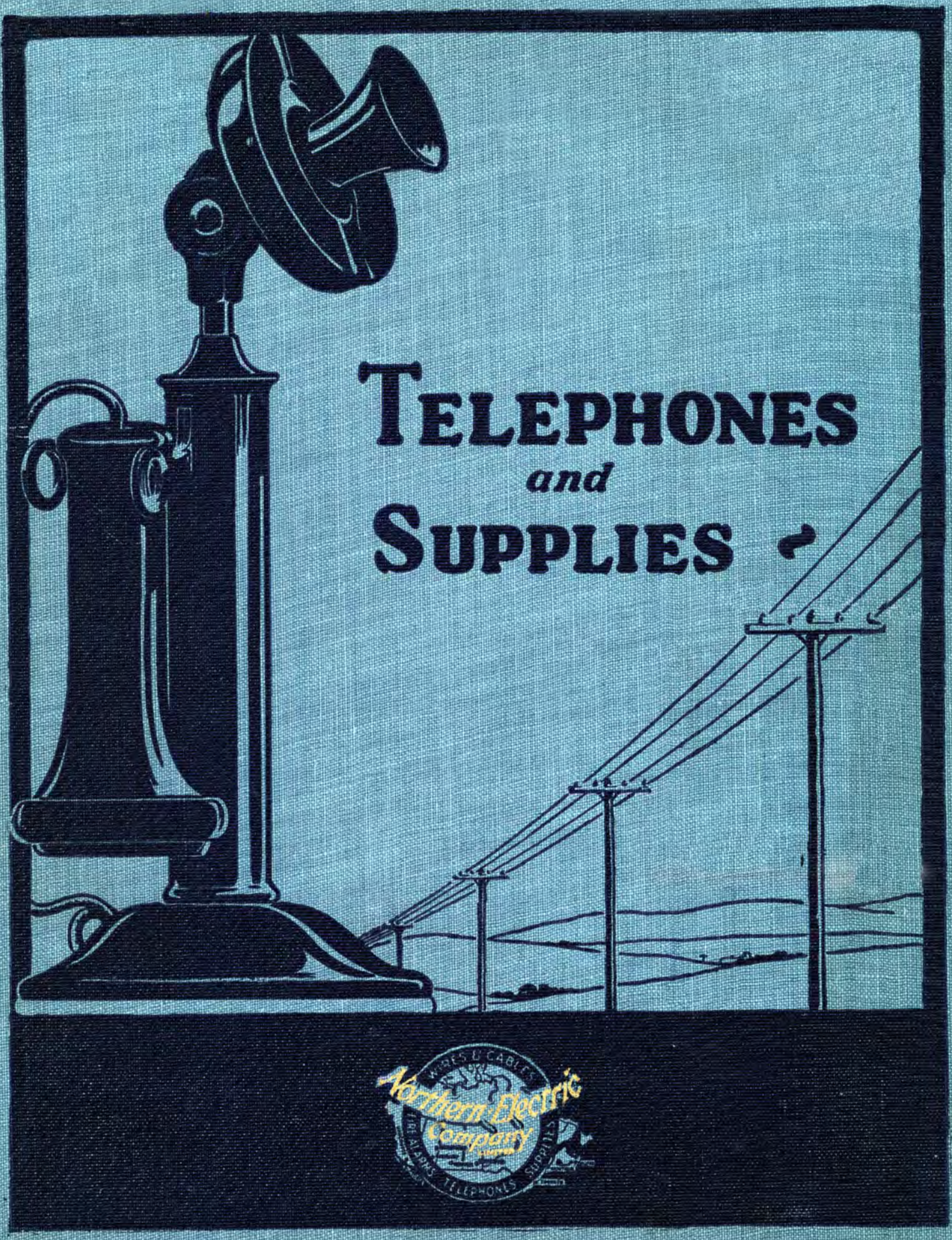


TELEPHONES *and* SUPPLIES

Northern Electric Company

WIRES & CABLES
FIRE ALARMS
TELEPHONES
SUPPLIES

TELEPHONES AND SUPPLIES

T-3
Catalogue

Northern Electric
COMPANY LIMITED

MONTREAL	OTTAWA	LONDON	REGINA
HALIFAX	TORONTO	WINDSOR	CALGARY
QUEBEC	HAMILTON	WINNIPEG	VANCOUVER

The Northern Electric Factory and Head Office, from a painting by Chas. W. Simpson, R.C.A., December, 1926.

The building was opened in 1915 and houses over 4,100 employees. Its total floor space approximates one million square feet.

INTRODUCTION

to the T-3 Catalogue of Telephones, Supplies and Construction Material

The scope of this Catalogue

This catalogue has been compiled and issued for the purpose of bringing to the attention of telephone buyers in general some of our most generally used magneto, central battery and automatic telephones and associated equipment. The first few pages describe our telephone sets and this is followed by an alphabetically arranged catalogue. With a line so extensive as our telephone apparatus, it is impossible to show all types and combinations in this catalogue. If your requirements are not covered by the apparatus described, write us regarding the conditions to be met and we will send you the information desired.

As this catalogue in general covers magneto equipment, there is no mention of central battery switchboards or central office machine switching equipment, which we manufacture to meet all requirements.

On account of the growing favor of the portable telephone, we would direct your attention particularly to our desk telephones, of which we carry a complete line. A detailed description of these is given and we would be glad to furnish any additional information on request. When used in the home these equipments are referred to as table telephones rather than desk telephones, but for purposes of cataloguing we are retaining the reference "Desk Telephone."

Shipments and Prices

Large and complete stocks are carried at our Distributing Houses, which are located in the principal cities of Canada; this insures prompt filling of orders, together with a saving in transportation cost, as our prices are F.O.B. Distributing House. Prices on apparatus listed in this catalogue or on any other equipment which we are in a position to furnish, will

be quoted upon application to our nearest Distributing House. Inquiries should clearly describe the apparatus and quantity desired.

Inspection and Tests

All parts entering into the construction of our apparatus are inspected after each process through which they pass, and only those fully meeting the requirements are used. After the different parts are assembled, the whole is carefully inspected and given an actual working test before shipment from our factory. These tests give assurance that all our apparatus is uniform and of standard Northern Electric quality.

Packing Weights

Before shipment our Telephone Sets are carefully packed either in wooden boxes or cardboard cartons having weights as follows:—

Code No.			*Packed Weight*
1293-A	Telephone Sets,	4 per carton	28 lbs.
N1293-EA	" "	4 " "	28 "
N1293-G	" "	4 " "	35 "
N1293-GP	" "	4 " " Less Dials	27 "
1020-AL	Desk Stands	10 " " Less Receiver	43 "
1020-AL	" "	10 " " With Receiver	51 "
N1050-AL	" "	10 " "	55 "
N1050-EL	" "	10 " "	55 "
N1317-AH	Telephone Sets,	1 " Box With Receiver	28 "
N1317-N	" "	1 " "	35 "
N1317-R	" "	1 " "	35 "
N1317-P	" "	1 " "	35 "
N1317-S	" "	1 " "	35 "
N1317-G	" "	1 " "	35 "
6003-B	" "	1 " "	35 "
N 300-A	Desk Set Boxes	1 " "	25 "
N 300-R	" " "	1 " "	26 "
295-A	" " "	10 " Carton	48 "
315-H	" " "	4 " "	50 "

Magneto Desk Telephones

No. 6003-B Desk Telephone Set

With the increasing use of the Telephone, Desk Sets or Table Telephones have met with such favor that they are now used in almost all business offices, and to a large extent in residences. This popularity is due chiefly to their small compact form, durability, convenience and attractiveness. Being portable, they can be placed upon a desk within easy reach of the user, enabling telephone calls to be made and answered with the greatest ease.

Our Desk Telephones described in this catalogue require only a small expense for maintenance. They have been carefully designed with respect to this feature, and constructed of the best materials obtainable. The working parts of the Desk Stand are enclosed, and yet easily accessible for maintenance.

The ringer, induction coil and hand generator are mounted in a wooden box of pleasing appearance and substantial construction, the unit being known as the Desk Set Box. It can be attached to the underside of a desk or table, and is connected to the Desk Stand (the part comprising the transmitter, switch hook and receiver) by a flexible cord. The battery cells are placed nearby.

All parts are of ample size, yet light in weight and their proportions are such that the Desk Stand is not easily upset. The stand consists of a vertical metal tube, rigidly fastened to a base of large diameter. Inside this tube are the binding posts and the springs which are assembled on a steel plate, together with the switch hook and support for the transmitter.

This is the simplest form of Desk Stand that has ever been produced, there being but three principal units exclusive of the transmitter and receiver, namely: the terminal plate and switch hook assembly, the base and stem assembly and the base plate assembly. The switch hook lever acts directly upon the main spring of the switch, no intermediate parts being interposed. The contact springs are of nickel silver, backed up with a stop spring and all current-carrying parts are insulated from the frame. The entire terminal plate and switch hook 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 base plate assembly may be removed from the stand for the purpose of connecting or disconnecting cords by the removal of two additional screws from the bottom of the base plate.

The bottom and edges of the base are covered with a high-grade, brown woven felt which is held in place by a clamping ring which fits inside of the base plate. This feature prevents the Desk Stand from marking or scratching the table or desk on which it rests. The cords enter the Desk Stand through a hole in the side of the base.

Desk Stands are regularly supplied with a black finish which will be found to be both durable and attractive. These sets may also be obtained with the metal work finished in nickel.

By removing the screws in the base plate, the Desk Stand may be resolved into its three principal parts, as shown above

Central Battery and Automatic Desk Telephone Sets

No. 6000-A Desk Telephone Set

The Desk Telephone Set has a wide and extensive use in automatic and manual central battery areas where its many conveniences have long been recognized.

The Desk Set Boxes (also known as Subscribers' Sets) used in the central battery and automatic Desk Telephone Sets are made with the same high class material and workmanship as those used on magneto service, but are smaller in size as they do not contain a hand generator. A full description of Desk Set Boxes will be found on pages 27 and 28.

The Desk Stand used in the central battery Telephone Set is the same as that used for magneto service and is described on page 29 under the code number 1020-AL. The Desk Stand used in automatic service is known as the N1050-AL. It has an offset base and is arranged to mount a calling dial. It is also provided with a terminal block in the base to make the necessary connections. If a calling dial is not supplied the opening may be covered with an apparatus blank, and the circuit completed by means of a strap cord; otherwise the general design of the Desk Stand is similar to that used on magneto and central battery service. Because of the simplicity of design and the high quality of the apparatus and materials used in the construction of our Desk Stands, the maintenance cost is kept at a minimum.

Magneto Wall Telephones
No. N1317 Type

The No. N1317 type Wall Telephones represent the standardization of Magneto Telephone design and construction. Their high efficiency, reliability, and long life, have been thoroughly proven by the many thousands in service.

The cabinets of these Telephone Sets are strongly constructed of carefully selected quarter sawed oak and are given a durable attractive finish with a high grade varnish, rubbed down by hand. Unexposed surfaces of the Telephone are also given a protective finish, to prevent warping. The metal parts are given an extremely durable and pleasing black finish.

The door of the cabinet is hinged at the left, so that when open for inspection or adjustment, the ringer and generator can be seen while the generator crank is being turned. Also by arranging the door to open towards the left, there is no danger of the door striking the generator crank and disfiguring the woodwork. The door is held closed by one self-centering screw lock.

A feature of these sets is the location of the main binding posts inside the cabinet, thus preventing trouble from tampering with the connections or accidentally short circuiting the set. All the binding posts have screw connections and all permanent connections are soldered. A complete and explanatory wiring diagram is furnished with each Telephone.

These Telephones are carefully adjusted in the factory and are satisfactory for service as received by the customer, unless unusual service conditions should be encountered, in which case, only the ringer will require readjustment; this is a very simple matter and instructions furnished on the wiring diagram are so clear that no difficulty will be encountered. These sets are very easy to install and may be installed at isolated points where skilled telephone men are not available, a screw-driver being the only tool required.

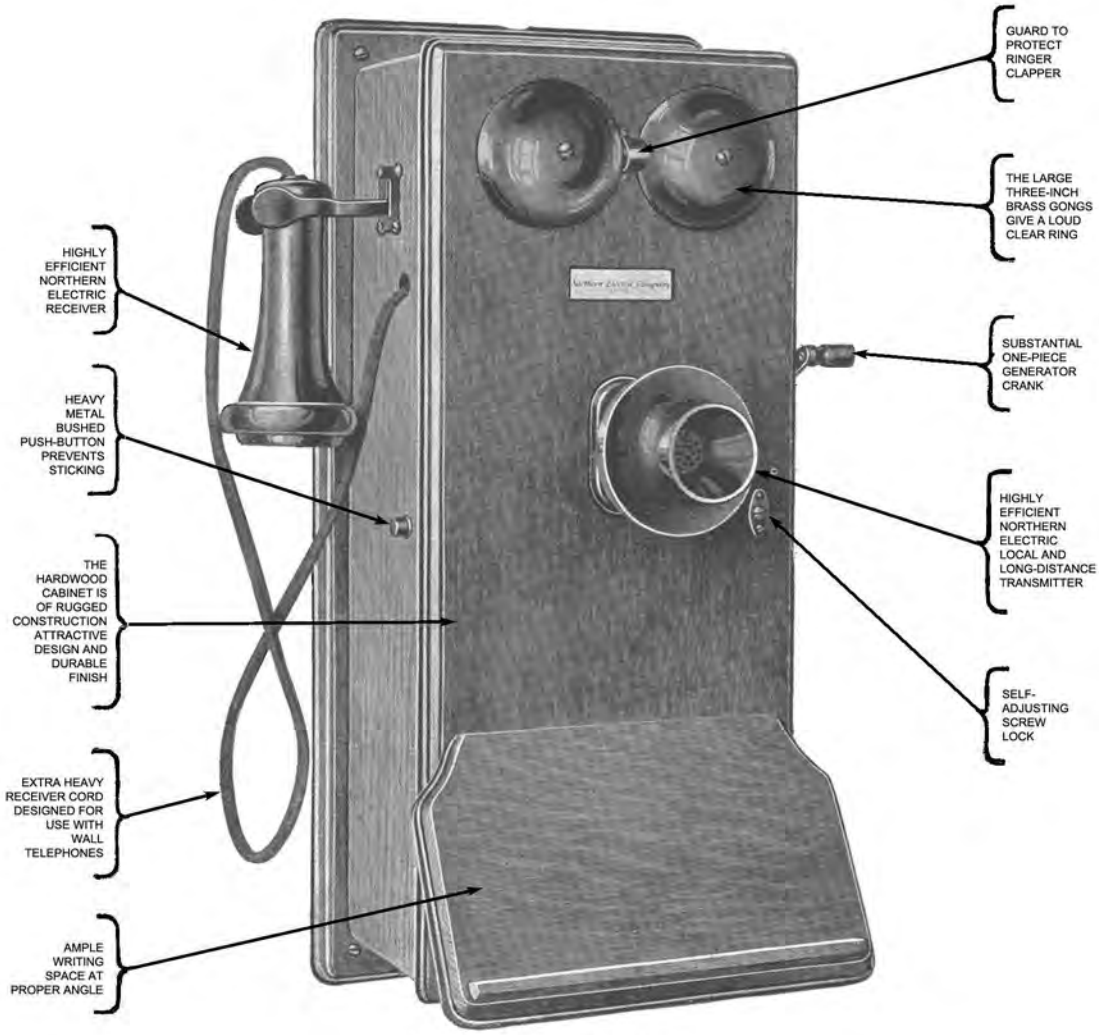
Our Magneto Telephones are primarily designed to faithfully reproduce the natural tones of the speaker's voice on long or short lines. This is accomplished by means of highly efficient apparatus, which is the result of many years of engineering research and practical operation.

These Telephones, by means of their large gongs and efficient ringers, give a loud and distinct ring, which responds clearly to all code calls. Their powerful generators will enable you to ring other bells clearly under the most severe conditions.

The various parts of these Telephones are connected by a cable consisting of flexible conductors, highly insulated and moisture-proofed, each designated by a color and protected at points of wear.

