch is marked "Talk" and "Ring." In the "Talk" position, the operator can listen in directly on the line. When he wishes to talk he must depress the push-button and keep it depressed while talking. In the "Ring" position the buzzer and hand generator are connected in series to the line. The generator will operate the buzzer through a total line resistance of 2500 ohms.

The No. 1017C Test Set is more efficient than the No. 1017B Set in that it is equipped with a more powerful generator and instead of using a push-button in the battery circuit, a receiver switch is provided which is actuated by the removal or replacement of the receiver in the side of the cabinet. The dial switch is marked "Talk and Listen," "Open," and "Listen Only." In the "Talk and Listen" position, the removal of the receiver from the side

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LINEMEN'S TEST SETS—Continued

of the cabinet closes the transmitter and battery circuit for talking and listening purposes. In the "Listen Only" position, the transmitter battery circuit is open. This position of the switch enables the lineman to listen continuously on a connection without running down the battery. The buzzer and hand generator are connected in series on an open circuit, the operation of the hand generator will close the circuit and will operate the buzzer through a total line resistance of 5000 ohms. The generator will operate a No. 19A Drop through 11,500 ohms resistance.

The No. 1017E Test Set is the same as the No. 1017C Test Set except that it has a larger cabinet and is equipped with the No. 6000A Interrupter. This is a high speed interrupter operated by the generator gear wheel and is used for furnishing high frequency current for ringing on composited lines. The interrupter consists of a commutator, a No. 21K Condenser equipped with leads, and a small switch for cutting the commutator in and out of the circuit. (Other apparatus listed below.)

Code No.	Transmitter	Receiver	Receiver Cord	Generator	Buzzer (100 Ohms)	Battery (Eveready)	Size of Case, Inches
1017B	266	515	572 (2 ft.)	29B	2D	703	$8\frac{11}{16} \times 6\frac{3}{32} \times 4\frac{27}{32}$
1017C	266	515	572 (2 ft.)	29F	2D	703	$8\frac{11}{16} \times 6\frac{3}{32} \times 4\frac{27}{32}$
1017E	266	515	572 (2 ft.)	29F	2D	714	$9\frac{3}{4} \times 6\frac{5}{8} \times 4\frac{13}{16}$

Note. In addition to the above each set also contains a No. 13 Induction Coil.

1526 TYPE

This type of set has been developed primarily for communication over open wire lines and is more adaptable for this purpose than the 1017 Type Test Set. The transmitter was designed to prevent the entrance of moisture or rain. Exposed metal parts have been eliminated as a protection against outside contacts and short circuits. It is of rugged construction and designed to withstand jarring and rough handling. Two No. 771 Eveready Batteries are required but furnished only when ordered.

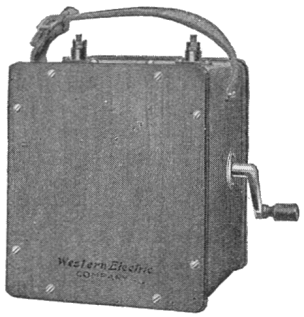
The 1526A contains the following apparatus.
- 1—526A Subscriber Set containing
  - 1—29G Generator
  - 1—31 Induction Coil
  - 2—T1A Cords, 6 in. long.
- 1—397A Transmitter
- 1—562A Receiver
- 1—R2AJ Cord

The 1526B contains the following apparatus.
- 1—526B Subscriber Set containing
  - 1—29G Generator
  - 1—71 Induction Coil
  - 2—T1A Cords, 6 in. long
- 1—398A Transmitter
- 1—562A Receiver
- 1—R2AJ Cord

Nos. 90512 to 90530

Consist of a generator and ringer, in series for testing through various line resistances.

The case of the set is finished in birch and is designed to withstand rough handling. A leather strap handle is provided.



No. 90530 Test Set

List No.	Generator	Ringer Type	Ringer Ohms	Gen. Operates Ringer Through	Size of Case in Inches
90530	22K	19B	2500	10,000 ohms	$5\frac{3}{4} \times 6\frac{5}{8} \times 5\frac{1}{4}$
90510	22K	19H	500	35,000 ohms	
90511	22N	19A	1000	50,000 ohms	
90512	22N	19B	2500	100,000 ohms	

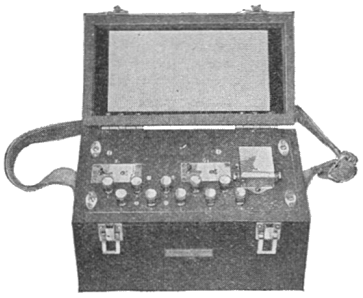
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LINEMEN'S TEST SETS

No. 43A Test Set

This is a portable set designed as a cable splicer's test set in connection with the installation and maintenance of cable in manual or dial system areas. It consists of a buzzer circuit which provides tone for identifying wires, for balance testing and for running down low resistance faults on short non-loaded cable by the exploring coil method; together with auxiliary circuits which provide a battery for detecting defective pairs by receiver battery tests or for energizing the transmitter of a talking set. It also consists of a ringer buzzer by means of which the splicer may be called from a central office when communication with him is desired.

The woodwork is birch, finished in olive green.



No. 43A Test Set

No. 45A Test Set

This is a portable set designed to facilitate the usual testing done by splicers in connection with the installation and maintenance of cables. It provides a space for a battery which by means of a dial switch in the test set furnishes a voltage of either 4½, 9, 31½ or 54 volts for supplying direct current for Wheatstone bridge measurements. It includes a buzzer circuit which provides tone for identifying wires, for balance testing and for locating low resistance faults on a short non-loaded cable by the exploring coil method.

The woodwork is birch, finished in olive green.

No. 1020C Test Set



No. 1020C Test Set

This portable cable test set consists of a special vibrating device, an exploring coil and a receiver. It is used for locating short circuits, grounds and wet spots in cable and it is so designed that it may also be utilized in testing the continuity and insulation of the conductors or to locate special pairs of wires. This set, therefore, includes the usual cable splicer's equipment as well as the exploring coil features.

In operating the set for the location of grounds and short circuits, the vibrating element is used to place a varying voltage upon the line being tested and the operator, by passing along the cable with the exploring coil and telephone receiver, can tell when he passes the fault for which he is testing by the change which then results in the sound produced in his telephone receiver.

An electro-magnetic mechanism is provided for making interruptions in the circuit of the vibrator, producing a distinctive tone which can easily be recognized. The design features of the vibrating coil give a long battery life.

The exploring coil is waterproofed in order that it will not be injured through accidental contact with water when being passed over cable in manholes, etc.

The set is accurate in its results, simple and easy to operate and requires no mathematical calculations.

An instruction book for adjusting, operating and maintaining is furnished with each set.

The No. 1020C Test Set is a combination of No. 20C and No. 1019C Test Sets.

The No. 20C Test Set consists of 3 No. 540 Cords, 1 No. 18AC Resistance, 1 No. 21K Condenser, 1 Vibrator, 1 Interrupter and 1 Two-point Switch.

The No. 1019C Test Set consists of 1 No. 19C Test Set (exploring coil), 1 No. 747 Cord, 1 No. 186 Plug and 1 No. 528BW Receiver.

Overall dimensions 12 x 10½ x 6½ inches.

Material, birch with mahogany finish.