Magneto Wall Telephone

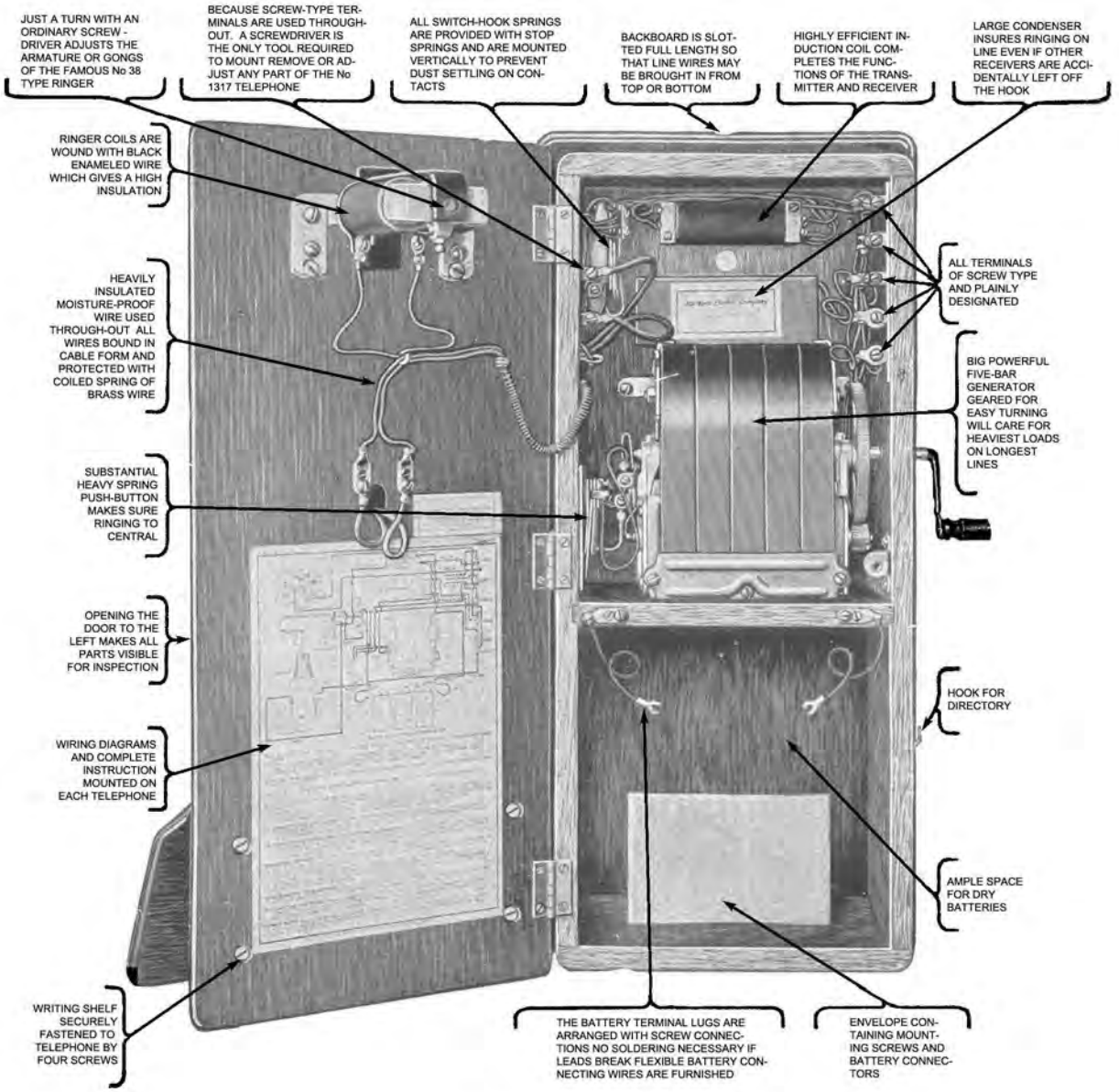
CLOSED



No. N1317 Type—Wall Telephone

Magneto Wall Telephone

OPENED



No. N1317 type—Wall Telephone

Magneto Automatic Wall Telephone

No. N1317-AP Wall Telephone Set

Where the central office equipment is of the automatic type, the rural lines may be so arranged as to permit the Rural Subscribers to call other lines by means of the dial, and to call other parties on the same line, by using the hand generator. There is a device on the switch hook known as the switch hook latch which prevents one Subscriber from unknowingly interrupting the dialing impulses of another Subscriber.

Central Battery and Automatic Wall Telephones

No. 1293-A Wall type Telephone Set

No. N1293-G and GP types Automatic Wall Telephone Sets

These are Wall Type Telephone Sets used for central battery and automatic service. The cabinets are strongly constructed and given a durable attractive finish to match black walnut. The exposed metalwork is given a black finish. This type, as in the case of our magneto telephones, has all the binding posts inside the cabinet; screw connections are used except for the permanent connections which are soldered; also the sets are wired with differently colored wires to facilitate the tracing of connections. All the apparatus used in these sets is of proven quality and is arranged in such a manner that when the door is opened every part of the interior is easily accessible. The latest type of receivers, transmitters, etc., in addition to the No. 46 induction coil, forms part of the equipment of these sets.

The dial or apparatus blank used with the Automatic Sets is not included as a part of the set and must be specified additionally.

Dry Battery

Each magneto telephone set is complete and ready for use with the exception of the Dry Battery, which should, of course, be purchased as required, in order to insure fresh ones being supplied. Our standard "Northern" Telephone Dry Battery is recommended, as they are made especially for telephone service. Their long life, extremely low polarization and great recuperative power, make them valuable for this purpose.

Northern Telephone Dry Battery No. 6

Two or three dry cells are used depending upon the range of service it is desired to get from the telephone. We recommend three cells because every telephone is potentially a "Long Distance Telephone" and it is to the interest of the Telephone Company and the Subscriber that the long distance service be handled efficiently.

Our "Northern" Telephone Dry Battery has been specially developed to meet the exacting requirements of telephone work. Comparative tests applied to the different cells now on sale show conclusively that it is the best dry cell on the market for local battery telephone service. Size 2⅝ inches diameter by 6¾ inches in height. Packed for shipment in boxes of 50 each.

Battery Box

The No. 1-A Battery Box is a black finished metal box provided with a removable cover and lined with insulating material. Holes are provided in the back of the box for the entrance of the battery wires and also screw and nail holes for attaching the box to a wall or shelf.

This Battery Box is designed to hold three Northern No. 6 Dry Batteries, is rectangular in shape with rounded corners. The approximate outside dimensions are as follows:

Length	*Width*	*Height*
9½ inches.	3¼ inches.	7½ inches.

Cable

Lead Covered Cable for Telephone Lines

The efficiency of a telephone system is no better than its weakest link, hence, even although the central office and sub-station equipment is of the best, satisfactory service cannot be supplied to the customer unless the distribution system is properly designed and constructed of the very best material.

While open wire telephone lines are most economical and satisfactory under certain conditions, yet paper insulated Lead Covered Telephone Cables are everywhere superseding the unsightly and cumbersome network of the old open wire construction. Their advantage in congested areas, in conjunction with loading coils and telephone repeaters for long distance transmission between cities, has long been established.

Although the initial cost in the smaller sizes may, at first sight, seem high, yet the saving from the expense of repairing and rebuilding lines destroyed by wind and snow compensate for the additional expense, to say nothing of the increased efficiency of service to the Subscriber. Usually when twenty-five or more circuits are needed, the use of Lead Covered Cable is a first cost economy.

The principal advantages governing the use of paper insulated Telephone Cables are that they are compact in form, contain a large number of circuits, and possess a lower electro-static capacity than Cables with any other type of insulation. On account of the lead sheath affording protection from the action of the elements, their electrical characteristics remain practically constant.

Cables connecting Subscribers' telephones to an exchange are generally made with copper conductors No. 22, or No. 24 A.W.G. Standard sizes vary from five pairs to 1200 pairs. Conductors in toll line cables are usually No. 19 A.W.G. or larger. Our range of standard sizes of this latter type of Cable varies from five pairs to 450 pairs.

Experience gained through supplying practically all the large Telephone Companies throughout Canada, ensures a product unequalled in any way.

Central Office Entrance Cable

Lead Covered Cable for use between the office pole box and the switchboard protector rack in the Central Office can be supplied in any size and with the conductors insulated with silk and cotton.

Switchboard Cable

The conductors are of tinned copper wire having an enamel coat of insulation and two servings of cotton, one of which is colored as shown in the Color Code.

The Cable is protected from moisture and injury by a serving of lead tape and a heavy braid and is given a coat of fire resisting paint. The following are a few examples of No. 22 gauge Switchboard Cable:

Code No.	*No. of Pairs*	*No. of Spare Pairs*	*No. of Spare Singles*
6081	5	1	1
6079	10	1	1
6024	20	1	1
6035	25	1	1
6070	40	1	1
6066	50	1	1

We manufacture many different sizes of Switchboard Cable with different gauges of wire upon which information will be forwarded on request.

Switchboard Cable

Color Code for Switchboard Cables

(Given for purposes of information only)

Color Scheme

1	Blue	6	Blue-White	11	Orange-White	16	Green-Brown
2	Orange	7	Blue-Orange	12	Orange-Green	17	Green-Slate
3	Green	8	Blue-Green	13	Orange-Brown	18	Brown-White
4	Brown	9	Blue-Brown	14	Orange-Slate	19	Brown-Slate
5	Slate	10	Blue-Slate	15	Green-White	20	Slate-White

Paired Cable

Pairs

1–20	Colors	1–20	Paired	with	White.
21–40	"	"	"	"	Red.
41–60	"	"	"	"	Black.
61–80	"	"	"	"	Red-Wh.
81–100	"	"	"	"	Blk-Wh.
101–120	"	"	"	"	Red-Blk.
121–140	"	"	Threaded	"	Red.
			Paired	"	White.
141–160	"	"	Threaded	"	Red.
			Paired	"	Red.
201	Or-Wh.		"	"	Or-Gr.
202	Or-Br.		"	"	Or-Sl.
203	Gr-Wh.		"	"	Gr-Br.
204	Gr-Sl.		"	"	Br-Wh.
205	Br-Sl.		"	"	Sl-Wh.

Spare Pairs

1 White	Paired	with	Red.
2 White	"	"	Black.
3 Red	"	"	Black.
4 Red-Wh.	"	"	White.
5 Red-Wh.	"	"	Red.
6 Red-Wh.	"	"	Black.
7 Blk-Wh.	"	"	White.
8 Blk-Wh.	"	"	Red.
9 Blk-Wh.	"	"	Black.
10 Red-Blk.	"	"	White.
11 Red-Blk.	"	"	Red.
12 Red-Blk	"	"	Black.

Single Cable

Singles

1–20	Colors	1–20	threaded	with	Red.
21–40	"	1–20	"	"	Blk.
41–60	"	1–20	"	"	Red-Blk.

Spare Singles

1 Red-White.
2 Black-White.
3 Red-Black.
4 Red-Black-White.

Cable Terminals

No. 8 type Terminal

No. 14 type Terminal

No. 18 type Terminal

These Cable Terminals are intended for either pole or wall mounting. The No. 8 and No. 14 types are unprotected, while the No. 18 type is protected with No. 7-A (7 ampere) fuses and carbon blocks. They are all equipped with spun-over binding posts to prevent the loss of the locknuts and are furnished, unless otherwise ordered, with a six-foot cable stub attached to the terminating chamber which is filled with waterproof pothead compound.

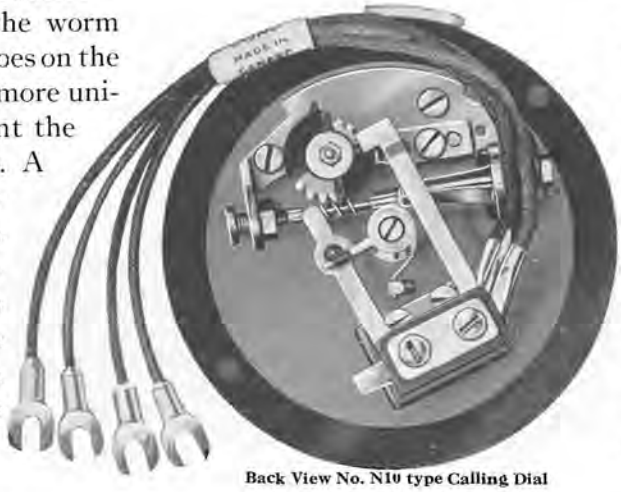
The outside covers of these Cable Terminals have a galvanized finish. The hood on the numbers 8 and 18 type is attached to the base by means of a chain. The cover on the No. 14 type is arranged for charting the pairs on its inner surface and is hinged to the body of the box.

Code No.	*Capacity Pairs*	*Height Inches*	*Width Inches*
8-A	10	15 3-16	6 1-4
8-B	16	15 3-16	6 1-4
8-C	26	19 11-16	6 1-4
8-D	31	19 11-16	6 1-4
8-E	51	28 11-16	6 1-4
14-B	11	10 3-32	7 7-16
14-C	16	12 21-32	7 7-16
14-D	26	17 23-32	7 7-16
18-A	11	23	8 1-2
18-B	16	25 3-4	8 1-2
18-C	26	32 5-8	8 1-2
18-D	31	36 3-4	8 1-2
18-E	51	50 1-2	8 1-2
18-F	61	57 3-8	8 1-2

Calling Dials

Calling Dials are designed for transmitting calls from telephones to the automatic central office equipment. Northern Electric Calling Dials are reliable in operation and are designed to operate between very close speed limits.

N9 and N10 Type Calling Dials.—These are improved Calling Dials having steel ball-bearing governor spindles and laminated worm wheels, the centre lamination of which is fibre, impregnated so as to provide an efficient lubrication between the rubbing surfaces of the worm and the gear. Fibre shoes on the governor balls give a more uniform speed and prevent the balls cutting the cup. A new design of governor pivot screw prevents back lash on the governor and also prevents it revolving when the Dial is operated in a reverse or clockwise direction.



Back View No. N10 type Calling Dial

The following are a few of the more generally used types of Calling Dials:

Dial	*Cord*	*Enamel Number Plate*	*Removable Number Plate*
N 9-B	N 4-B	N135-E	As Specified
N 9-C	None	N135-E	As Specified
N10-H	N13-A	N135-B	N104-D
N10-L	N13-A	N135-B	As Specified
N10-M	N13-A	N135-D	As Specified
N10-P	N13-A	N135-E	As Specified

The N9 Type is used on Series Telephone Sets, that is, telephone sets in which the receiver is wired in series with the transmitter; and the N10 Type is used on Induction Coil Telephone Sets, that is, telephone sets equipped with an induction coil.

The N9 and N10 types of Dials differ only in the spring pile-up assemblies.

Calling Dial Cords

These Cords are equipped with cord tips at one end and are wire whipped on the other end for soldering to the calling dial. The conductors are approximately seven and one-half inches long.

N4-B Cord.—This is a 3-conductor cord used on the N9 Calling Dials. Conductors are colored green, yellow and black.

N13-A Cord.—This is a 4-conductor cord used on the N10 Calling Dials. Conductors are colored red, green, yellow and black.

Calling Dial Number Plates

Enamel Number Plate—N135 Type.

No. N135-B

This is a steel number plate porcelain enamelled, bearing the figures one to zero arranged in a contra-clockwise direction. The lettering on these number plates varies according to the requirements of the particular calling dial upon which they are used. The following is a description of those most generally used:

No. N135-D

N135-B.—Figures one to zero with the word "Operator" appearing around zero. The lettering and figures are black on a white background.

No. N135-E

N135-D.—Has the figures one to zero in black.

N135-E.—Has the figures one to zero in black with the words "Long Distance" in red appearing around zero.

Removable or Instruction Number Plate—N104 Type

This is a brass Number Plate which is fastened to the calling dial by a central retaining screw. The lettering or instructions is etched on the surface and then nickel-plated over a black background. The following are a few of those in general use on our calling dials:

N104-D.—Used on all calling dials where no specific operating instructions are required. The words "Remove Receiver" and "Northern Electric Company, Limited" appear around the outside periphery and "Pull Dial Around to Stop and Let Go," appear around the central retaining screw.

No. N104-D

N104-F.—Has ten divisions which appear opposite the figures one to zero on the enamel number plate, each division marked respectively as follows:—Blank; S; B; L; A; H; W; F; LD; OPR. This is the Removable Number Plate used on calling dials in Halifax.

No. N104-F

N104-G.—The ten divisions are marked as follows in contra-clockwise direction: A; M; S; W; E; R; H; L; Blank; Blank. This is the Removable Number Plate used on calling dials in Calgary.

No. N104-G

N104-P.—Has the words "Do Not Jiggle Receiver Hook," "Dial 0 For Long Distance," "Always Consult Directory," written horizontally across the face of the Number Plate. This is the Removable Number Plate used on calling dials in Edmonton city.

No. N104-P

Calling Dial Mounting

No. N1-A Dial Mounting

No. N9 and No. N10 Calling Dials require no mounting ring when used on No. N1293-G Wall Telephones or No. N1050 type Desk Stands.

Former types of Calling Dials N1, N2 and N4, required a mounting ring on Wall Type Telephone Sets. This mounting ring is known as an N1-A Calling Dial Mounting and consisted of a flat ring of brass which was screwed to the Wall Type Telephone Sets by two screws. Three upright lugs on the Calling Dial Mounting were attached to the corresponding lugs on the Calling Dial by one machine screw and two fitting surfaces.

Calling Dial Adapter

No. N1-C Dial Adapter

To mount N9 or N10 Calling Dials on Wall Telephones or Desk Stands previously arranged for N1, N2 or N4 Calling Dials, it is necessary that the N9 or N10 Calling Dial be equipped with an N1-C Calling Dial Adapter. This Adapter is made of brass in the form of a flat ring with three upright lugs. It is screwed to the N9 or N10 Calling Dials by two machine screws while its upright lugs are attached to the corresponding lugs of the N1-A Calling Dial Mounting by one machine screw and two fitting surfaces.

No. N9 and N10 type Calling Dial Parts.

Cat. No.	Description
1001	Finger stop screw.
1002	Finger stop.
1003	Number plate screw.
1007	Finger plate assembly.
1008	Fibre washer on main spindle.
1009	Main spring assembly.
1011	Gear wheel.
1012	Gear case.
1013	Enamel number plate.
1015	Governor bearing screw.
1016	Bearing lock nut.
1017	Governor assembly.
1018	Governor cup.
1019	Governor cup pivot screw.
1020	Main frame.
1021	Pinion bracket screw.
1022	Pinion bracket.
1023	Wheel and pinion assembly.
1024	Brass nut for impulse cam.
1025	Impulse cam clamp washer.
1026	Impulse cam.
1027	Impulse cam support washer.
1028	Spring pile up clamp screws.
1029	Insulating bushing.
1031	Steel clamp plate.
1032	Insulator between springs.
1034	Shunt spring outer.
1035	Impulse spring farther from frame
1036	Shunt spring inner.
1937	Impulse spring nearer frame.
1038	Movable number plate.
1039	Ratchet dog.
1040	Ratchet dog spring.
1041	Nickel silver spacer.
1042	Governor assembly bracket.
1043	Gov. assembly bracket screws.
1044	Shunt spring middle.
1045	Spring pile up bracket.
1046	Spring pile up bracket screws.
1047	Cord.

NOTE.—Specify code number of particular N9 or N10 type calling dial for which parts are required. No. N10-P calling dial with No. N104-D number plate illustrated above. Where more than one identical part is used in an assembly the catalogue number covers one of those parts only.

No. N1 type Calling Dial Parts.

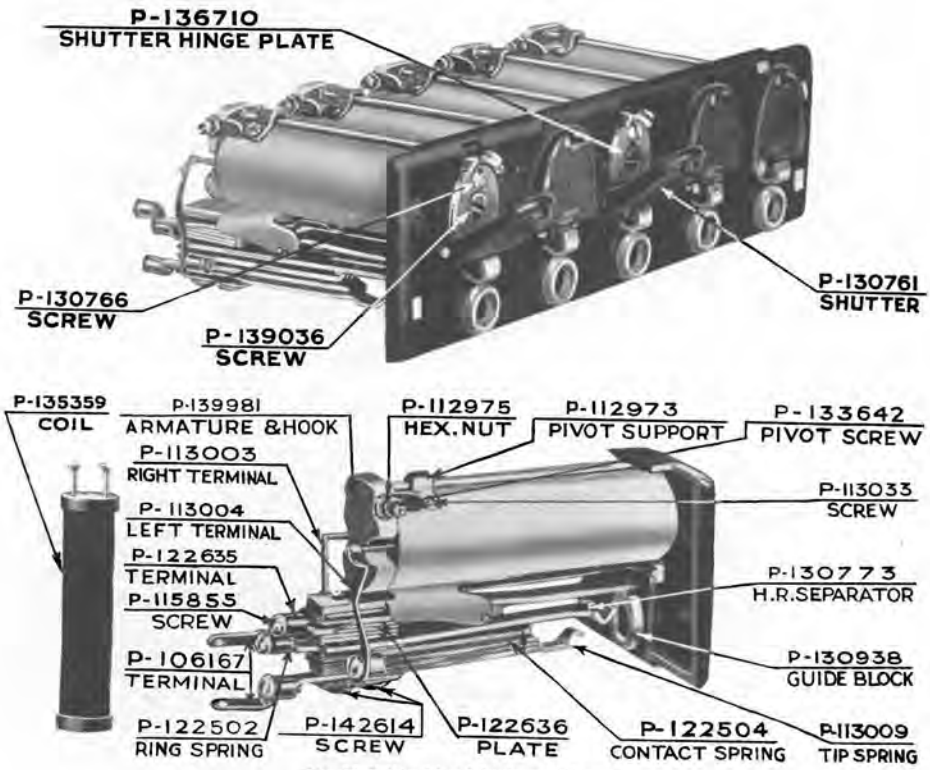
Cat. No.	Description
101	Finger stop screw.
102	Finger stop.
103	Number plate screw.
107	Finger plate assembly.
108	Fibre washer on main spindle.
109	Main spring assembly.
111	Gear wheel.
112	Gear case.
113	Enamel number plate.
114	Paper washer.
115	Governor bearing screw.
116	Bearing lock nut.
117	Governor assembly.
118	Governor cup.
119	Governor cup pivot screw.
120	Main frame.
121	Pinion bracket screw.
122	Pinion bracket.
123	Wheel and pinion assembly.
124	Brass nut for impulse cam.
125	Impulse cam clamp washer.
126	Impulse cam.
127	Impulse cam support washer.
128	Spring pile up clamp screws.
129	Insulating bushing.
130	Insulator under clamp plate.
131	Steel clamp plate.
132	Insulators between springs.
133	Terminals.
134	Shunt spring outer.
135	Impulse spring farther from frame.
136	Shunt spring inner.
137	Impulse spring nearer frame.
138	Movable number plate.
139	Ratchet dog.
140	Ratchet dog spring.
141	Nickel silver spacer.

Replacement Parts

To aid in identifying replacement parts, the component parts of the N9 and N10 Calling Dials are illustrated on page 20.

On the same page the replacement parts of the N1 and N2 Calling Dials are also shown, but as a matter of record only and to aid in identifying parts for such of these particular Dials as may still be in service.

Combined Jacks and Signals



No. 22-C Combined Jacks and Signals

The above parts are also used on the No. 23-C, 26-C and 27-C Signals

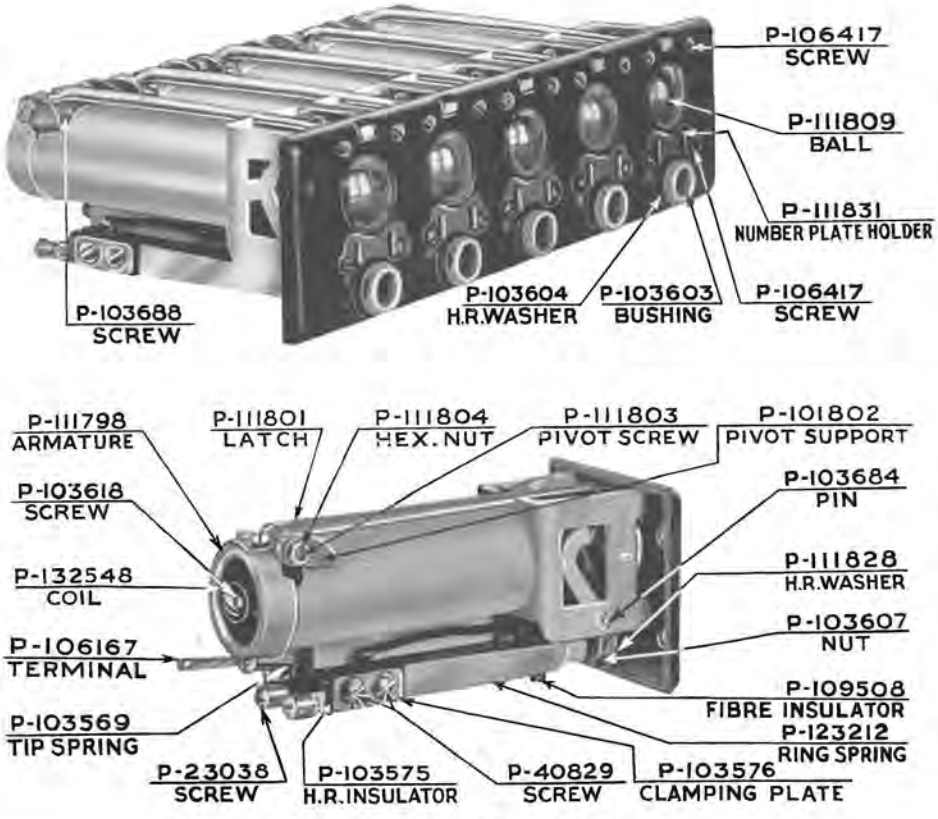
The shutter type Combined Jacks and Signals are used as magneto line signals in switchboards where it is desirable to have the jack closely associated with its signal. This arrangement increases the ease and rapidity of operation as the signal is electrically operated and automatically restored by mechanical means when the plug is inserted in the jack by the Operator. They are equipped with a night bell contact which is closed when the shutter is in the operated position.

These Signals will be furnished mounted five per strip on a No. 89-B Signal Mounting, or mounted singly on a No. 92-B Signal Mounting. When mounted five per strip these Signals are used on Nos. 1220, 1240, and N-1317

type Switchboards and when mounted singly they are used on Nos. 1228, 1248 and units of the No. 1800 type Switchboards. The Signals are furnished unnumbered unless otherwise ordered. (For number plates refer to page 42.)

Replacement parts for these Combined Jacks and Signals are shown. The No. 22-C is shown as it is the one most generally used. Substantially all these parts are also used on the Nos. 23-C, 26-C and 27-C Signals. The coil shown is used on those Signals whose code numbers end in the letter "C," and have a line resistance of 330 ohms. Signals whose code number ends in the letter "D" and have a line resistance of 1000 ohms will be ordered as P-132914.

For purposes of record and to aid in identifying replacement parts for Ball Type Combined Jacks and Signals, replacement parts are shown. The No. 2-C is shown as it was the one most generally used. Substantially all these parts are also used on the Nos. 3-C, 6-C and 7-C Signals. The coil shown is used on those Signals whose code number ends in the letter "C" and have a line resistance of 240 ohms.



No. 2-C Combined Jacks and Signals
The above parts are also used on the No. 3-C, 6-C and 7-C Signals

Condensers

No. 21 type Condenser

No. N1 type Condenser

Northern Electric Condensers are the result of years of experience and represent the highest development in the field. They are of the rolled type, the paper dielectric used in separating the plates is prepared under rigid specifications, from materials carefully selected, of high and uniform quality. They are treated by a process which effectually expels all moisture from the interior, and seals them against the admission of moisture. This is very important, as the presence of moisture renders the insulation more liable to breakdown when subjected to any abnormal stress. Each individual Condenser is tested to its required voltage.

Northern Electric Condensers are rectangular in shape, and may be readily mounted, occupying a minimum amount of space. The terminal lugs are mounted on insulating bases, which, when assembled in the Condenser are completely covered with moisture-proofing compound. The conductors 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.

N1 Type Condensers.—On rural lines trouble sometimes occurs due to parties leaving the receivers off the switch-hooks or listening in during a call. On heavily loaded lines this practice makes it difficult and sometimes impossible to ring the bells. To secure good signalling in such cases it is necessary to have a Condenser wired in the receiver circuit and the N1 type is used for this purpose. Terminals are provided so that the Condensers can be connected in the receiver circuit of any of our Magneto Telephone Sets. Screw mounting holes are provided for the Condenser. There are, of course, many other uses for the N1 type Condensers.

The N1-C Condenser differs from the N1-A in that the flexible leads of the former are soldered to fixed terminals. The N1-C will be supplied wherever possible.

Code No.	*Capacity Microfarads*	*Voltage Tested On.*	*Use*
21-D	2.0	500 D.C.	Telephone Sets.
21-F	1.0	500 D.C.	Telephone Sets.
N1-A	0.5	(6 in. flexible leads).	Receiver Circuit of Magneto Telephone Sets.
N1-B	0.5	(two lugs for mounting screws).	General.
N1-C	0.5	(flexible leads soldered to the regular terminals).	Same as N1-A.

Connecting Blocks

No. 6-B Connecting Block

The No. 6 type Connecting Blocks are terminals, with nuts and washers, mounted in a moulded composition base, and are made up in the following capacities for use in cable terminals.

Code No.	*No. of Pairs*	*Length Inches*	*Width Inches*
6-B	11	8 5-8	1 7-8
6-C	16	12 3-8	1 7-8
6-D	21	16 1-8	1 7-8
6-E	26	19 7-8	1 7-8
6-F	13	10 1-8	1 7-8
6-G	6	4 7-8	1 7-8

No. 11-A Connecting Block

The No. 11 and No. 12 type Connecting Blocks are equipped with terminals consisting of two screw terminals electrically connected and provided with screws and washers mounted in a moulded composition base. The No. 11-B and No. 12-B can be supplied with black finished metal covers. They make very convenient subscribers' station wiring devices.

Code No.	*No. of Wires*	*Length Inches*	*Width Inches*	*Description*
11-A	2	1 3-8	1 5-32	Without Cover.
11-B	2	1 3-8	1 5-32	With Cover.
12-A	3	1 15-16	1 5-32	Without Cover.
12-B	3	1 15-16	1 5-32	With Cover.

Cords

Northern Electric Cords are composed of high grade flexible conductors, thoroughly insulated and equipped with Tips at each end for connection with the apparatus. Stay Cords are provided to relieve the conductors of mechanical strain. The effective length of a Cord is taken as that portion of the main body covered by a common braid which terminates where the individual conductors separate and where the Stay Cord is knotted about the common braid. This length is commonly referred to as "from knot to knot." When the method of measuring a Cord is "from tip to tip" or overall length, such Cords appear to be longer, but as the "knot to knot" measurement is the effective length, Northern Electric Cords are rated on this basis.

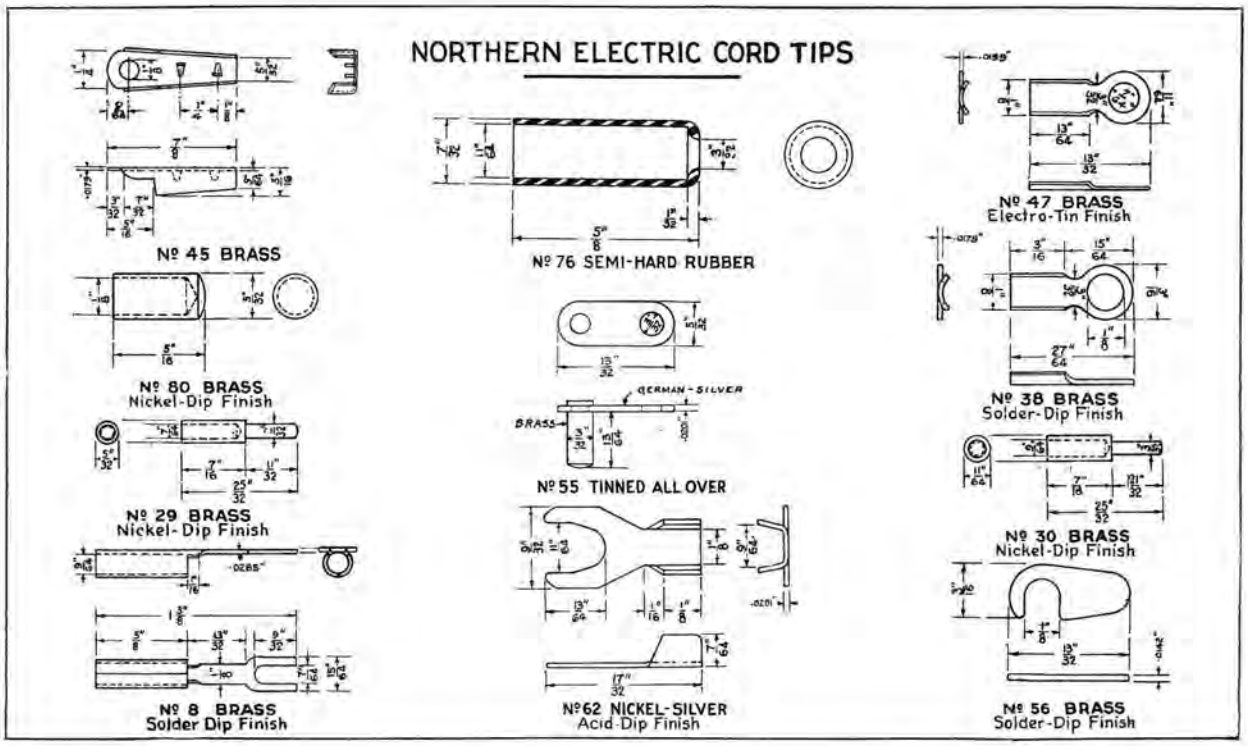
Switchboard and Central Office Cords.—Northern Electric tinsel conductor Switchboard Cords are superior both in life and transmission qualities to any Cord previously manufactured. They are regularly made in three colors, red, green and white and the order should specify the color required.