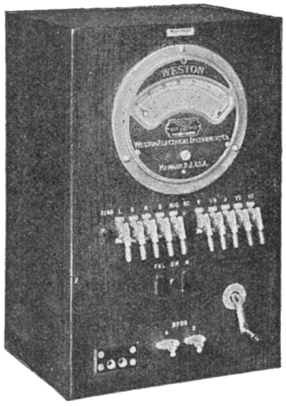
Weight, without batteries, 12½ pounds.

All metal corner pieces, lock, etc., are finished in nickel. The leather carrying strap has an adjusting buckle.

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LINEMEN'S TEST SETS

No. 1407C Testing Cabinet



No. 1407C Test Cabinet

This cabinet provides adequate, efficient, and reliable testing equipment, which is adaptable to either magneto or central battery systems. All classes of trouble, such as grounds, short circuits, crosses, open circuits, high resistance, can be tested for and the location calculated from the direct reading voltmeter 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.

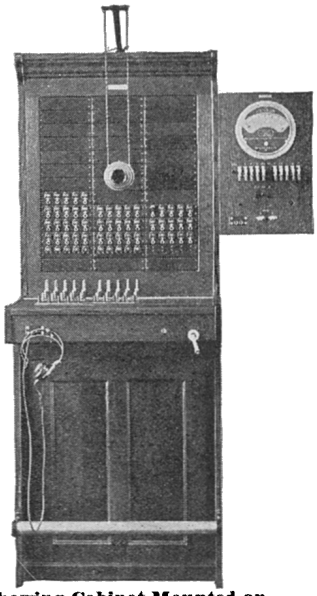
1—Operator's circuit, complete with head receiver and chest type transmitter.

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.



Showing Cabinet Mounted on Switchboard

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.

Group No. 6

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

Group No. 7

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

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LINEMEN'S TEST SETS

No. 1407C Testing Cabinet—Continued

Group No. 8

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

Group No. 9

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

Group No. 10

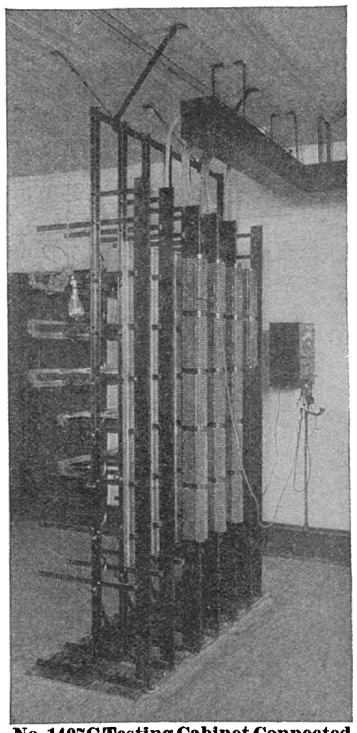
Consists of hand generator equipment for four-party pulsating ringing. This group is not necessary in all cases of four-party pulsating ringing, as ringing current can frequently be obtained from the hand generator on the switchboard, alongside of which the cabinet is sometimes mounted, or from the interrupter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

Group No. 11

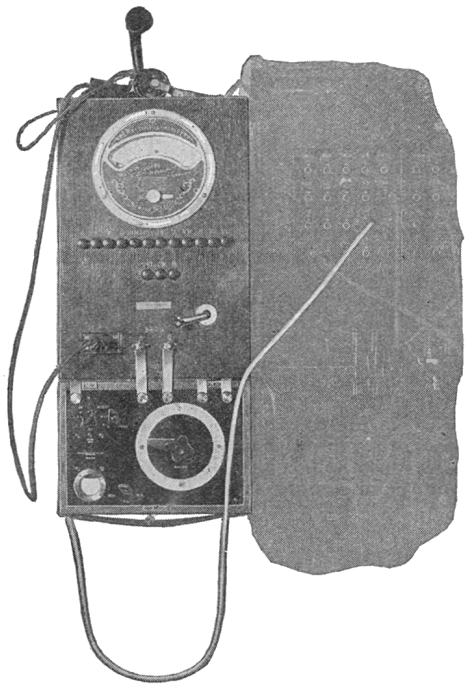
Call circuit and telephone line equipment for central battery system. This is used when the testing cabinet is located away from the switchboard, and enables the test man to receive and send calls.

Group No. 12

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



No. 1407C Testing Cabinet Connected to Main Distributing Frame



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

Auxiliary Equipment for Use With No. 1407C Testing Cabinet

NO. 1407A BRIDGE UNIT

For a more accurate means of making resistance measurements than is possible with a voltmeter, the No. 1407A Bridge Unit was developed. It consists of a Wheatstone Bridge outfit and is so designed that it will line up and attach by means of No. 1407B Bracket Unit to the bottom of a No. 1407C Testing Cabinet.

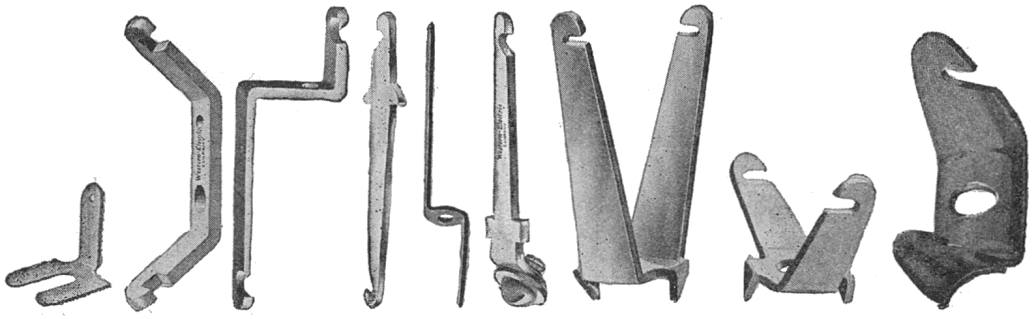
With this equipment Murray and Varley loop tests as well as straight resistance measurements can be quickly made in addition to the regular voltmeter testing possible with the No. 1407C Testing Cabinet.

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

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

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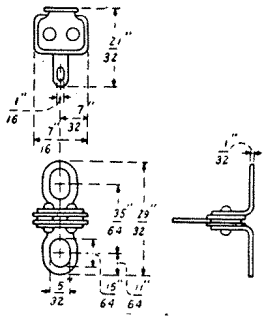
TERMINAL PUNCHINGS



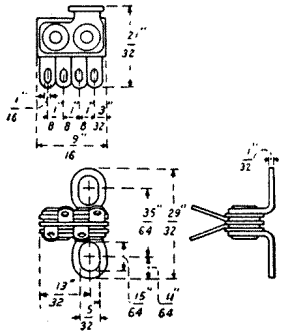
No. 3 No. 6 No. 8 No. 9 No. 13A No. 14 No. 15A No. 16A No. 17A

TERMINAL PUNCHINGS

Code No.	Material	Use
3	Nickel Silver	On fuse posts and fuse blocks.
6	Brass, tinned ends	For the ground side of ringing leads.
8	Brass, tinned ends	On double sided connecting racks.
9	Brass, tinned ends	On No. 10 Switchboards.
12A	Nickel Silver	.....
13A	Brass, dip tin finish	On double sided connecting racks.
14	Brass, one end tinned	For screw connection on one end.
15A	Brass, tinned ends	On one sided connecting racks.
16A	Brass, tinned ends	On repeating coils and retardation coils.
17A	Brass, tinned ends	On induction coils and telephone coils.
18A	Brass, tinned ends	.....
21A	Brass, dip tin finish	On repeating coils, induction coils and retardation coils.