Switchboard and Operators' Telephone Set Cords will be furnished with Plugs attached if so ordered.

If the Cords mentioned below do not meet your requirements, write us, sending a sample Cord (an old one will do) or tell us the length and color of the Cord and the size of the Tips required.

Telephone Set Cords

Code No.	*Description*	*Stock Length (Knot to Knot)*
92	Two conductor tinsel Receiver Cord with brown worsted covering; for general use. No. 62 (spade) Tips at Telephone Set End. No. 30 (round) Tips at Receiver End.	2 feet, 6 inches.
408	Two conductor tinsel, moisture-proofed Receiver Cord, for use in humid places, black and maroon mercerized cotton covering. No. 62 (spade) Tips at Telephone Set end and No. 29 (round) Tips at Receiver end, protected by No. 76 (rubber) Tips which act as insulating sleeves.	2 feet, 6 inches. 6 feet, 0 inches. 7 feet, 0 inches.
409	Three conductor tinsel, moisture-proofed Desk Stand Cord for use in humid places, black and maroon mercerized cotton covering. No. 62 (spade) Tips at both ends.	6 feet, 0 inches. 8 feet, 0 inches.
454	Two conductor tinsel Receiver Cord with brown worsted covering, for use where No. 30 (round) Tips are required at both ends of Cord.	2 feet, 6 inches.
547	Single conductor, tinsel Transmitter Cord; green cotton covering, No. 62 (spade) Tip on Telephone Set end and No. 56 (hook) Tip on Transmitter end. Five and one-half inch length used on Wall Telephones and nine and seven-eighths inch length used on Desk Sets.	5½ inches. 9 7-8 inches.
548	Similar to the No. 547 except that the Transmitter end is equipped with a No. 55 (stud) Tip.	5½ inches. 9 7-8inches.



Telephone Set Cords—*continued*

Code No.	*Description*	*Stock Length (Knot to Knot)*
549	Two conductor, tinsel Receiver Cord; brown silk covering. No. 62 (spade) Tips on Stand end and No. 29 (round) Tips on Receiver end.	2 feet, 6 inches. 4 feet, 6 inches. 6 feet, 0 inches.
550	Three conductor, tinsel, moisture-proofed Desk Stand Cord; brown silk covering. For use where No. 62 (spade) Tips are required at both ends of Cord.	5 feet, 6 inches. 8 feet, 0 inches. 10 feet; 11 feet. 15 feet; 25 feet.

Switchboard and Central Office Cords

Code No.	*Description*	*Stock Length (Knot to Knot)*
87	Four conductor, tinsel, Operator's Set Cord, brown silk covering, arranged for No. N151 Receiver, No. 234 Transmitter and No. N103 or No. 137 Plug. No. 38 (looped) Tips on Plug and Transmitter end and No. 29 (round) Tip on Receiver end.	4 feet, 0 inches. 6 feet, 0 inches. 10 feet, 0 inches.
254	Two conductor, tinsel, brown silk covered, Operator's Set Cord, arranged for No. N151 Receiver and No. N103 Plug. No. 38 (looped) Tips on Plug end and No. 29 (round) Tips on Receiver end.	6 feet, 0 inches.
375	Four conductor, tinsel, moisture-proofed Operator's Set Cord, black and maroon mercerized cotton covering. The No. 29 (round) Tips on the Receiver end are protected by No. 76 (rubber) Tips, otherwise similar to No. 87 Cord.	6 feet, 0 inches.

Switchboard and Central Office Cords—*continued*

Code No.	*Description*	*Stock Length (Knot to Knot)*
437	Single conductor, tinsel, brown silk covered Cord with green tracer, arranged for No. 232 Transmitter—Operator's suspended type. No. 29 (round) Tips at Transmitter end and No. 62 (spade) Tips at Switchboard end.	3 feet, 6 inches. 4 feet, 6 inches. 6 feet, 0 inches.
447	Three conductor, tinsel, moisture-proofed Switchboard Cord, made up in red, green and white and arranged for No. 109 Plug. No. 8 (spade) Tips on Cord Fastener end, No. 45 Tip on Stay Cord end and No. 47 (looped) Tips on Plug End.	6 feet, 3 inches.
448	Similar to the No. 447 Cord except arranged for the No. 110 Plug.	4 feet, 0 inches. 6 feet, 3 inches.
493	Two conductor, tinsel, moisture-proofed Switchboard Cord made up in red, green and white arranged for the No. 47 Plug or No. N47 Plug. No. 8 (spade) Tips on Cord Fastener end, No. 45 Tip on Stay Cord end, No. 38 (looped) Tips on Plug end.	4 feet, 0 inches. 6 feet, 0 inches.
540	Single Conductor, moisture-proofed Cord having a flexible tinned copper conductor with a brown cotton covering, ends bared for 5-8 inches and dipped in solder. Used for connecting Dry Cells.	5 inches.
848	Similar to the No. 87 Cord except arranged for the No. 528 Receiver and has the No. 29 (round) Tips on the Receiver end replaced by the No. 80 Tips which are shorter and thicker.	4 feet, 0 inches.

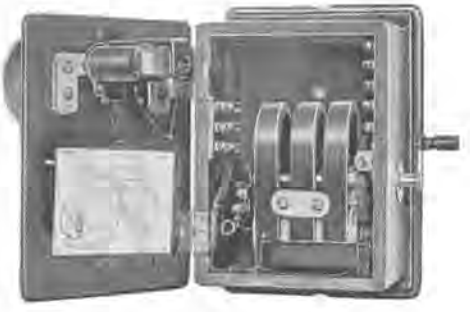
Desk Set Boxes

Desk Set Boxes are for use with desk stands, transmitter arms or hand sets.

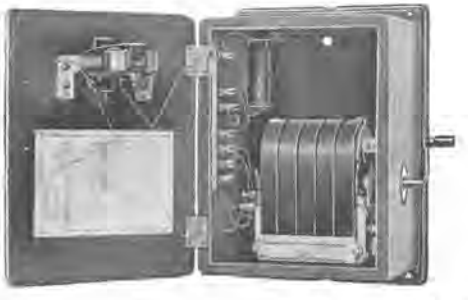
Those designed for use on magneto lines contain a hand generator, ringer, induction coil, push button (or key), and condenser as required. The equipment is determined for a particular station in the same way as for a magneto Wall Telephone Set.

Desk Set Boxes for use on magneto lines are of oak and constructed similarly to the N1317 Wall Telephones, while those for use on central battery or automatic lines are made of gumwood finished to match dark walnut. Dry Cells must be mounted outside the Desk Set Box and for this purpose a No. 1-A Battery Box may be ordered.

These Desk Set Boxes are of three types, the No. N300 being used with the Desk Stand to form a Desk Telephone for party lines and the No. 315-H is used with the Desk Stand to form a Desk Telephone for indi-



No. 315-H Box Open



No. N-300 Box Open

Desk Set Boxes—*continued*

vidual magneto lines. The No. 295-A Desk Set Box is used with the Desk Stand to form a Desk Telephone for central battery or automatic lines.

Magneto Service

Code No.	*Description*
315-H	For light load bridging service where code ringing is employed. Sets contain: One 1000 ohm No. 38-AG Ringer, one 3-bar No. 22-A Generator, one No. 13 Induction Coil. Ten (10) or twelve (12) of these sets may be operated on a twelve (12) or fifteen (15) mile line of No. 12 B.W.G. iron wire. May be used on lines equipped with N1317-AH Wall Telephones.
N300-R	For medium load bridging service where push button system of signalling central without ringing other subscribers on the line is used. Set contains: One 1600-ohm No. 38-FG Ringer, one 5-bar No. 48-A Generator, one No. 13 Induction Coil, one No. N1-A condenser, one No. N1-E Key. The N1-A condenser is wired in series with the receiver to insure the ringing of the bells, even if a receiver is left off the hook. Thirty (30) of these sets may be operated on a twenty (20) mile line of No. 12 B.W.G. iron wire. May be used on lines equipped with N1317-F Wall Telephones.
N300-A	For heavy load rural service where code ringing is employed. Set contains: One 2500-ohm No. 38-BG Ringer, one 5-bar No. 48-A Generator, one No. 13 Induction Coil. Forty (40) of these sets may be operated on a thirty-five (35) mile line of No. 12 B.W.G. iron wire. May be used on lines equipped with N1317-P or N1317-S Wall Telephones.
N300-C	For heavy load rural service, where push button system of signalling central without ringing other subscribers on the line is used. Set contains: One 2500-ohm No. 38-BG Ringer, one 5-bar No. 48-A Generator, one No. 13 Induction Coil, one No. N1-A Condenser, one No. N1-E Key. The N1-A condenser is wired in series with the receiver to insure the ringing of the bells, even if a receiver is left off the hook. Forty (40) of these sets may be operated on a twenty-five (25) mile line of No. 12 B.W.G. iron wire. May be used on lines equipped with N1317-G or N1317-E Wall Telephones.
N300 CG	For heavy load rural service, where push button system of signalling central office and simplex ringing is used. Set contains: One 2500-ohm No. 38-BG Ringer, one 5-bar No. 48-A Generator, one No. 13 Induction Coil, one No. N21-F Condenser, one No. N1-G Key. The condenser is wired in series with the receiver to insure the ringing of the bells even if a receiver is left off the hook. Forty (40) of these sets may be operated on a twenty-five (25) mile line of No. 12 B.W.G. iron wire. May be used on lines equipped with the N1317-CG Wall Telephone.

No. 295A Box Open

Central Battery and Automatic Service

Code No.	*Description*
295-A	This is our standard Desk Set Box for central battery and automatic service, consists of a 1400-ohm Ringer, No. 21-F Condenser and a No. 46 Induction Coil, mounted in a gumwood box which is finished in dark walnut.

Desk Stands

No. 1020-AL Desk Stand

No. N1050-AL Desk Stand

There are Desk Stands, as illustrated, of both manual and automatic types, the code number of which includes the transmitter and cords.

Code No.	*Type*	*Desk Stand*	*Finish*	*Transmitter*	*Cords*	*Length*
1020-PC	Manual	20-PC	Nickel	323	1 No. 550	5 feet, 6 inches.
					1 No. 549	2 feet, 6 inches.
					2 No. 547	9 7-8 inches.
1020-AL	Manual	20-AL	Black	323	1 No. 550	5 feet, 6 inches.
					1 No. 549	2 feet, 6 inches.
					2 No. 547	9 7-8 inches.
N1020-EL	Manual	20-AL	Black	337	1 No. 550	5 feet, 6 inches.
					1 No. 549	2 feet, 6 inches.
					2 No. 547	9 7-8 inches.
N1050-AL	Automatic	N50-AL	Black	323	1 No. 549	2 feet, 6 inches.
					1 No. 550	5 feet, 6 inches.
					1 No. 547	9 7-8 inches.
N1050-EL	Automatic	N50-AL	Black	337	1 No. 549	2 feet, 6 inches.
					1 No. 550	5 feet, 6 inches.
					1 No. 547	9 7-8 inches.

If a dial or apparatus blank is required with either of the above automatic Desk Stands, details must be specified on the order.

These Desk Stands will be furnished with a No. 143 Receiver (composition shell) or No. 144 Receiver (hard rubber shell) as ordered.

No. 1020-PC and No. 1020-AL are manual Desk Stands for use at local (or dry cell) stations, and also at central battery stations except where the loop is of high resistance. In the latter case, use the No. N1020-EL.

No. N1050-AL and No. N1050-EL are automatic Desk Stands, the latter being used when the loop resistance is high.

Distributing Frames

A Distributing Frame is an iron framework intended for supporting switchboard protective apparatus and terminal strips. It is usually located near the point where the outside wires enter the office building, and provides a satisfactory method of terminating such wires, as well as a very flexible means of cross connecting any outside line to any switchboard drop without interfering with the wiring inside the switchboard.

Code No.	*Capacity*		*Used With*
	Inside Lines	*Outside Lines*	
1431-A	20	20–25	Any small switchboard.
1420-B	100	100–125	Any non-multiple switchboard.
1430-E	100	100–125	No. 1220 Switchboard.
1430-F	100	100–125	No. 1240 Switchboard.
1425	(As many 100 line units as desired).		Magneto or Common Battery Switchboard.

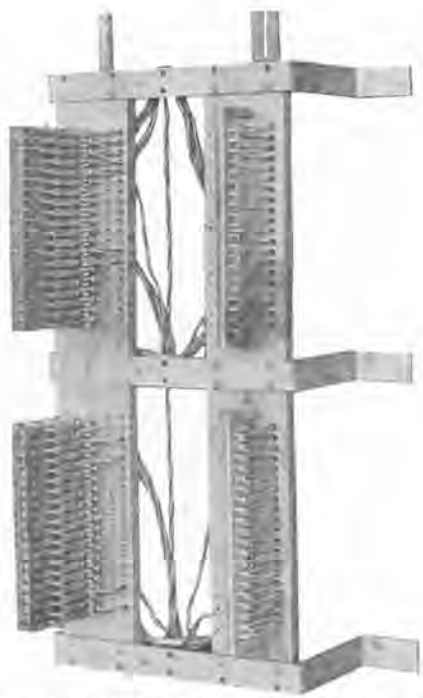
No. 1431 Wall Type Distributing Frame

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

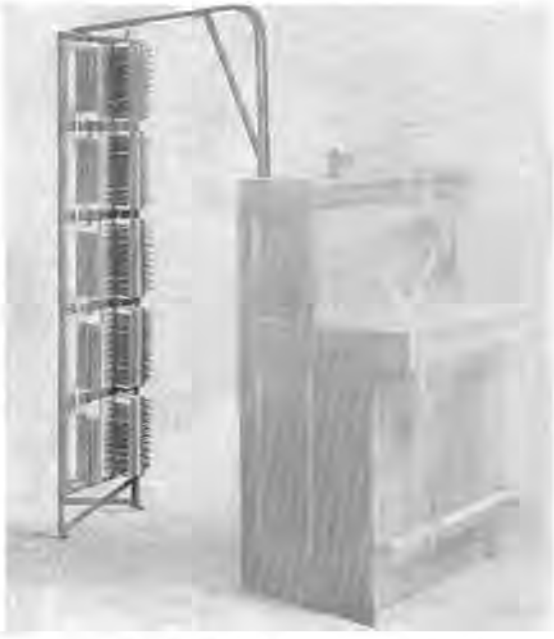
It is especially suitable for the small rural office operating a No. 1800 or other type switchboard, equipped for from ten to forty lines, with little prospect of immediate growth.

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

In ordering this frame it will be necessary to specify the Protector Groups desired. For information on Protector Groups see pages 47 to 48.



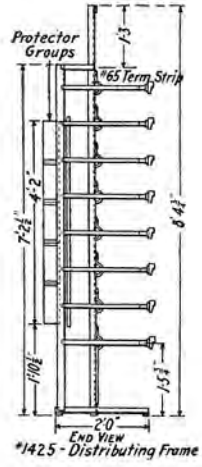
Two Units of No. 1431 Distributing Frame equipped with two No. N1435-M and two No. 1435-Y Protector Groups



No. 1430 type Main Distributing Frame

No. 1425 Type Distributing Frame.—This is a unit type Distributing Frame, adapted for central office telephone or exchange protective apparatus where Nos. 1420 or 1430 type frames are too small for present requirements or future growth.

Initial Equipment.—For initial equipment at least two units or verticals must be 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.



#1425 - Distributing Frame

Nos. 1420 and 1430—100 Line Types.—These Distributing Frames are recommended for all No. 1220 and 1240 and similar switchboards.

They consist of units of 100 line capacity each. Any number of units can be assembled together to provide accommodation for any number of lines.