No. 25A



No. 26A

NOS. 25 AND 26 TYPES

Terminal punchings for use in connection with relays as extra terminals to which wires may be soldered for strapping, grounding, pairing, etc. Mount under relay mounting screws on terminal side of relay mounting plate.

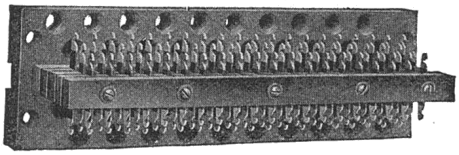
Code No.	No. of Terminals	Used with Relays
25A	1	For use with B and G Type Relays on No. 606 or similar type mounting plates and with A, E, F and H Type Relays on No. 737 or similar type mounting plates.
26A	2	Same as No. 25 Type, except provided with 7/16 in. mounting screws, with nuts to replace those furnished with relays.

No. 30 TYPE

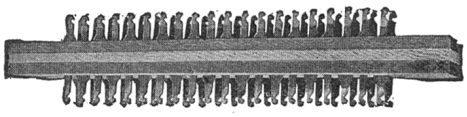
Consists of twenty terminals. Intended for use in central offices on "A" Type Main Frames in connection with the No. 21A Bracket for grounding spare conductors in outside plant cables when fuses are omitted between aerial plant and underground cables.

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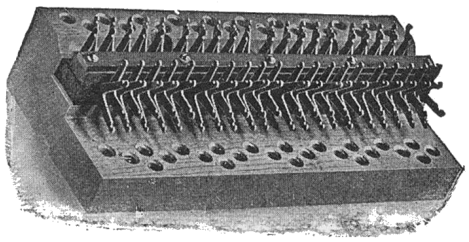
TERMINAL STRIPS



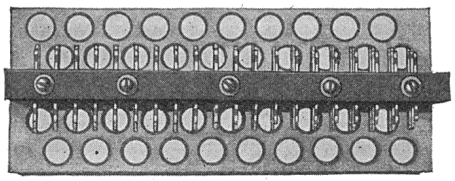
No. 35



No. 53



No. 65



Nos. 100A and 101A

Terminal Strips

The Nos. 53 and 69 Terminal Strips are composed of a 3 ply laminated maple wooden base having holes into which the terminal punchings are driven.

All other models have a solid maple base upon which are assembled hard rubber insulating strips which hold the terminal punchings in place. The base is drilled to act as a fanning strip for wires and the holes are chamfered to prevent injury of the insulation. These terminal strips are furnished unnumbered unless otherwise specified. The Nos. 100 and 101 Types are provided with a clamping strip which is wide enough to permit of four characters being used for each stack of terminals. The Nos. 100 and 101 Types are arranged to mount on a ½ inch by ½ inch bar by means of two 1¼ inch No. 10-32 round head iron machine screws, which are furnished with the terminal strips.

The Nos. 65 and 93 Types are for use with main distributing frames.

The No. 53 Type is for use with No. 9 Switchboards.

The Nos. 35 to 70 Types are for use with intermediate distributing frames.

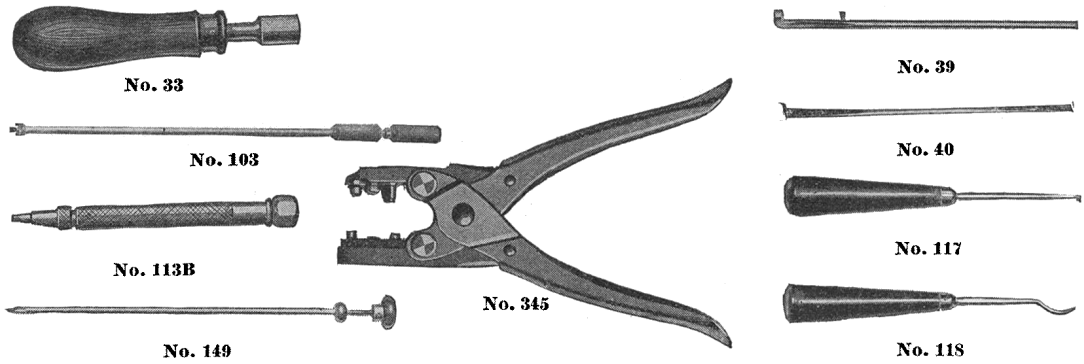
The Nos. 85, 88, 100 and 101 Types are for general switchboard purposes.

Code No.	Number of Terminals per Row	Number of Rows of Terminals	Length of Strips in Ins.	Width	Height Overall
35	20	3	7 31/32	2 17/32	2 1/2
36	20	4	7 31/32	2 17/32	2 29/32
37	20	5	7 31/32	2 17/32	3 1/4
38	20	3	6 15/32	2 19/32	2 1/2
39	20	4	6 15/32	2 19/32	2 27/32
40	20	5	6 15/32	2 19/32	3 1/4
41	20	6	6 15/32	2 19/32	3 5/8
51	20	6	7 31/32	2 17/32	3 5/8
53	20	2	10	31/32	2
65	*40	1	7 31/32	3 3/8	2 1/8
69	20	3	10	31/32	2
70	20	7	7 31/32	2 15/16	4
83	20	2	13 1/2	1	1 7/8
85	20	6	6 15/32	2 19/32	4 1/64
88	20	4	6 15/32	2 19/32	3 1/4
93	20	4	7 31/32	3 3/8	2 63/64
99	50	6	14 7/16	2 19/32	3 1/2
100A	20	3	6 1/16	2 15/16	2 29/32
100B	20	4	6 1/16	2 15/16	3 9/32
100C	20	5	6 1/16	2 15/16	3 21/32
100D	20	6	6 1/16	2 15/16	4 1/32
101A	20	3	7 9/16	2 15/16	2 29/32
101B	20	4	7 9/16	2 15/16	3 9/32
137A	50	6	14 7/16	2 19/32	3 15/16
148A	22	7	8	2 19/32	4 25/64
163A	50	8	14 7/16	2 19/32	4 1/8

* Three way.

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TOOLS



CABLE AND CABLE TERMINAL TOOLS

Code No.	Use	Approximate Dimensions Inches, Overall
93	Maple wedge for use as a multiple cable lifter	18 x 5 x 1
216B	Combination double end screw driver and double end socket (taking hexagonal nuts, 3/8 in. and 7/16 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. Ends are insulated from each other. Replaces No. 30	6 3/4
287	A flat steel blade with a slot at one end which is bent up at an angle of 15 degrees. Has wood handle. Intended for sewing switchboard cable in run	6
288	A spring steel blade mounted in a metal handle. Blade is slotted at the edge at 15° angle, the inside edge of which is sharpened. For use in stripping braid from switchboard cable	5 1/2
311	A double ended socket wrench for use on 3/8 in. or 7/16 in. hexagonal nuts, also has slots at either end for inserting a screw-driver	.....