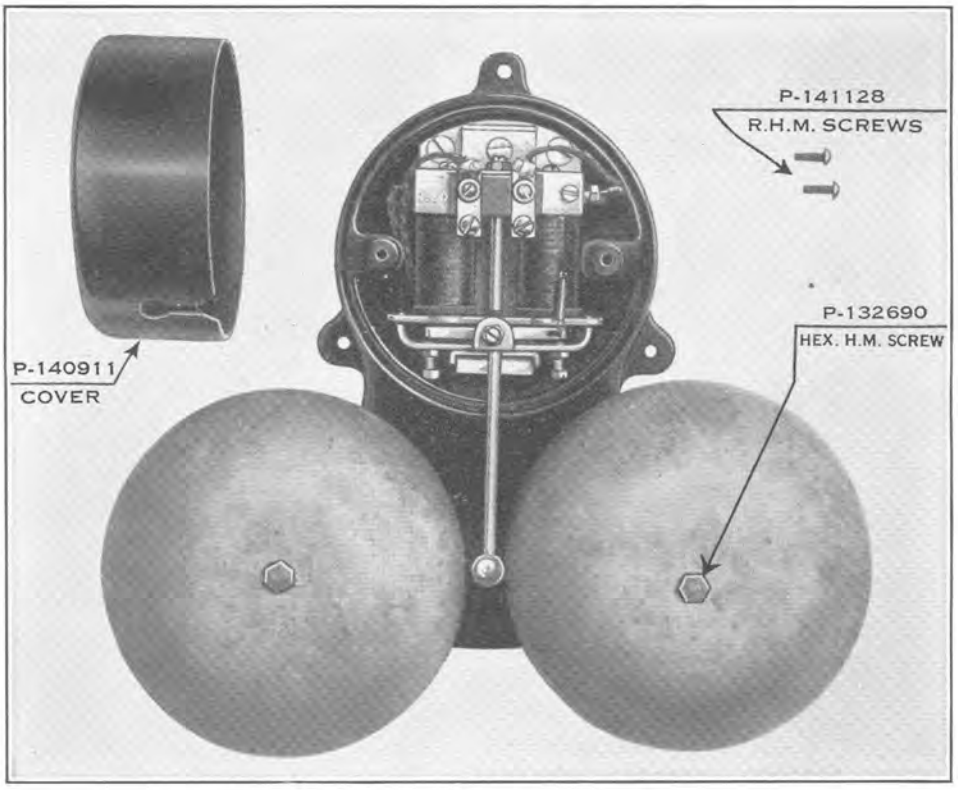
They differ only in the supporting brackets, the No. 1430 type frames being designed to attach to the switchboard, and the No. 1420 being arranged to be braced to the wall and thus be independent of the switchboard for support.

Extension Bells

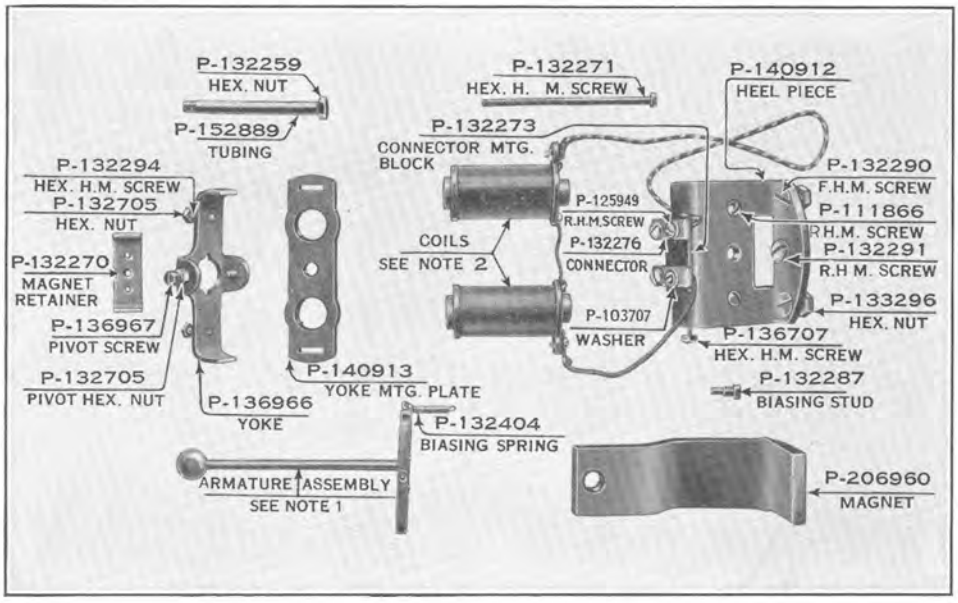
No. N43 Type.—These Extension Bells are intended for auxiliary use in connection with wall, desk or telephone arm telephones or for use instead of the regular ringer furnished in a telephone. The resistance of the ringer in the Extension Bell Set should be the same as that of the Ringers used on the same line.

The N43 type Extension Bells consist of a ringer mounted in a wooden box and provided with three inch gongs, black finished. The terminals are mounted on the inside of

Replacement Parts for Nos. 392 and 342 Extension Bells



No. 392 Extension Bell, showing cover removed (No. 392-D shown)



No. 392 Extension Bell coil and armature parts (No. 392-D shown)

(Note 1)

Bell Code No.	Armature Assembly
392A	P-140919
392B	P-140919
392D	P-140919
392E	P-140919
392J	P-140919

(Note 2)

Bell Code No.	Ringer Coils:
392A	P-145236
392B	P-145237
392D	P-145237
392E	P-145238
392J	P-145236

Extension Bells—*continued*

the box, the approximate outside dimensions of which are 6 3/8 inches wide, 6 inches high and 6 inches deep. The boxes are finished to match dark walnut.

Code No.	*Ringer*	*Resistance Ohms*	*Service*
N43-AA	38-AG	1000	Light load bridging.
N43-AB	38-BG	2500	Heavy load bridging.
N43-AF	38-FG	1600	Medium load bridging.

No. N43 Extension Bell

No. 392—Loud Ringing Type

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

The No. 342 type Extension Bell consists of a No. 392 type mounted on a No. 149-A backboard. This backboard has a sloping roof which protects the bell from falling water and other substances.

The windings of the No. 392 type bells are moisture-proofed and all metal parts are given a protective finish. The case and base is finished in black and the six-inch gongs are given a hot dipped galvanized finish.

These bells may be used on magneto telephone lines and in signalling systems as normally furnished, that is without a condenser, but if they are to be bridged across a central battery telephone line, a 2 M.F. (No. 21-D) condenser must be connected in series with the ringer coils. Space is provided in the base of the bell for this purpose.

If a condenser is required the following parts must be ordered:—

One No. 21-D Condenser.
One Condenser Strap P.P. 954.
Two Condenser Mounting Screws P-122026.

No. 392 Type

Code No.	*Approx. Res. (Ohms)*	*Biasing Feature*
392-A	1000	None
392-B	2500	None
392-D	2500	Bias Spring to prevent tapping.
392-E	1600	None
392-J	1000	Bias Spring to prevent tapping.

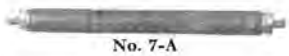
No. 342 Type

Code No.	*Extension Bell Used*	*Backboard*
342-J	392-A	149-A
342-K	392-B	149-A

No. 392 Type

No. 342 Type

Fuses (tubular)



No. 7-A

No. N7-A

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.

The Fuses listed below are supplied in 7 ampere capacity, unless otherwise ordered.

Code No.	*Ampere Capacity**	*Used With*
7-A	1 to 8 as specified	No. 1435-J & No. 1435-U Protector Groups.
N7-A	7	N7-A Protector.
11-C	1 to 8 as specified	58-A & 58-AP Protector.

Generators

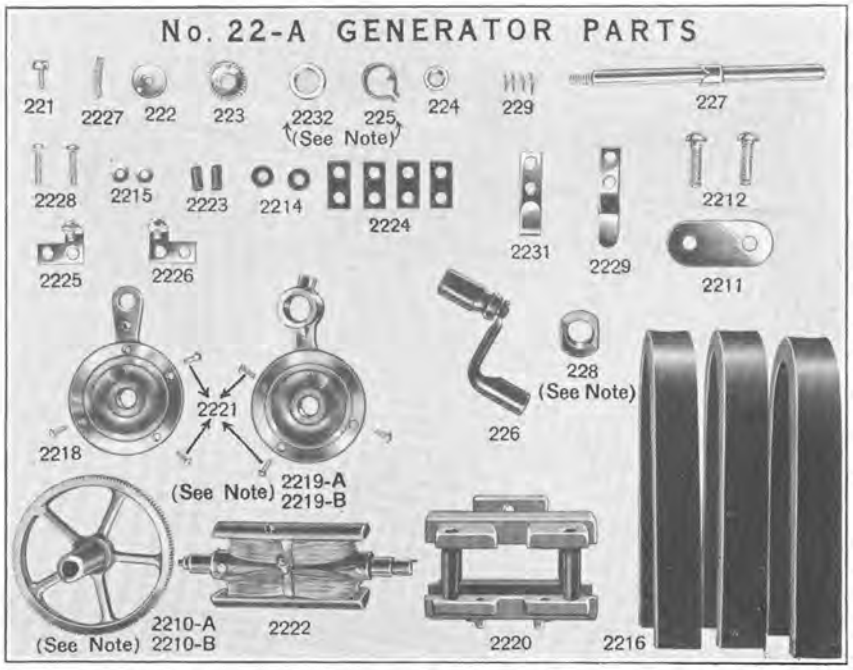
No. 48A—Generator

No. 22A—Generator

Northern Electric Hand Generators are of compact durable construction with working parts designed to give years of continuous service. These 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:—

Their armatures are automatically disconnected from the line when not in use and short circuited or shunted, protecting them from lightning. The armature winding is moisture-proofed.



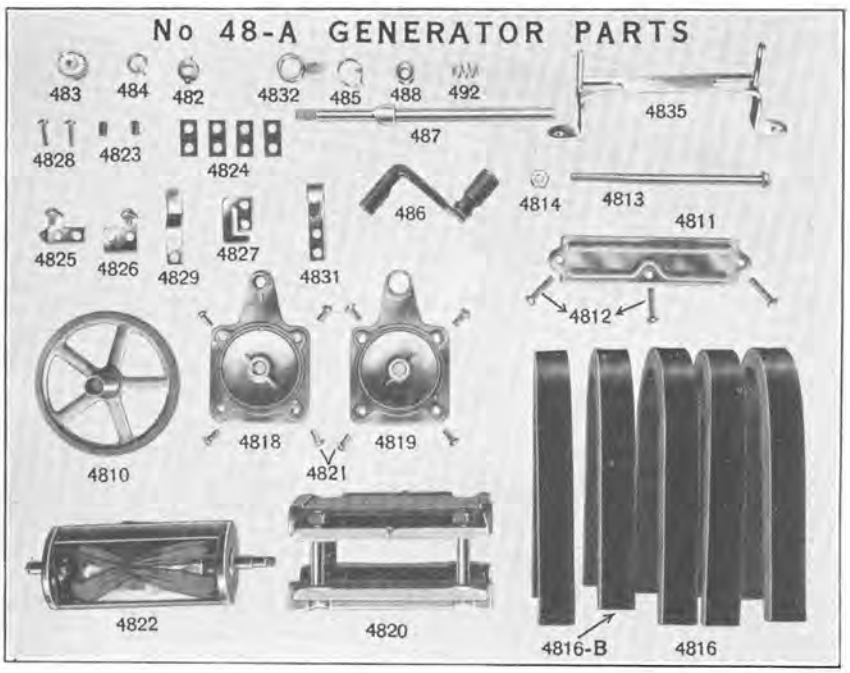
No. 22-A Generator Parts

Cat. No.	*Description*
221	Pinion cap screw.
222	Pinion cap.
223	Pinion.
224	Shaft collar (outside).
225	Spring clip. (See note).
226	Crank.
227	Shaft.
228	Sleeve nut. (See note).
229	Shaft spring.
2210-A	Gear and sleeve. (See note).
2210-B	Gear and sleeve. (See note).
2211	Magnet strap.
2212	Magnet strap screws.
2214	H.R. Washers.
2215	Brass washers N.P.
2216	Magnets.
2218	Bearing bracket terminal end.
2219-A	Bearing bracket gear end. (See note).
2219-B	Bearing bracket gear end. (See note).
2220	Pole piece assembly.
2221	Bearing bracket screws.
2222	Armature assembly.
2223	H.R. bushings.
2224	Insulators.
2225	Terminal, inner.
2226	Terminal, outer.
2227	Pinion spring.
2228	Spring assembly screws.
2229	Armature contact spring.
2231	Shaft contact spring.
2232	Shaft collar (inside). (See note

NOTE.—For old style generators with sleeve of main gear threaded, specify Nos. 2219-A, 2210-A and 228. For new style generator without threaded sleeve, specify Nos. 2219-B, 2210-B, 2232 and 225. New type illustrated.

No. 48-A Generator Parts

Cat. No.	*Description*
482	Pinion cap.
483	Pinion.
484	Pinion Spring.
485	Spring clip.
486	Handle.
487	Shaft.
488	Shaft collar, outside.
492	Shaft spring.
4810	Gear and sleeve.
4811	Magnet bracket.
4812	Magnet bracket screws.
4813	Long bolt.
4814	Nut for long bolt.
4816	Magnets.
4816-B	Centre magnet (shorter).
4818	Bearing bracket, spring end.
4819	Bearing bracket, gear end.
4820	Pole piece assembly.
4821	Bearing bracket screws.
4822	Armature assembly.
4823	H.R. Bushings.
4824	Insulators.
4825	Terminal assembly, inner.
4826	Terminal assembly, outer.
4827	Contact spring middle.
4828	Spring assembly screws.
4829	Contact spring inner.
4831	Contact spring outer.
4832	Shaft collar.
4835	Mounting bracket.



Generators—*continued*

All parts are accurately machined and fitted and the gears are accurately cut so that they are easy to turn, and smooth, noiseless operation is obtained. The metal parts are given a protective finish.

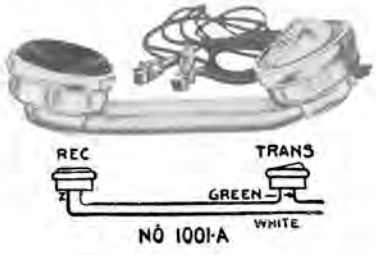
The magnets are made from steel which was developed especially for this purpose and the heat treatment employed is such that their strength is retained indefinitely.

No. 22-A.—Used on magneto lines for supplying alternating current; equipped with 3 bars.

No. 29-F.—Are used where light weight is essential, as in linemen's test sets, and portable telephones. May be equipped with folding handles; equipped with 2 bars.

No. 48-A.—This is our most powerful hand generator and is used in telephones for heavy load line service; equipped with 5 bars.

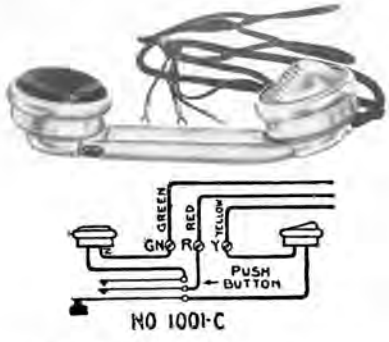
Hand Sets



No. 1001 Type

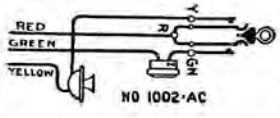
The No. 1001 type Hand Sets were originally intended for the use of linemen and are designed to withstand the rough handling incidental to such service. This design proved so satisfactory that it is now used extensively for a number of different purposes.

The handles are made of brass tubing with drawn brass end pieces and the transmitter and receiver are provided with drawn brass cases equipped with screw clamping rings, thereby making an instrument that is extremely rugged. The No. 1001-C Hand Set is provided with a push button switch which is connected so that these hand sets may be used instead of the No. 1020-AL Desk Stand, where a rugged hand set is of importance.



No. 1002 Type

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



Code No.	*Transmitter*	*Receiver*	*CORDS* *Code No.*	*Length*	*Push Button Spring Combination*	*Use*
1001-A	244	131	243	8 inches		Test Set for Linemen.
			2–547	5 feet (Waterproof)	None	
1001-C	285	131	366	6 feet (Waterproof)	2 Make	Portable Telephones
1002-AC	267	141	415	9½ inches		No. 1800 Switchboard
			414	4¼ inches	2 Make	and Telephone Sets.
			318	4 feet		

Hand Set Hanger

No. 1B Hanger

The No. 1-B Hand Set Hanger mounts on a vertical surface and holds the 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. This Hanger is made of cast brass, black finish. Overall dimensions: 3 1/16 inches wide, 2½ inches deep and 3 3/8 inches high.

Heat Coils

No. 76-A Heat Coil

The No. 76-A Heat Coil is used in protectors and protector groups to protect central office equipment against sneak currents. When an excessive current passes through the circuit the solder melts and allows a spring on the protector mounting to press the pin of the Heat Coil against a contact spring on the protector mounting and ground the line. This Heat Coil is provided with a black hard rubber shell and replaces the No. 73-A and No. 67 types and will mount on protectors of one-half and three-eighths inch centres.

Induction Coils

No. 13

No. 23

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

No. 24

These 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, there being no dead sections of the winding to reduce its efficiency through the introduction of direct current resistance.

A new core material made up of thin strips of special alloy steel has been adopted which permits of greater transmission efficiency than has been heretofore possible with any other Induction Coil core material.

The Nos. 62, 63 and 65 Induction Coils were designed for use with the No. 528 Receiver in improved Operator's telephone circuits. The Nos. 23 and 24 Induction Coils are used with the No. N151 Receiver. The description and uses of these Induction Coils are given in the following table:

	Overall Dimensions—Inches			
Code No.	*Length*	*Width*	*Height*	*Principal Use*
13	3¼	1	1 3/16	Standard for local battery telephones. Terminals No. 1 and No. 2 are the primary winding.
23	*6¼	2	2	Nos. 9 and 10 central battery switchboards, magneto switchboards and P.B.X.'s using N151 receivers.
24	*6¾	3¼	1⅞	No. 1 central battery switchboard and Nos. 1 and 2 toll switchboards, using N151 receivers.
46	4 9/16	1⅜	1 3/16	Standard for central battery telephones. Supersedes and mounts instead of No. 20.
62	4¼	1¾	1 9/16	Primarily for use in "Trunk" operators' improved telephone circuit with the No. 528 receivers; for this use replaces the No. 24.
63	4¼	1¾	1 9/16	Primarily for use with "Subscribers" operators' and P. B. X. attendants' improved telephone circuit using No. 528 receiver; for this purpose replaces No. 23.
65	4¼	1¾	1 9/16	Primarily for use with "Toll" operators' improved telephone circuit using No. 528 receiver; for this purpose replaces the No. 24.

**Includes mounting base*

Interrupters

(Pole Changers)

No. 84-D Interrupter

Interrupters provide a convenient means of obtaining alternating current from a direct current source of energy. They are suitable for Private Branch service and for use with Magneto Switchboards and Central Battery equipment. They serve as a battery operated ringing machine on telephone lines from the switchboard, thereby increasing the operating efficiency.

Each Interrupter is mounted on the top of a metal base eight inches square, in which is mounted condensers, resistance and a switching key for starting and stopping. A metal cover with a glass window is hinged to the base and protects the moving parts. A circuit label is pasted on the inside of the cover. The Interrupters occupy a small amount of space, are easily installed in either a horizontal or vertical position, have their adjustable parts readily accessible and require a minimum amount of maintenance.

No. 84D.—This Interrupter is the popular model with Canadian telephone companies and has been thoroughly tested by long and continuous service.

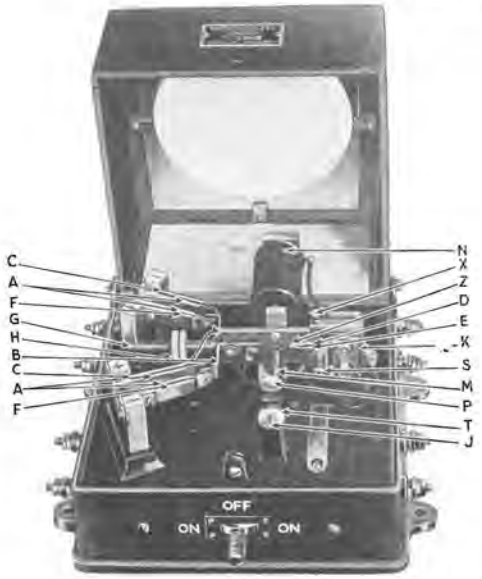
The operating coil is wound for current from two cells of Edison primary battery. Numbers S-502 and S-403 are two of the types of Edison Battery which may be used. A 100-volt dry cell battery will supply alternating current of 83 volts for ringing purposes.

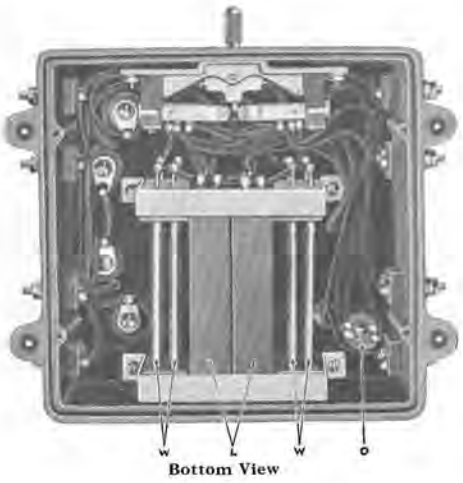
No. 84-F.—This model is designed to take both operating and ringing current from a 24-volt storage battery.

No. 84-G.—This model is designed to operate on a 36-volt central office battery.

In order to obtain replacement parts for Nos. 84-A, C and E types of Interrupters, new ones of which have not been recently sold in Canada, we are showing on the next page a list of parts for the complete line of No. 84 type Interrupters.

Interrupters—*continued*





Bottom View

Types 84A, C, D, E, F and G Interrupters (No. 84E shown)

PIECE PART LIST

When odering 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

Jacks

No. N99—Jack

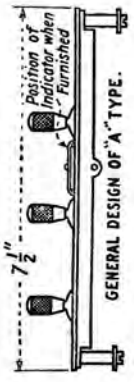
Northern Electric Jacks are equipped with springs which are hard, resilient and long-lived. All talking circuits are provided with contacts of precious metal. Sleeves are accurately machined for inside diameter and length, and the structure is properly designed to hold the component springs and insulators firmly in place.

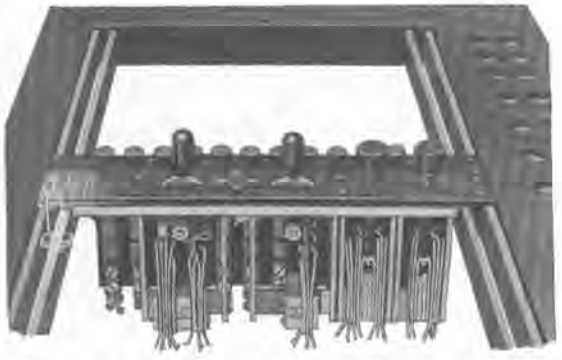
There are Northern Electric Jacks, both individual and strip mounted, to meet all requirements. Information will be furnished on request.

Keys

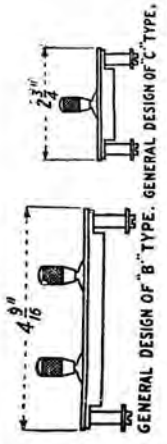
We manufacture telephone switchboard Keys of many different designs and combinations and are always pleased to recommend a Key to meet your particular requirements.

Northern Electric Keys are designed for easy manipulation, rough handling and freedom from trouble.





A2 and A3 Type Keys in Universal Key Shelf



Universal Type Keys

Universal Type Keys are arranged to mount in a universal type key shelf, which, instead of being drilled and tapped for a definite location for each Key, is provided with two mounting slots running lengthwise of the key shelf and registering with a mounting stud at each end of the Key as shown in the illustration above.

In coding these Universal Keys they have been divided into three types according to the length of the base; A type, 7½ inches; B type, 4 9/16 inches; C type 2¾ inches.

All of these types of Keys are made in a

Universal Type Keys—*continued*

variety of models, mounting lever key units and push button key units in varying numbers and combinations.

Key units are supplied mounted with or without indicators which show the last Key operated. The units are manufactured in non-locking form and the lever units in both locking and non-locking arrangements.

Universal Type Keys of the same length base will mount in any key shelf designed for that length of Key, and apparatus blanks can be supplied either to take the place of Keys at non-equipped positions in the switchboard, or to fill the space remaining in the universal key shelf after the required Keys have been placed in it.

Several hundred forms of the Universal Key are available.

Number Plates

Number Plates for calling dials are shown under the general heading of calling dials.

The following are the Number Plates supplied for combined jacks and signals:

Code No.	*Type*	*Numbered*	*Used With*
P-113032	Metal with raised numbers	As ordered	Shutter Type Signals.
P-111104	Numbered on Paper.	As ordered	Ball Type Signals.

Plugs

No. 47 Plug

No. N103—Plug

Northern Electric Plugs are manufactured to meet all requirements. They are efficient, reliable in operation and constructed of materials which permit of rough usage.

The No. 47-A Plug has a red shell and is made up with two conductors. The No. N47-A is a similar Plug only smaller and with a spring tongue on the sleeve.

When an Operator's headset is to be used at a switchboard it is convenient to wire two adjacent jacks to provide the necessary connections into the switchboard circuit and to use a Twin Plug so that the Operator will not have to handle two separate Plugs for this purpose. The No. N103 Plug, which is made up of two No. N47 Plugs to fit our No. N99 Jack, was designed for this purpose.

Pay Stations or Coin Collectors

(Post Pay Type)

Pay Stations are valuable to an operating telephone company in affording convenient service to the transient public on a cash basis, and were developed in order that the non-subscriber might pay his proper share for the use of the Telephone Company's Plant.

The operation of the Pay Station is simple. The coin is placed in the proper slot when requested by the Operator and descends by gravity, there being no levers to push or pull. The coin in its descent strikes bells of different tones and signals the receipt of the money in the cash box. Because the coin signals are rendered directly, they are frequently known as "automatic pay stations."

No. 50-M Pay Station

No. 139-A Bracket

No. 50 Type Pay Station

No. 50-M.—This is the only post pay type of Pay Station arranged to operate with the Canadian 25 cent, 10 cent and both the new nickel 5-cent coins and also the small silver 5-cent pieces. It will also accept the regular nickels, dimes and quarters of the United States mintage.

This Pay Station has a general ruggedness of construction which enables it to withstand the rough usage incidental to public service. It is equipped with new locks of an improved type on the upper housing and on the cash drawer, insuring a maximum of protection. The cash drawers are large, hav-

No. 50 Type Pay Station—*continued*

ing an approximate capacity of sixty cubic inches and may be obtained either in the open type (No. 2-A) or in the self-sealing type (No. 6001-A).

When equipped with a No. 143 Receiver, No. 323 Transmitter, No. 92 Cord and a Desk Set Box of the proper selection, this Pay Station makes a complete telephone equipment.

If it is desired to mount the No. 50-M Pay Station on a table or on a shelf in a booth, a No. 139-A Bracket is required. This Bracket is not included as part of the Pay Station and must be ordered separately.

No. 23 Type Pay Station

No. 23-D Pay Station can be furnished to operate with Canadian 25 cent, 10 cent and either the new nickel 5-cent pieces or the old type small silver 5-cent pieces, but a station furnished to operate with one type of 5-cent piece will not operate with the other type.

This Pay Station is compact and neat in appearance and its installation not only proves a decided advantage in appearance over the old method of attaching a station to a telephone which was never designed for such service, but it affords a substantial saving to the Telephone Company by dispensing with the regular telephone set. They consist of a complete telephone equipment when provided with a No. 143 Receiver, No. 92 Cord, No. 323 Transmitter and a Desk Set Box of the proper selection. The universal mounting plate on these stations allows for either wall or shelf attachment.

No. 23-D Pay Station

No. 11 and No. 14 Type Pay Stations

No. 11 Pay Station is arranged to operate with coins similar to the No. 23-D Type.

It is designed to attach to any regular wall type telephone set and is connected to the wall telephone by means of a mounting plate which is included with the station.


No. 11 Pay Station

No. 14 Pay Station operates with similar coins to the No. 23-D Type. It is designed to attach to any regular desk type telephone as illustrated. In ordering the No. 14 Pay Station, state what type of desk stand is used so that proper fittings will be furnished.


No. 14 Pay Station

Protectors for Telephones

No. 60-AP

No. 58-AP

Telephone protection is essential to the operating company, as Protectors reduce the hazards to life, telephone equipment and property, which may result from outside electrical sources such as lightning or crosses with electric light, trolley or high tension wires.

The Board of Fire Underwriters in their official rules covering the wiring of buildings for telephones, prescribe that the Protector must be mounted on a non-absorptive, non-combustible base, and must be located as near as possible to the point where the telephone wires enter the building. This is to prevent, as far as possible, injury to persons using the telephone and to reduce to a minimum the possibility of fires due to lightning or crosses with power circuits.

The term "power circuits" as used above includes direct current trolley lines, and the usual series arc and incandescent lighting circuits, as well as those lines used exclusively for power but not of excessive potentials. The protection of telephone lines exposed to very high potential circuits requires separate consideration in each case, and we will be glad to advise in such cases.

We manufacture several types of Telephone Protectors to meet different local conditions. These Protectors are accurately designed, constructed of first-class material and if properly installed give good results. In the Protectors listed below there are several new types which employ our improved protector blocks, a description of which is found on the following pages:

Code No.	*Protector Micas*	*Protector Mounting*	*Protector Blocks*	*Fuses*	*Heat Coils*	*Protect Central Battery and Magneto Telephones against*
58-A	2 No. 3	1 No. 16 1 No. 29 1 No. 48	2 No. 1 2 No. 2	2 No. 11-C		High potential and abnormal currents.
58-AP	—	1 No. 16 1 No. 29 1 No. 48	2 No. 26 2 No. 27	2 No. 11-C		High potential and abnormal currents.
60-A	2 No. 3	1 No. 49	2 No. 1 2 No. 2	—		Lightning only.
60-B	2 No. 10	1 No. 49	2 No. 19 2 No. 20	—		Lightning only.
60-AP	—	1 No. 49	2 No. 26 2 No. 27	—		Lightning only.
76-AP	—	1 No. 29	2 No. 26 2 No. 27	—		Lightning only; arranged to be used as part of No. 58-AP Protector.
87-BA	2 No. 3	1 No. 64-A	2 No. 1 2 No. 2		2 No. 76-A	High potentials and sneak currents; switchboard side.
89-BA	2 No. 3	1 No. 65-A	2 No. 1 2 No. 2		2 No. 76-A	High potentials and sneak currents; line side.

Protector Blocks

No. 1

No. 19

No. 2

No. 20

No. 27

No. 26

The No. 1 and No. 2 Protector Blocks form a pair that is used with one No. 3 protector mica. Both Blocks are made of specially treated carbon, the No. 1 having a plug of fusible metal in its center while the discharge surface of the No. 2 is flat. The No. 2 Protector Block is grooved on its outside surface to engage with the spring of the protector mounting which holds it in place.

The No. 19 and No. 20 Protector Blocks are used with the No. 10 protector micas. They are solid copper Blocks, the No. 19 having two pins which fit into the two bushing on the No. 20.

Nos. 26 and 27 Type Protector Blocks.—The No. 26 Protector Block is a solid piece of hard non-dusting carbon and 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 Protector at the proper voltage is thereby ensured.

Ordinarily, lightning discharges will cause an arc across the air gap between the carbon insert and the ground Block but will not heat them sufficiently to melt the cement used for holding the insert 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 Block will melt the cement holding it and allow the mounting spring to push it into direct contact with the No. 26 Block, thus permanently grounding the line.

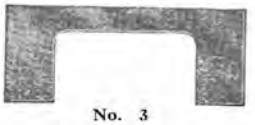
The Nos. 26 and 27 Protector Blocks are interchangeable with the combinations of Nos. 1 and 2 Protector Blocks and No. 3 Protector Mica, both at subscribers' stations and central offices, and are, therefore, generally available for improving protective equipment.

The No. 30 Protector Block is similar to the No. 27 except that it is blue in color and is intended for use only in cable box protectors.

Code No.	*Description*	*Used with Protectors*
1	Plain Carbon Block with fuse metal	58-A, 60-A, 87-BA, 89-BA and Protector Groups No. N1435-M and MB.
2	Grooved Carbon Block without fuse metal	
19	Copper Block with two pins which fit into two bushings of the No. 20 Protector Block	60-B
20	Copper Block with two bushings	
26	Carbon Block	58-AP, 60-AP, 76-AP and Central Office Protectors.
27	Porcelain Frame with carbon insert	
30	Porcelain frame with carbon insert	Cable Box Protectors.

Protector Micas

No. 10



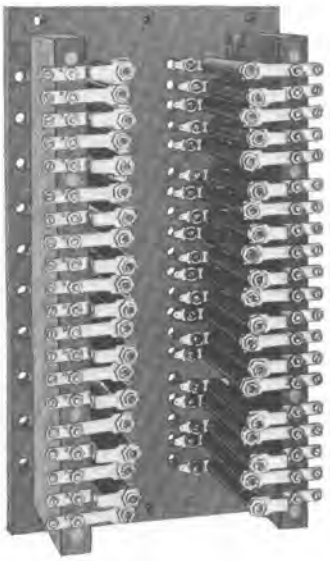
No. 3

Protector Micas are made of selected mica because of its incombustibility and are machined to a uniform thickness. They are placed between the protector blocks to secure the necessary air gap.