DISTRIBUTING FRAME TOOLS

33	Socket wrench for use on 11/32 in. hexagonal nuts on distributing frames, shank	1 3/8 x 7/16

DROP TOOLS

39	Shutter support adjuster, used on drops	5 3/4 x 5/16 x 5/32
40	Double screw-driver for use on drops. One end bent at angle of 90 degrees	7 x 9/32 x 5/32

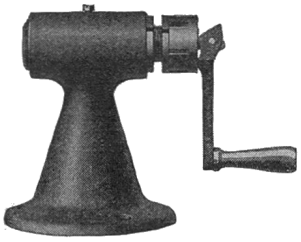
JACK TOOLS

103	Wrench and screw-driver for adjusting No. 16 Jack Fastener	27 x 1
113B	A steel holder with a removable steel blade having a screw-driver edge at one end. Approximate diameters; holder 31 3/32 inches long; blade 2 9/32 inch long. Intended for use in removing the underlining of jack mountings. Replaces No. 113	4 5/16 x 3/8
117	Adjusting tip and ring springs of Nos. 49 and 92 Jacks. Used with No. 118 Tool for adjusting abnormally bent ring springs	7 9/16 x 1
118	With No. 117 Tool for adjusting abnormally bent ring springs of No. 92 Jacks	7 3/8 x 1
149	Spring tweezers for use in holding wires to jack terminals while soldering	21 1/2 x 1 3/4
338	Strip of insulating material. Intended for opening the jack springs on line switchboards in step-by-step machine switching equipments for cutover purposes	4 15/64 x 33/64
345	Consists of a parallel jaw plier handle and two tool heads, one on each jaw, arranged so that they may be rotated in turret fashion. For use on No. 92 Jacks to remove old sleeves and replace them with new sleeves	7 1/4 x 1 1/8
409A	Consists of a handle, two hand wheels, a cam shaft and a steel housing. For use in the field for offsetting the terminal tang of Nos. 49 and 141 Type Jack Sleeves for the purpose of holding the sleeves in place in the jack mountings	.....

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TOOLS

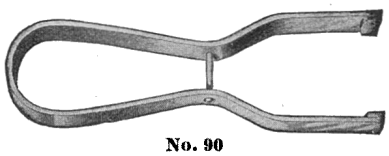
(Continued)



No. 316



No. 116



No. 90



No. 213

KEY TOOLS

Code No.	Use	Approximate Dimensions Inches, Overall
105	Adjusting springs on No. 453 or vertical type keys	$3\frac{1}{32} \times \frac{1}{4} \times \frac{15}{64}$
143	Adjusting springs of horizontal type keys	$4\frac{1}{4} \times 3\frac{3}{4} \times \frac{15}{64}$

LAMPS AND LAMP CAP TOOLS

116	Removing No. 2 Type Lamps	$3\frac{7}{8}$
319B	For removing No. 2 Type Lamp Caps and Nos. 59 and 60 Type Number Plates. Similar to the No. 58 Tool. Replaces No. 146	$4\frac{5}{8} \times 1\frac{7}{8}$

MESSAGE REGISTER TOOL

90	For removing caps of Message Registers	$6\frac{3}{16} \times 1\frac{5}{8} \times \frac{1}{2}$

PLUG TOOLS

213	Socket wrench for use in adjusting nuts of Nos. 103 and 137 Plugs and consists of a hardened steel socket attached to a wood handle	$6\frac{1}{2} \times 1\frac{1}{4}$
255	Grooved pliers for use in conjunction with Nos. 200, 201 and 202 Tools for attaching plugs to repaired cords	$6\frac{1}{4} \times 1\frac{25}{32} \times \frac{1}{2}$
316	Consists essentially of a hollow shaft which is equipped with a crank and contains a chuck. This shaft is provided with a collar whereby the chuck is adjusted to grip the stop shoulder of a No. 109 or No. 110 Plug. Replaces combination of Nos. 200, 201 and 202 Tools	$6 \times 7\frac{11}{16}$
KS-2348	Combination tool for inserting and extracting shell and connecting screws of plugs. (Replacing No. 109)	.....

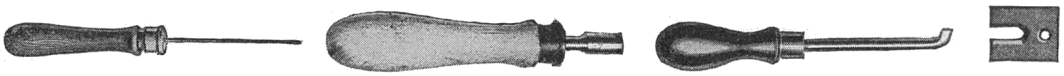
PORTABLE TESTING EQUIPMENT

360B	Spring chuck for use in conjunction with No. 364 Tool and arranged to attach Nos. 891, 892, 893 or similar cords. Has black shell of insulating material.	$1 \times \frac{1}{4}$
360C	Spring chuck for use in conjunction with No. 365 Tool and arranged to attach Nos. 891, 892, 893 or similar cords. Has white shell of insulating material.	$1 \times \frac{1}{4}$
364	For use in conjunction with No. 360 Type Tools, in connection with portable testing equipment	$1\frac{15}{32} \times \frac{1}{2} \times \frac{3}{32}$
365	For use in conjunction with No. 360 Type Tools, in connection with portable testing equipment	$1\frac{5}{8} \times \frac{3}{8}$

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TOOLS

(Continued)



No. 35 No. 45 No. 50 No. 136

PROTECTOR TOOLS

These Include Fuse, Heat Coils, Etc.

Code No.	Use	Approximate Dimensions Inches, Overall
84	Wrench and screw-driver for No. 7 Type Fuses. Fits 7/16 hexagonal nuts	2 5/8 x 1 3/4 x 5/8
351	A brush for use in cleaning protector blocks and designed to mount on the end of the No. 3A Carrying Case by means of a screw which is provided	2 3/8 x 7/8 x 5/8
KS-2827	Pliers for use in handling heat coils of protectors	.....