Code No.	*Used with Protector Blocks No.*	*Used With Protectors No.*
3	1 and 2	58-A, 60-A,
10	19 and 20	60-B

Protector Groups

No. 1435R & Y (R shown)



No. 1435U

No. N1435-M

The following standard types of Protector Groups are designed for either central battery or magneto telephone exchange lines and are intended to mount on the various types of distributing frames as listed on the following page.

Protector Groups—*continued*

Code No.	*For Protecting*	*Consisting of*	*Used With Distributing Frames No.*
1435-U	20 metallic outside lines against abnormal current.	40 No. 7-A Fuses mounted on a base which also serves as a fanning strip.	1420-B 1430-D, E, F 1431-A
N-1435-M	20 metallic inside lines against high potential and sneak currents.	20 No. 87-BA protectors mounted on a base which serves as a fanning strip.	1420-B 1430-D, E, F 1431-A
N-1435-MP	20 metallic inside lines against high potential and sneak currents.	Similar to N-1435-M except equipped with Nos. 26 and 27 protector blocks.	
N-1435-MB	20 metallic inside lines against high potential and sneak currents.	20 No. 89-BA protectors mounted on a base which serves as a fanning strip.	1420-B 1430-D, E, F 1431-A
N-1435-MBP	20 metallic inside lines against high potential and sneak currents.	Similar to N-1435-MB except equipped with Nos. 26 & 27 protector blocks.	
1435-R	25 metallic outside lines where fuse protection is unnecessary.	A terminal strip only, mounted on a base which serves as a fanning strip.	1420-B 1430-D, E, F 1431-A
1435-Y	20 metallic outside lines where fuse protection is unnecessary.	A terminal strip only, mounted on a base which serves as a fanning strip.	1420-B 1430-D, E, F 1431-A

Push Buttons

The No. N1-E and No. N1-G Push Buttons are intended for use in magneto telephones for Selective Central Office Signalling Service. Telephone Sets arranged for this service may signal Central Office by depressing the Push Button, without ringing the other bells on the line. When the Push Button is in its normal position other parties on the line may be called without ringing Central Office.

No. N1-E—Push Button

The button is made of hard rubber and the springs are made of nickel silver with the ends notched or drilled and tinned so that wires can be readily soldered to them.

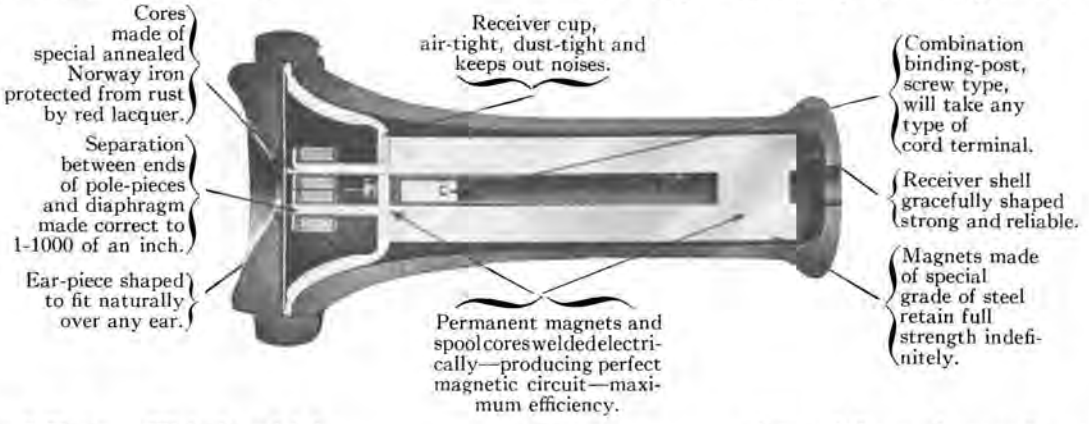
These Push Buttons are made up with three and five springs as listed below.

Code No.	*Springs*	*Used with Numbers*
N1-E	3	N1317-F, G and E Telephones and N300-R and C Desk Set Boxes for Selective Central Office Signalling.
N1-G	5	N1317-CG Telephone and N300-CG Desk Set Box for Selective Central Office Signalling with Simplex Ringing.

Receivers

Northern Electric Receivers are efficient, compact and even if exposed to severe usage require no adjustment after leaving the factory. The magnet coils are wound with the finest grade of silk covered magnet wire. The ferrotype diaphragms are subjected to enormous pressure so that they are perfectly flat and will vibrate uniformly over their entire surface and reproduce the exact sounds transmitted.

No. 143 and No. 144 Type.—These are standard hand Receivers for use with telephone sets, desk stands, transmitter arms, etc. The bipolar permanent magnet is made of the best magnet steel, especially prepared to make it efficient and lasting in its magnetic qualities. The pole pieces are constructed of annealed Norway iron and the permanent magnets and spool cores are welded, producing a perfect magnetic circuit.



No. 528 Type.—This is a high efficiency Receiver designed for use by telephone Operators at magneto and central battery switchboards. The code number of this Receiver includes a No. 3-A Headband and a No. 1466 Pad.

The case of this Receiver is made of metal which reduces its weight and guards against breakage. The ear piece is large and fits the ear in a comfortable and efficient manner.

Due to the increased sensitiveness of this Receiver it should, for magneto switchboard use, be employed in circuits with the No. 63 Induction Coil.

No. 528 Receiver

Code No.	*Description*	*Used with*
No. 143	Hand Receiver with concealed binding posts, and composition case.	Telephone Sets, Desk Stands. Transmitter Arms, etc.
No. 144	Similar to No. 143 except with hard rubber case.	Similar to No. 143
No. N151	Single Head Receiver, includes headband. Hard rubber case.	Operator's telephone circuits.
No. 515	Watchcase Receiver bipolar, hard rubber case.	No. 1017 type Test Sets.
No. 528	Single Head Receiver, includes No. 3-A Headband and Pad. Has metal case.	Operator's improved telephone circuits.

Replacement Parts

Receiver No.	*Receiver Case*	*Ear Piece*	*Diaphragm*
143	P.P. 6200	P.P. 6199	P.P. 1154
144	P.P. 9312	P.P. 9313	P.P. 1154
N151	P.P. 4411	P.P. 4412	P.P. 1784
515	P-99491	P-99485	P-95225
528	P.P. 12077	P.P.15831	P.P. 12076

Relays

In central battery and automatic systems the Relay is an essential and important piece of telephone equipment. The correct design of this apparatus not only materially affects the quality of service rendered by the telephone plant, but also the cost of operation. Relays must of necessity meet many different operating requirements. Space is too limited here to describe them, but details will be furnished on request.

Repeating Coils

No. 27 type
Repeating Coil

Northern Electric Repeating Coils represent the highest development in the science of Repeating Coil design and manufacture. The cores of our toroidal type Repeating Coils form a complete magnetic circuit thereby giving the highest possible efficiency. The coils are covered with an iron shell to prevent "crosstalk" and mechanical injury. This shell is filled with a special compound that produces a high insulation resistance and renders the coil impervious to moisture.

No. 76-A—Repeating Coil

The No. 27 type consists of a toroidal type coil enclosed in a crosstalk-proof shell and mounted on a wooden base. They are intended for use in magneto cord circuits to metallically separate a grounded or common return telephone line from a full metallic line, thereby preventing circuit unbalance with resulting noise and loss of circuit efficiency.

The Nos. 76-A and 77-A Repeating Coils

consist of toroidal type coils, each enclosed in a crosstalk-proof shell and mounted on a wooden base. They are used for terminating phantom circuits and replace the No. 46-A and No. 47-A respectively. The No. 76-A consists of two coils mounted on a wooden base and the No. 77-A consists of one coil mounted on a wooden base.

Resistances

Resistances enter into the equipment of magneto switchboards only to a limited extent, but much use is made of them in central battery and automatic systems.

It is impossible, on account of the great number of various combinations of resistances which we manufacture, to list them here, but we will be glad to discuss any particular problems on request and make suitable recommendations.

Retardation Coils

No. 46—Retardation Coil

There is a Northern Electric Retardation Coil for all telephone circuits requiring one. Space does not permit describing all types in this bulletin. We will be glad to advise on other types if the coils mentioned below do not meet your conditions.

No. 116—Retardation Coil

The No. 46-P and No. 47-P are designed for use in line circuits of magneto switchboards terminating rural lines which are equipped with telephones using the five-spring selective push button. They each have two windings of approximately 500 ohms per winding. The No. 46-P is used for mounting singly on a wooden base, and the No. 47-P for mounting on a mounting plate.

The No. 116-A Retardation Coil is intended for use in eliminating high frequency interference produced by pole changers, interrupters and ringing machines. This retardation coil is designed to have a high inductance and a low resistance. The resistance is approximately 2.6 ohms. One coil of this type is required in each interrupted circuit lead.

Ringers

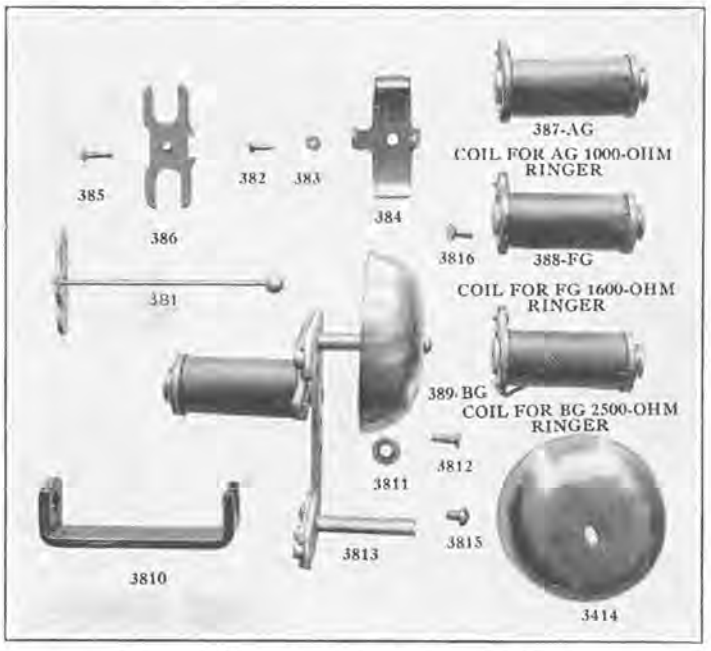
All Northern Electric magneto telephone sets are equipped with a high efficiency Ringer. The Ringer coils are wound with black enamel wire and are designed to give maximum ringing efficiency and at the same time offer high impedance to voice currents.

The Ringers of all telephones on a line should have a similar resistance, otherwise some of the bells will not ring. The selection of the proper type of Ringer should be made as indicated under telephone sets.

No. 38 Type Ringer

No. 38 Ringer

These Ringers are equipped with 3-inch brass gongs, black finished, together with the necessary gong mountings and gong nuts. They are not equipped with biasing springs and are suitable only for use with alternating current.



Replacement parts for No. 38-AG, BG and FG Ringer

Adjustment can be easily made when required. The adjustment of the armature is made by means of a single screw and adjustment of each of the gongs by two screws, one for clamping the gong posts in position and one (an eccentric) for changing their position. A screw-driver is the only tool required in making these adjustments. In the Ringers listed below the standard gong equipment is denoted by the letter "G." If gongs are not required omit the letter "G" from the code number when ordering.

Code No.	*Resistance Ohms*	*Gong Posts*
38-AG	1000	Mounts on 5/8" woodwork
38-BG	2500	Mounts on 5/8" woodwork
38-FG	1600	Mounts on 5/8" woodwork

Magneto Switchboards

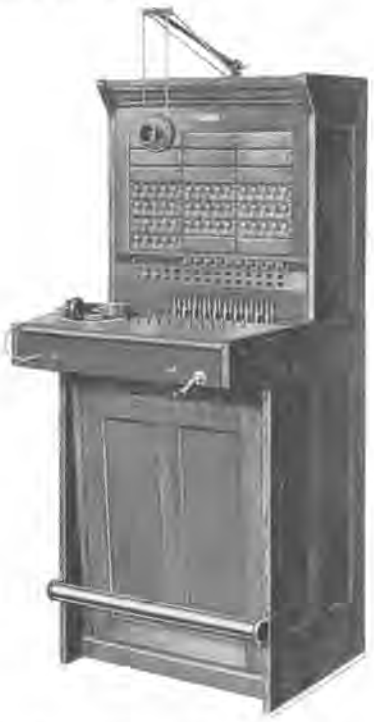
Only the smaller Switchboards are mentioned; the larger central offices must of necessity be designed to care for the individual requirements of each Exchange area and Northern Electric engineers are equipped to make studies and recommend correct central office equipment for any locality. If the Switchboards described in this catalogue do not meet your requirements, communicate with us and we will gladly advise you.

Northern Electric Switchboards have been the recognized standard of the leading telephone companies since their inception and have satisfactorily met every operating condition. The lumber used in their construction is thoroughly seasoned and kiln dried, which prevents warping and cracking. The exterior surface is given a golden oak finish and the interior an ample coat of shellac to completely fill all pores. All Boards are equipped with a standard transmitter, head receiver, hand generator and night alarm, and all keys, cords, plugs, jacks, signals, etc., are standard apparatus, the same as used in the largest Exchange Switchboards. Northern Electric Switchboards are entirely free from "crosstalk," all signal and drop winding being enclosed in soft Norway iron shells and all wiring being with twisted pair wire.

No. 1220 and No. 1240 Switchboards

These Switchboards are designed for the medium sized magneto office. The smaller Board—the No. 1220—has an ultimate capacity of 105 lines, and the larger—No. 1240—a capacity of 165 lines, and are equipped as required.

The apparatus on the face of the Switchboard is supported by a rigid steel framework, to which it is fastened with machine screws. The plug shelf is covered with 3/16" semi-hard rubber, affording protection to the woodwork from the impact of falling plugs when a connection is taken down by the Operator. All the Switchboards are fitted with removable rear doors. The combined jack and line signals furnished with these Boards on account of the exacting requirements made on them, are the most important pieces of apparatus in the Switchboard. The signal when operated by a ring on the line, displays in such a way as to attract the Operator's attention. When a



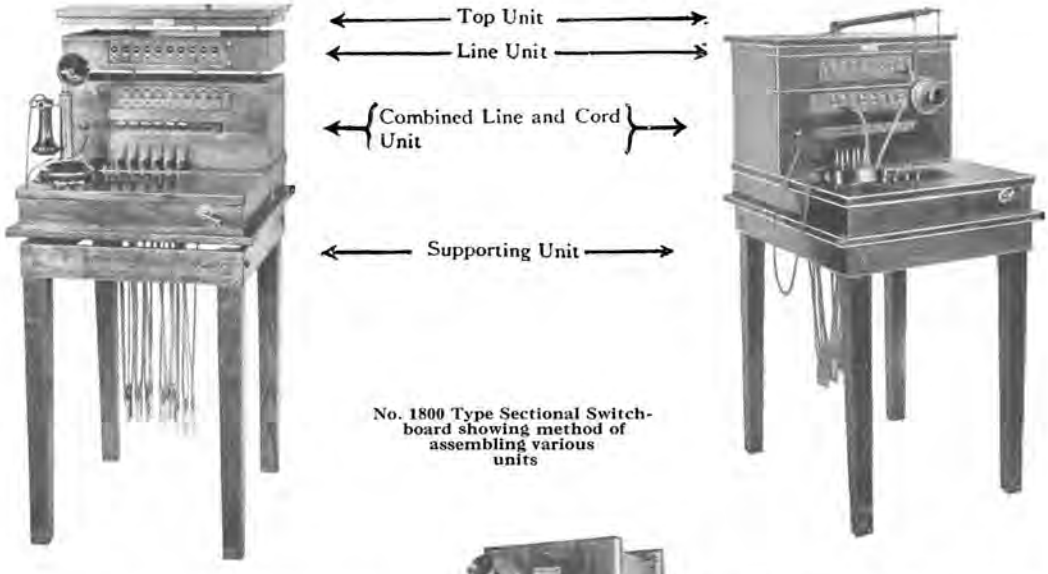
No. 1220 Switchboard: 50 Lines and 10-Cord Circuits Equipped

Magneto Switchboards—*continued*

plug is inserted in the associated jack to answer the call, the signal is automatically restored.

These Switchboards have a capacity of 15 pairs of cords per position, and are equipped with as many as specified.

No. 1800 Sectional Unit Type



No. 1800 Type Sectional Switchboard showing method of assembling various units

This is an equipment for small growing Telephone Offices having a maximum capacity of 30 lines. You buy as much equipment as your present needs require, and by adding Units the Switchboard grows with your business. These Units are easily assembled into a complete Switchboard, which presents a compact and serviceable appearance and can be arranged to meet any service conditions. Line units can be added at any time; in fact, the sections are built up like a sectional bookcase. All the apparatus and terminals associated with Operator's cord and telephone circuits are mounted in the cord unit.