RELAY TOOLS

35	Screw-driver with blade 9/64 in. wide used with relays, shank	3 1/2
43	Double wrench arranged for .195 in. and .260 in. hexagonal nuts	4 x 1/2
45	Socket wrench for 5/16 in. hexagonal armature adjusting nuts of relays, shank.	1 3/16 x 7/16
46	Removing 3/8 in. hexagonal cap nuts from relays of No. 122 Type, shank	1 3/8 x 1/2
48	Wrench and screw-driver for adjusting armature contacts of relays. Will fit 1/4 in. hexagonal nuts	4 5/8 x 3/8
50	Relay spring adjustment	5 3/4
72	Wrench and screw-driver for adjusting armature contact screws. Same as No. 48 except arranged for 3/16 in. and 5/32 in. hexagonal nuts	4 5/8 x 5/16
130	For use in adjusting the middle bank of springs on the No. 125 Type Relays	5 x 15/16 x 17/32
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	5/8 x 1/2
136B	Similar to the No. 136 except that it has a spring construction	3/4 x 1/2
206	An off-set screw-driver used with the No. 207 Tool for adjusting the screws holding the springs on flat type relays ("E" types) after the relays have been mounted	5 x 1/4
207	Used with No. 206 Tool	5 x 1/4
212	A non-magnetic tool used for adjusting contact and pole piece screws of the Nos. 206 and 209 Type Relays	2 13/16 x 3/4
221	Consists of a combination of the Nos. 35, 219 and 220 Tools	7 7/16
252	An offset contact clip for making connections with relay springs under operating conditions	15/16 x 13/16 x 7/16
259	A single piece, bar shaped, vanadium steel tool. From the side of one end extend two beveled tipped jaws. These tips are so proportioned that they can be inserted between the springs of the "A" and "E" Type Relays thus permitting of adjusting them to the proper tension	5 9/16 x 9/32
300	Intended for use to adjust relay springs. Handle covered with cotton sleeving.	5 5/8 x 3/16
265B	Designed for cleaning contact points of relays. Consists of a No. 266B Tool mounted in a chuck which has a rubber handle and a magazine containing 5 spare No. 266B Tools	4 31/32 x 1 3/32
266B	Part of No. 265B Tool for cleaning contact points of relays	1 1/2 x 3/16 x .0035
268	For adjusting contact springs of relays. For use in P.B.X. switchboards of the No. 550 S.C. Type	5 1/2 x 1/4
270	For use in adjusting contact springs of relays used in P.B.X. switchboards of the No. 550 S.C. Type	3 7/8 x 1/4
324	Fibre strip. Rounded end used to hold armature of bridge cut-off relays on line switches in step-by-step dial equipments in operated position for cut-over and maintenance purposes	2 13/16 x 3/4
340	For adjusting armature and contact air gaps on polarized relays of the Nos. 206 and 215 Types	3 x 1/4
349	A double-ended wrench, one end fits hexagon nuts of "E" type relays which are 3/16 inch across flats—other end fits nuts of No. 207 Relays which are 7/32 inch across flats	1 9/16 x 3/8 x 1/16

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TOOLS

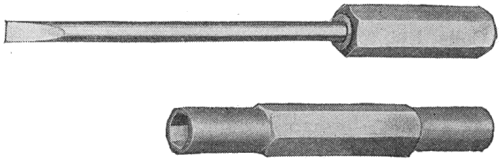
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No. 96



No. 129



No. 48 Tool



No. 144 Tool



No. 115 Tool



No. 145 Tool

RELAY TOOLS (Continued)

Code No.	Use	Approximate Dimensions Inches, Overall
350	For use in adjusting front contact spring of No. 118 Type Relay	$3\frac{15}{16} \times \frac{1}{4}$
360A	Spring chuck for use in conjunction with No. 361 Tool and arranged to attach Nos. 891, 892, 893 or similar cords. Has red shell of insulating material	$1 \times \frac{1}{4}$
361	For use in conjunction with No. 360 Type Tools to make connections with winding terminals of "E" and "R" Type Relays from contact end of relay.	$4\frac{3}{4}$
373	Handle for holding Nos. 374A and B Tools separately or simultaneously	$3\frac{3}{4} \times \frac{1}{2}$
374A	Intended for use in burnishing contact points. Can be held in jaws of No. 373 Tool	$5 \times \frac{15}{64}$
374B	Intended for use in burnishing contact points. Can be held in jaws of No. 373 Tool	$2\frac{33}{64} \times \frac{15}{64}$

RESISTANCE COIL TOOLS

276	Socket wrench for adjusting mounting nuts of Nos. 18 or 19 Resistances. (Similar in design to No. 94 Tool)	$9\frac{3}{4} \times 1\frac{1}{8}$
277	Open end off-set wrench intended for use on mounting nuts of Nos. 18 or 19 Type Resistances when wired in position	$9\frac{1}{4} \times \frac{7}{8}$

RINGER TOOLS

96	Double screw-driver for ringers	$3\frac{1}{4} \times \frac{5}{8} \times \frac{3}{16}$
122	A flat wrench with off-set handle arranged with jaws to take $\frac{7}{16}$ inch hexagonal nuts used for adjusting the air gap between the armature and core on harmonic ringers	.....
129	Double wrench for adjusting armature pivot screw nuts and adjusting posts of ringers	$3 \times \frac{1}{2}$
48	Used for adjusting Nos. 50A and 50B Selectors. Consists of a wrench and screw-driver. Will fit $\frac{1}{4}$ inch and $\frac{7}{32}$ inch nuts	.....
115	Used for changing Nos. 50A and 50B Selectors to call different stations. It is a small double ended tool, one end consisting of a wrench for $\frac{1}{4}$ inch hexagonal nut; the other end a small wire hook	.....
144	Used for changing Nos. 60A and 60B Selectors to call different stations. Consists of a socket wrench and screw-driver	.....
145	Used for changing Nos. 60A and 60B Selectors to call different stations. Small double ended tool, one end consisting of a wrench for $\frac{1}{8}$ inch hexagonal nut; the other end a small wire hook	.....

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TOOLS

(Continued)



No. 63



Nos. 43 and 74



No. 110

SWITCHBOARD CORD TOOLS

Code No.	Use	Approximate Dimensions Inches, Overall
312 313 314 315	A set of tools for use in repairing the No. 447 and No. 448 Switchboard Cords.	.....

TELEPHONE SET TOOLS

Including Transmitters, Receivers, Etc.

63	Triple wrench for use on nuts of binding posts of receivers and transmitters...	$2\frac{3}{8}$ x $1\frac{5}{16}$
110	Double socket wrench for No. 20 Type Desk Stands and No. 48 Type Telephone Arms. Fits $\frac{5}{16}$ and $\frac{9}{32}$ inch hexagonal nuts.....	4 x 1
138	For adjusting stops and lugs of No. 50 Type Coin Collector.....	$4\frac{15}{32}$ x $\frac{1}{4}$ x $\frac{5}{32}$

WIRE TOOLS

71	Wire skinner for use in removing the insulation from braided rubber covered wire. Has adjustable blades arranged to receive wire of different gauges..	4 x $3\frac{1}{2}$
79	Cable butter for use in turning back external braiding on switchboard cables..	.....
289	A steel rod one end of which is bent at right angles with the axis of the rod and formed into a hook. Has wood handle. For use in dressing skinners to relays and resistances.....	8
291	Consists of a piece of music wire formed into a loop and mounted in a wood handle. Intended for pulling wires in terminal blocks.....	8

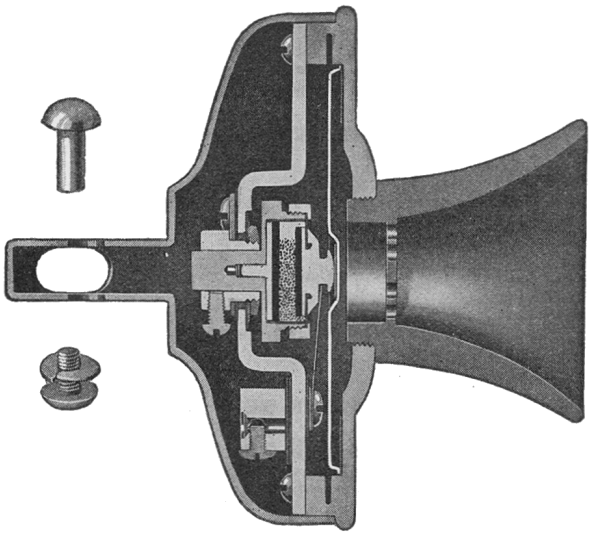
MISCELLANEOUS TOOLS

74	Double wrench; same as No. 43 except arranged for $\frac{5}{32}$ in. and $\frac{7}{32}$ in. hexagonal nuts.....	4 x $\frac{1}{2}$
282	Metal cap provided with knobs which are free to rotate. For use on end of a pencil to operate No. 2 Type Dials.....	$1\frac{31}{64}$ x $\frac{33}{64}$
303	For use in adjusting interrupter spring and retaining pawl on No. 200 Type Selectors.....	3 x $\frac{1}{4}$
363	For use in adjusting rotor brush springs and the feeder springs of No. 200 and similar type selectors. Equipped with a handle of insulating material....	4 x $\frac{1}{2}$
370A	For use as a bank busying tool for 100 point banks in step-by-step machine switching equipments.....	$3\frac{3}{4}$ x $2\frac{1}{4}$ x $\frac{29}{64}$
375A	Intended for use as a make busy plug and trouble ticket holder in maintenance of connectors, selectors, line switches and repeaters of step-by-step equipment.....	$\frac{31}{32}$ x $\frac{13}{16}$ x $\frac{7}{16}$

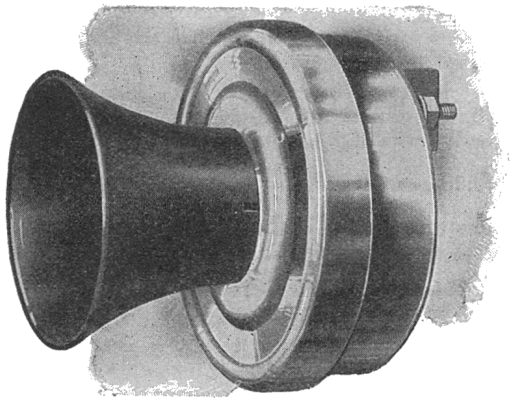
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TRANSMITTERS

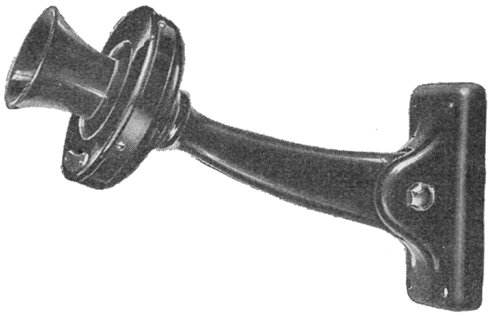
Western Electric transmitters represent the highest development from all angles, and are recognized as standard throughout the world by leading telephone authorities.



Cross Section of No. 323 Transmitter



No. 312



No. 353

Standard Central Battery and Local Battery Transmitters

The average resistance of the following transmitters in service is from 35 to 50 ohms.

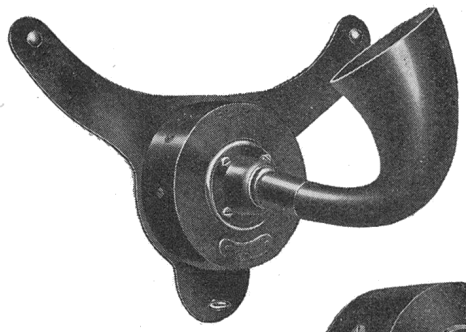
Wall and Desk Set Types

Code No.	Replaces	Service
312	312W	For use in No. 1336 Type Mine Telephones. Treated to resist the action of moisture and fumes. Nickel plated finish with black finished brass mouthpiece. Drilled and tapped for mounting screws.
323	323W 323BW	General standard transmitter for telephones and deskstands. Mounts by means of bolt and screw. Furnished in black unless nickel finish is specified.
337	337BW	For use on long subscribers' loops. Similar to the No. 323. Black finish. Mounts by means of bolt and screw.
353	353BW	Former standard for wall type magneto telephones. Transmitter mounts on an adjustable arm bracket and has an overall length of 8¾ inches. Black finish.
354	354BW	Same as No. 353 except that the arm bracket and cords are omitted.

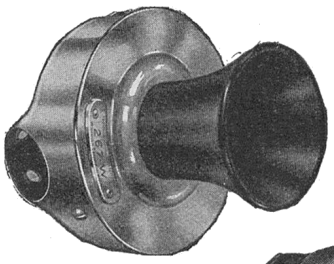
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TRANSMITTERS

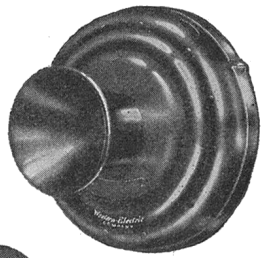
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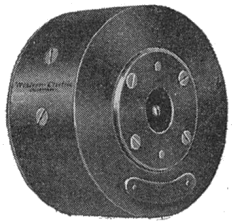
No. 234



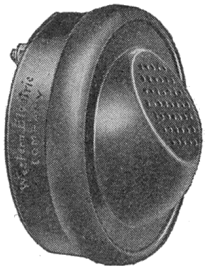
No. 267



No. 232



No. 266



No. 244 and No. 285

Standard Central Battery and Local Battery Transmitters

SWITCHBOARD TYPES

Code No.	Replaces	Service
232	232W	A switchboard operator's suspended type transmitter having one side of circuit grounded on the frame. Arranged to be suspended by means of two transmitter cords. Has a black finish.
234	234BW	Operator's chest type transmitter having an adjustable mouthpiece. Arranged for but not equipped with a No. 3 Transmitter Attachment. Has a black finish.
396A	———	Operator's chest type transmitter for use at magneto and common battery switchboards. Has a black finish.

HAND SET TYPES

244	244W	For use on No. 1001 Type Hand Sets. Has perforated metal mouthpiece secured to case by a clamping ring. Has black finish.
285	285W	For use on No. 1001C Hand Set for train dispatching circuits. Same as No. 244 except equipped with a low resistance button.
267	267W	For use on No. 1002 Type Hand Sets. Has nickel plate finish.

TEST SET TYPES

266	266BW	No. 1017 Type Test Set Transmitter. Mounts on back of perforated plate in test set. Has black finish and is equipped with mounting screws.

TRANSMITTERS FOR TRAIN DISPATCHING

The low resistance type of transmitters as indicated below have a resistance of from 5 to 15 ohms in operation.

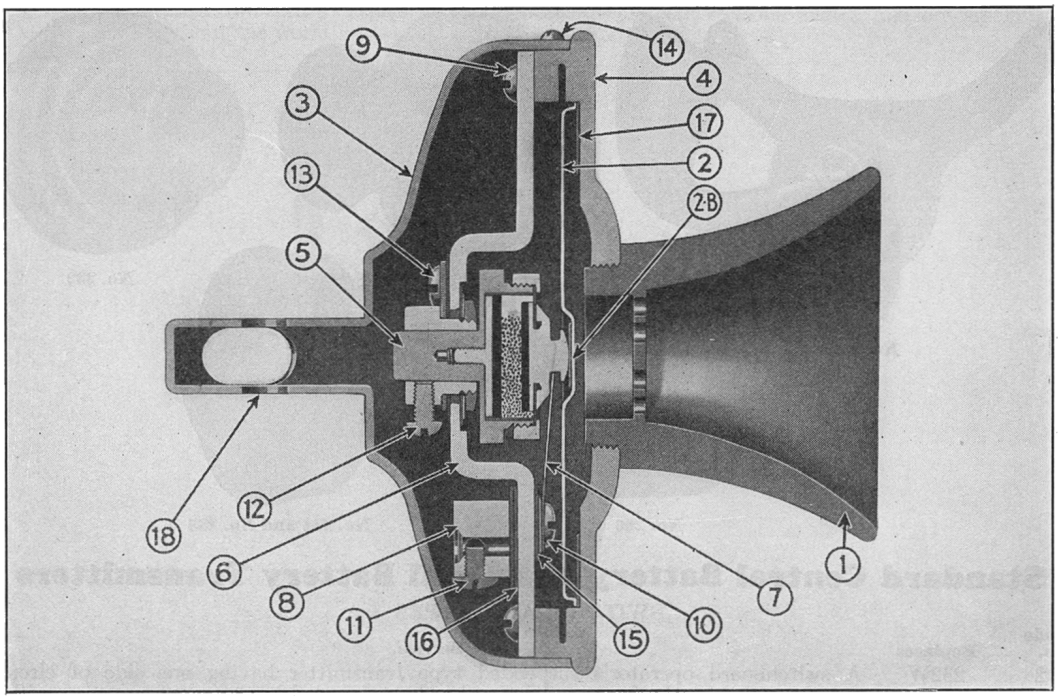
286W	———	A high resistance insulated short arm bracket type black finish transmitter for use with the No. 1312A Telephone Set.
349	349BW	An insulated black finish transmitter similar to the standard No. 323 except that it is equipped with a low resistance button. For use in No. 1317BU Telephone Set.
359	359BW	Similar to the standard No. 323 Transmitter except that it is equipped with a reinforced mouthpiece used in No. 1305AC Telephone Set.
386	386W	A low resistance insulated aluminum centrally damped local battery breast transmitter used with No. 375 Cord in dispatchers' switchboard.
601A	———	An insulated low resistance bridge type, moisture-proof black finish transmitter arranged for mounting in the Nos. 1336F and H Telephone Sets. Replaces the No. 292W Transmitter.

TRANSMITTERS FOR PORTABLE TELEPHONE SETS

397A	———	Similar to the No. 337 Transmitter except that it is moisture-proof and has a flat back bell and a short mouthpiece for mounting it in a small space. For use in the 1526A Telephone Sets in low power equipment.
398A	———	Similar to the No. 349 Transmitter except that it is moisture-proof and has a flat back bell and a short mouthpiece for mounting it in a small space. For use in the 1526B Telephone Sets in medium power equipment.

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TRANSMITTERS PARTS AND ACCESSORIES



Transmitter Parts

Symbol	Name of Part	Transmitter Code Numbers 232	234	244 285 312	267	323 337 349 353 359	601A
1	Mouthpiece	P-84570	P- 91818	(Note 1)	*P- 84570	†P- 84570	P-106561
2	Diaphragm	P-90689	P- 90160	P- 90513	P- 89099	P- 97905	P- 93248
	Diaphragm Band	P-89052	P- 89047	P- 89048	P- 89047	.....	.....
2B	Diaphragm Nut or Screw	P-95093	P- 82278	P- 82278	P- 95093	.....	.....
	Insulating Disc	.....	.....	.....	.....	P- 95750	.....
3	Back Case or Bell	P-95228	P- 97247	(Note 2)	P- 90145	‡P-209946	P-211717
4	Transmitter Face	P-90768	P- 99262	(Note 3)	P- 88325	P-207910	P- 91786
	Transmitter Face Ring	.....	.....	P- 81487	.....	.....	.....
5	Granular Button	P-95172	P- 99377	(Note 4)	P- 90527	(Note 5)	P- 94020
6	Bridge and Center	P-95192	P- 98453	P- 84761	P- 90527	P- 95782	P- 95782
7	Damping Spring	P-89587	P- 86547	P- 86547	P- 88343	P- 95751	P- 93250
8	Terminal Block	.....	P- 85472	P- 84780	.....	P-217476	P-217476
9	Machine Screw	P-85787	P- 85990	P-128914	.....	P- 98336	P- 98336
10	Machine Screw	.....	.....	.....	.....	P- 98334	P- 98334
11	Set Screw	.....	P-115484	.....	P- 39656	P-129702	P-129702
12	Adjusting Screw	P-85545	P- 81389	P- 84808	.....	P- 91810	P- 91810
13	Terminal Screw	.....	P-116353	.....	.....	P-129702	P-129702
14	Rim Mounting Screw	P-82291	.....	.....	P-180658	P-204520	P-204520
15	Washer or Insulator	.....	P- 5112	.....	P-101428	P- 99369	P- 99369
16	Terminal Insulator	.....	P- 86769	.....	P- 88339	P- 99370	P- 99370
17	Cloth Washer	P-95195	P- 88333	P- 81697	P- 88333	P- 97904	P- 93249
18	Bolt P-92375; Washer P-92381 and Screw, P-92378.						

* P-80543 Mica Diaphragm. † P-93553 for Nos. 349 and 359. ‡ P-209947 for No. 353.

Note 1. P-106561 for No. 312.

Note 2. P-90077 for No. 244, P-91163 for No. 285 and P-98072 for No. 312.

Note 3. P-81501 for Nos. 244 and 285, P-98074 for No. 312.

Note 4. P-85577 for Nos. 244 and 312, P-91162 for No. 285.

Note 5. P-95756 for Nos. 323, 353 and 359; P-98994 for No. 337 and P-99264 for No. 349.

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TESTING APPARATUS



Type T Testing Set

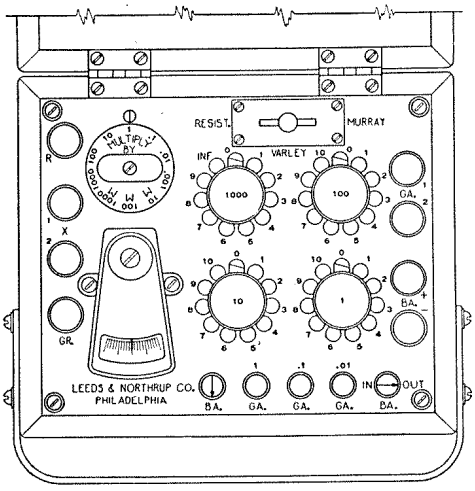


Diagram Type T Testing Set

Type T Testing Set

The features that are included in the Type T Set make it especially satisfactory in the maintenance of telephone, telegraph and other electrical transmission lines; but it is equally adapted to any measurement within ordinary Wheatstone bridge range for which there may be occasion in shop, field or laboratory. The six features described below will indicate its completeness as regards the number of tests and measurements that can be made with it and show how conveniently it may be operated.

1. Three-way Switch. The circuit connections for Varley or Murray loop tests and for making resistance measurements are made by the simple movement of a three-way key which is marked "Varley," "Murray" and "Bridge" as shown above. The operator has indicated before him in plain marking the name of the test for which the set is at any time being used.

2. Ratio Arms. A single ratio dial is used. This dial is shown in the illustration just above the galvanometer. It is so arranged that by its operation the user automatically selects that particular ratio which gives the maximum sensitivity in the measurement being made. Calculations are simplified by the use of a single dial, as a multiplication is always made and the multiplier read direct from the ratio dial.

3. Galvanometer Shunt. An Ayrton three-way shunt is so wired in the set that it is operated by the three push button keys marked "GA-1," "GA-.1" and "GA-.01" respectively. The "GA-1" key connects the galvanometer into the circuit with its full sensitivity; the other push buttons reduce the sensitivity as indicated. Operation by means of these push buttons is convenient and rapid.

4. Galvanometer. This set is provided with a suspended system pointer galvanometer. As there is no pivot friction in this type of instrument, there is no chance for sticking of the pointer or for false indications. The sensitivity is one megohm, that is a current of one microampere gives a deflection of one scale division. This galvanometer will withstand more hard usage without loss of accuracy than the ordinary portable voltmeter.

5. Rheostat Arm. There are four decades. The units, tens and hundred decades are made up of ten coils each. The thousands dial has nine coils and an infinity, or open, point. The range of the rheostat is therefore 0–10110 ohms. All coils are adjusted to a guaranteed accuracy of .1 of 1 per cent.

With complete ten-coil decades, accurate location of opens by "tone-test" with a buzzer becomes possible, since the variation of tone in the telephone receiver is continuous on either side of the minimum.

The infinity point on the thousands dial makes possible an unmistakable test of an open circuit in the "X" arm of the bridge. The "open" is indicated by no deflection of the galvanometer when the dial is set on "INF," and the galvanometer key is depressed.

An extra binding post on the set permits the use of the four dial rheostat independently of the set.

6. External Battery and Galvanometer. Provision is made for connection of an external battery and galvanometer in the few instances where this may be necessary; and without changing connections, either internal or external battery or galvanometer may be used. Protective resistances in both internal and external battery circuits guard against burn-outs or over-heating of the adjusted coils in the set.

List No.		List No.	
5410	L. & N. Type T Portable Testing Set	5412	Buzzer for use with above set
5301	Leather Carrying Case for above	9872	Telephone Receiver, with head band
5308	Extra Battery	2325	Extra galvanometer system

Approximate over all dimensions, 8½ x 7⅜ x 4½ inches. Weight 7½ lbs.

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TESTING APPARATUS

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 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.

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 $\frac{1}{10}$ of 1 per cent and the bridge arm coils to $\frac{1}{20}$ 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.

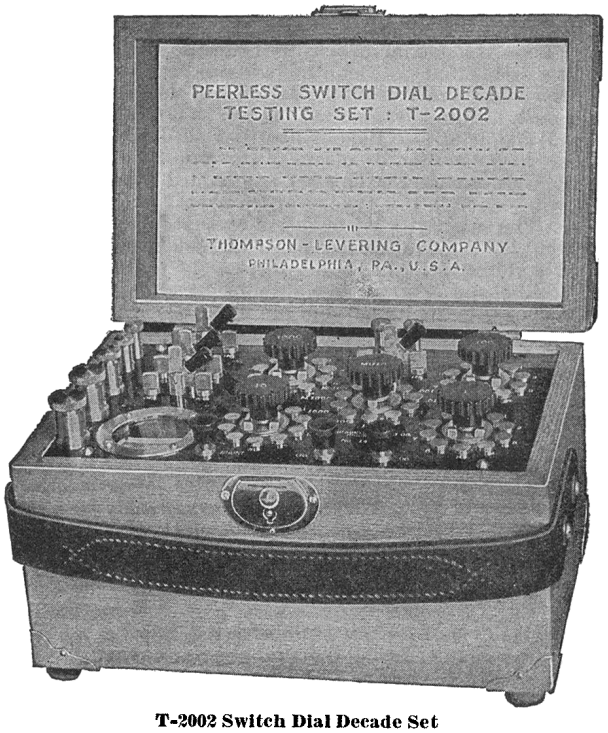
The galvanometer is of the high sensibility and dead beat D'Arsonval type.

A commercial battery is used.

The set has been simplified so that technical education is not required to operate it.

Approximate overall dimensions, $9\frac{1}{4}$ x $5\frac{3}{4}$ x $5\frac{1}{2}$ inches deep.

List No.	Description
T-2002	Peerless switch dial decade testing set.
T-3015	Sole leather carrying case for T-2002.
T-2020	Flexible contact clutches for gripping heavy conductors.
T-2040	Folding tripod for supporting T-2002 for field work.



T-2002 Switch Dial Decade Set

TCI Library- http://www.telephonecollectors.info/

WOOD POLES

In requisitioning poles the 3 principal determining factors are as follows:

1. Species of wood to meet specific requirements;
2. Quality of the poles;
3. Service on shipments.

1. SPECIES

Certain species of wood are best fitted for one kind of installation. In recognition of this we have available in various pole yards one or more of the 5 species that are generally used for poles: (1) western red cedar, (2) northern white cedar, (3) creosoted yellow pine, (4) chestnut, (5) lodgepole pine.

2. POLE QUALITY

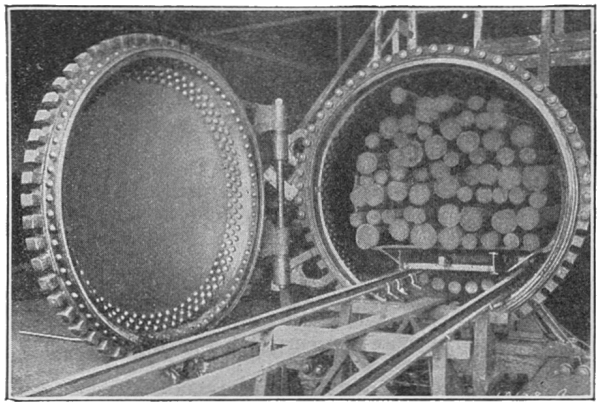
Poles sold by the Graybar Electric Company are a quality product. All conform to nationally accepted standards. Inspections are thorough.

3. SERVICE ON SHIPMENTS

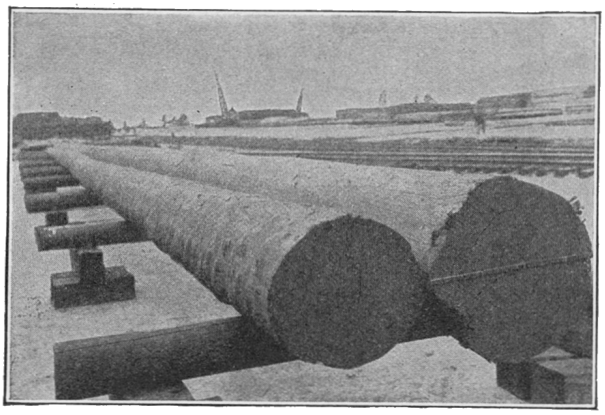
At Minneapolis, and Everett, Washington, cedar poles are concentrated, handled by steam equipment, etc. The stock runs fifty thousand poles and more.

At Texarkana, Texas, and Beaumont, Texas, the largest wood preserving plant thus far ever built makes available a service on pine poles never before undertaken by any producer.

Emergency service is always available to customers when the unforeseen happens.



Poles in the cylinder ready to seal the door and begin treatment. The largest creosoting cylinder in the treating industry. It is one of the cylinders located at the Texarkana Plant of the International Creosoting & Construction Company and measures 165 feet long and 9½ feet in diameter



These poles are 100 feet long. We carry poles of all sizes at all times

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