No. N1317-A Wall Type Switchboard—showing 10 Lines and 4 Cords equipped

The circuits used are very simple, and a complete set of circuit and equipment blueprints is furnished with each Switchboard. The back of each Unit is hinged and when open the wiring and equipment are easily accessible.

Units are shown with both ball and shutter type combined jacks and signals, but all new equipments should be of the shutter type. Ball type units can be supplied as extensions to equipments already using this type.

This Switchboard may be furnished with either a desk telephone, or with a suspended transmitter and arm, as shown.

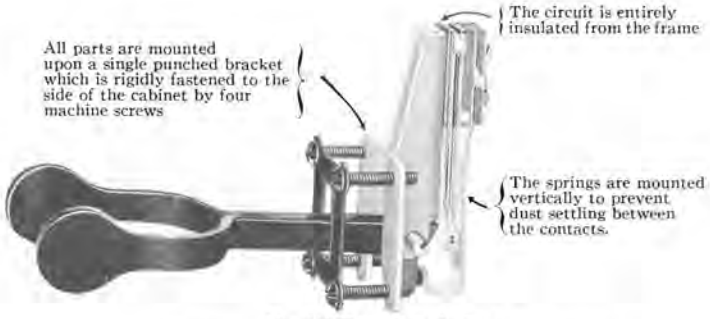
No. N1317 Switchboard

This is the most compact Switchboard equipment we furnish, even the necessary dry batteries being inclosed in the cabinet. The woodwork is of quarter sawn oak of substantial construction and dark golden finish. This is an ideal equipment where only a few lines enter an office, as all parts are accessible and it has the essential operating features of the larger Switchboards.

The No. N1317-A Switchboard is intended for original installations of fifteen lines or less. It has a capacity of fifteen lines and five pairs of cords arranged for two-way ringing. One of the five cords may be equipped with a repeating coil if desired.

Should the office grow beyond the capacity of the original installation, an extension known as the No. N1317-B Switchboard may be installed besides the original unit. The capacity of the No. N1317-B extension Switchboard is twenty-five lines and five pairs of cords, arranged for two-way ringing.

Switch Hook



No. 143 Type Switch Hook
(Showing hook depressed for purposes of illustration.)

The No. 143 type Switch Hooks are simple in construction, compact and self-contained. All the parts are mounted upon a single punched bracket which is fastened to the inner side of the cabinet. This bracket is made of extremely rigid steel, protected from rust by an electro-galvanized finish.

The Switch Hook lever is made of brass with a black finish and is designed to withstand rough usage. Mechanical contact is made between the lever and the operating spring by a hard rubber stud. The lever pivots on a fulcrum pin which is normally locked in position by a retaining spring. The movement of the lever is limited by stops, making it impossible to damage the springs. The springs are made of nickel silver and are backed up with brass stop springs. They are mounted vertically to prevent dust settling upon them.

The No. 143 type Switch Hook is designed for use with No. 143 and No. 144 Receivers.

Selection of Telephone Sets

On pages 27 and 28 reference was made to the proper method of selecting Desk Set Boxes for different classes of telephone service. This classification is repeated with the addition of the Wall Telephones to aid in the selection of proper equipment.

Light Load—Rural Lines

Telephone Sets for light load service, where subscribers are called by code ringing. Ten or twelve of these sets may be operated on a twelve-mile line of No. 12 B.W.G. galvanized iron wire.

Code No.	*Type*	*Ringer*	*Generator*	*Condenser*
6003-B	Desk	38-AG	22-A	None
N1317-AH	Wall	38-AG	22-A	None

(The No. 6003-B Set consists of a No. 1020-AL Desk Stand and a No. 315-H Desk Set Box).

Moderate Load—Rural Lines

Telephone Sets for moderate load rural service where subscribers are called by code ringing. Thirty of these sets may be operated on a twenty-mile line of No. 12 B.W.G. galvanized iron wire.

Code No.	*Type*	*Ringer*	*Generator*	*Condenser*
N1300-R	Desk	38-FG	48-A	With condenser.
N1317-N	Wall	38-FG	48-A	None.
N1317-R	Wall	38-FG	48-A	With condenser.

(The N 1300-R Set consists of a No. 1020-AL Desk Stand and a No. N300-R Desk Set Box).

Heavy Load—Rural Lines

Telephone Sets for heavy load rural service, where subscribers are called by code ringing. Forty of these sets may be operated on a thirty-five mile line of No. 12 B.W.G. galvanized iron wire.

Code No.	*Type*	*Ringer*	*Generator*	*Condenser*
N1300-A	Desk	38-BG	48-A	None.
N1317-P	Wall	38-BG	48-A	None.
N1317-S	Wall	38-BG	48-A	With condenser.

(The N 1300-A Set consists of a No. 1020-AL Desk Stand and a No. N 300-A Desk Set Box).

Selection of Sets for Selective Central Office Signalling

By means of a Selective Central Office Signalling System a large number of subscribers may be connected on one line, and each subscriber may signal Central Office without ringing the bells of the other parties on the line. This may be accomplished by one of two methods.

The first method is by bridging the Telephone across the line, using it so that the generator is normally connected to the two sides of the line, but may be switched by the subscriber so that it is bridged between one side of the line and the ground. At the Central Office the signal is connected between one side of the line and ground so that if the subscriber operates the generator in the usual way he will ring the other bells on the line, but if he operates the push-button while turning the generator crank he will operate the signal at the Central Office.

The second method, involving Simplex Signalling, is accomplished in so far as the subscriber's operation is concerned, in a similar manner. Telephones such as the No. N1300-CG and No. N1317-CG arranged for this service are equipped with five-spring

push-buttons and have one side of the generator connected to ground and the other side connected to both sides of the line, which provides two metallic conductors for the signalling current to Central Office.

Telephones arranged for Simplex Signalling under many conditions, particularly where there is inductive interference from power wires, provide a quiet circuit. They have a further advantage when installation is being done on the line—there is less liability of a subscriber's station being accidentally left so that they cannot signal Central Office.

Telephone Sets arranged for Simplex Signalling require special circuit arrangements in the Central Office.

Moderate Load—Rural Lines

Telephone Sets for moderate load rural service with push-button. As many as thirty (30) of these sets may be operated on a twenty (20) mile line of the No. 12 B.W.G. galvanized iron wire.

Code No.	*Type*	*Ringer*	*Generator*	*Condenser*
N1300-R	Desk	38-FG	48-A	With Condenser
N1317-F	Wall	38-FG	48-A	With Condenser

(The No. N1300-R Set consists of a No. 1020-AL Desk Stand and a No. N300-R Desk Set Box).

Heavy Load—Rural Lines

Telephone Sets for heavy load rural service with push button. Forty of these sets may be operated on a thirty-five mile line of No. 12 B.W.G. galvanized iron wire.

Code No.	*Type*	*Ringer*	*Generator*	*Condenser*
N1300-C	Desk	38-BG	48-A	With Condenser
N1300-CG	Desk	38-BG	48-A	With Condenser
N1317-G	Wall	38-BG	48-A	With Condenser
N1317-E	Wall	38-BG	48-A	None
N1317-CG	Wall	38-BG	48-A	With Condenser

(The Nos. N1300-C and N1300-CG Sets consist in each instance of a No. 1020-AL Desk Stand and a No. N300-C and No. N300-CG Desk Set Box respectively.)

Telephone Sets—Miscellaneous

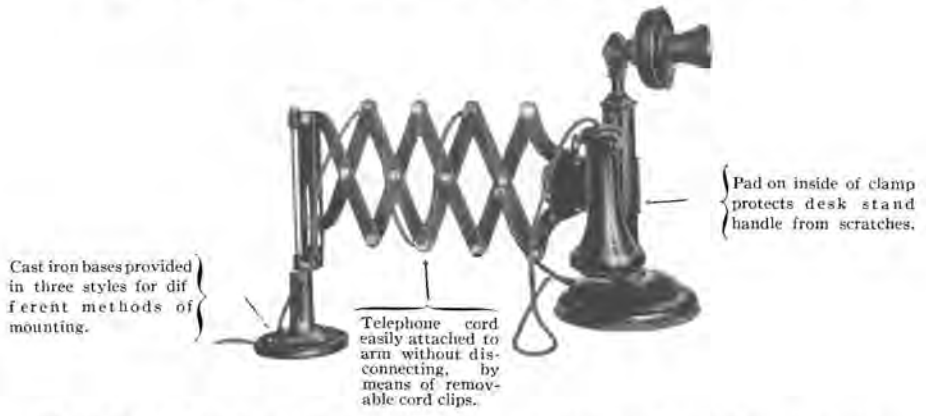
We have listed below a few of our Wall Type Telephone Sets, but in cases where you have other requirements we will be glad to recommend a set to meet your requirements.

Code No.	*Type*	*Transmitter*	*Receiver*	*Cord*
1293-A	Manual	No. 323	No. 143	No. 92
N1293-EA	Manual	No. 337	or No. 144	No. 92
N1293-G	Automatic	No. 323	as	No. 92
N1293-GP	Automatic	No. 323	required	No. 92

Note:—The No. N1293-G and No. N1293-GP Telephone Sets are normally used as automatic sets. They may, however, be equipped with an apparatus blank (which is not included in the code number) and used for manual operation until such time as it is desired to operate on an automatic basis.

The No. N1293-GP Telephone Set may be equipped with a No. N1-A Dial Mounting if required.

Telephone Arms for Desk Stands



No. 147-AC or CC Telephone Arm, attached to Desk Stand which is not included in code number

When a Desk Telephone is used by two or more persons, the Telephone Arm is a great convenience and, in some cases, almost indispensable.

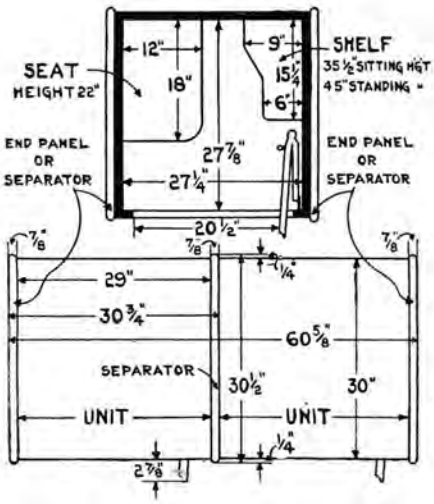
We can supply these Telephone Arms finished in black and having an extended length of either 24 inches or 36 inches as required.

Code No.	*Method of Mounting*	*Length Closed*	*Length Extended*
147-AA	Side of roll top desk	8¼ inches	24 inches
147-AB	Wall or side of flat top desk	8¼ inches	24 inches
147-AC	Top of flat top desk	8¼ inches	24 inches
147-CA	Side of roll top desk	10 inches	36 inches
147-CB	Wall or side of flat top desk	10 inches	36 inches
147-CC	Top of flat top desk	10 inches	36 inches

NOTE.—The Telephone Arm does not include a Desk Stand.

Telephone Booths

No. 1 Folding Door Telephone Booth



No. of Units	Over-all Width Ft.	In.
1	2	6¾
2	5	0⅝
3	7	6½
4	10	0⅜
5	12	6¼
6	15	0⅛
7	17	6
8	19	11⅞
9	22	5¾
10	24	11⅝

Note.—Over-all width includes End Panels and Separators.

Telephone Booths are installed at the Exchange, railway station, stores, hotels or wherever a telephone is located for the use of the public, as they provide privacy usually not obtainable in any other way. They are also desirable in factories and noisy places where it would otherwise be impossible to hold a telephone conversation.

No. 1 Type Folding Door Telephone Booths

The No. 1 Folding Door type Booths are designed for installation in groups, but may also be installed singly when the unit is equipped with end panels. The units are built with unfinished sides assembled with separators between adjacent units, and with end panels at either end of the group. The backs of the units are finished as indicated in the code listings.

The folding door construction makes these Booths particularly desirable for use in narrow hallways or passages, as the door opens and closes in a space only three inches beyond the front surface of the Booth. The door is normally open, which permits the maximum of ventilation and is opened and closed by the simple motion of pulling upon the handle. The construction of the joint in the middle of the folding door is such as to prevent the chance of injury to the hand or fingers.

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

The ceiling of the Booth is 4½ inches below the roof and the intervening space may be

Telephone Booths—*continued*

used as a wiring chamber to house an electric light relay or door switch equipment when these features are required.

These Booths are strong and substantial, solid birch mahogany finish or oak being used in their construction. The code numbers and descriptions of the different Booths are as follows:—

Code No.	*Description*
1-A	Birch with Light Mahogany Finish; Hardwood Back.
1-B	Birch with Light Mahogany Finish; Softwood Back.
1-C	Oak, Golden Finish; Hardwood Back.
1-D	Oak, Golden Finish; Softwood Back.
1-E	Birch with Dark Mahogany Finish; Hardwood Back.
1-F	Birch with Dark Mahogany Finish; Softwood Back.

NOTE:—These code numbers do not include end panels, separators, seats, shelves or lighting equipment; if any of this material is required it must be ordered in addition to the Booth.

Ends, seats, shelves and separators are usually finished in oak or birch to match units. These booths can also be supplied unfinished, or with any special finish desired.

Telephone Booth Lighting

Automatic Door Switch

Booth lighting controlled by a Door Switch which is automatically turned on when the door is closed, can be provided on these Booths by the addition of the following apparatus. If this provision is required, the apparatus must be ordered in addition to the Booth and the installation carried out by the customer.

1—No. 81 Light Receptacle.
1—No. 7241 Switch.
1—No. 140-A Switch.

Telephone Operators' Chairs

In order that the Operator may perform her work at the switchboard with maximum efficiency, it is necessary that the Operator's Chair be comfortable, as well as correct in mechanical design. Operators' Chairs have been made a subject of close study by tele-

phone traffic men, with the result that types of Chairs have been designed to meet the requirements of each of the different switchboards. The Chairs are illustrated below.

Code No.	*Minimum Height Seat of Chair from Floor*	*Range of Vertical Adjustment*	*Height of Rung from Floor*	*Used with*
11097	17 inches	4 inches	No Rung	Switchboard where Key-shelves are 2′ 6″ or less from floor as No. 1 switchboard with raised floor of 8″.
11300	26 inches	7 inches	11½ inches	Magneto and Multiple P.B.X.
11301	20 inches	4 inches	5½ inches	No. 1 Switchboards, No. 92 Jack with raised floor of 8″ and No. 49 Jack with raised floor of 4″.
11302	18 inches	4 inches	1½ inches	Toll Switchboards of low type, and switchboards whose key-shelves are approximately 2′6″ from floor due to use of raised floor.

The above Operators' Chairs are provided with revolving seats which can be adjusted in height to suit the physique of the Operator. The seats rest in a horizontal position and are made of perforated wood on Chairs No. 11300 and No. 11097, and woven cane on No. 11301 and No. 11302.

A foot rest provided on all chairs except No. 11097 adds to the comfort of the Operator and serves as a support when reaching across the face of the switchboard. All Chairs are made of hardwood and are furnished to match either mahogany or dark oak, as specified on the order.

No. 11097

No. 11300

No. 11301

No. 11302

Testing Apparatus

Lineman's Test Set—No. 1017 Type

The No. 1017-B Test Set is strong, reliable and especially adapted for the use of linemen. It comprises a substantial hardwood box with a mahogany finish, protected by a metal cover and provided with a strap for carrying. The overall dimensions of the case are approximately 8¾ inches high, 6 inches wide and 4¾ inches deep.

This Test Set contains a two-position dial switch actuated by a knob which is located on the top 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 located on the front of the cabinet, 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.

This Test Set contains a No. 266 Transmitter, No. 515 Receiver, No. 572 Cord, No. 29-B Generator, No. 2-D Buzzer, No. 13 Induction Coil and is arranged for but not equipped with a No. 703 "Eveready" tungsten battery, which is required and must be ordered separately.

No. 1017-B Test Set

The No. 1017-C Test Set is similar to the No. 1017-B except 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." The generator will operate the buzzer through a total line resistance of 5000 ohms.

This Test Set is equipped with a No. 29-F generator, otherwise the equipment is similar to that mentioned under the No. 1017-B.

Testing Cabinet

The No. 1407-C Testing Cabinet provides efficient and reliable testing equipment, which is adaptable to either magneto or small central battery systems. All classes of trouble, such as grounds, short circuits, crosses, open circuits and high resistance, can be tested for and the location calculated from the direct reading voltmeter, with no complicated mathematical calculations involved.

No. 1407-G Test Cabinet

For Exchanges where the installation of a regular Wire Chief's Desk is not warranted, the installation of the No. 1407-C 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. Further particulars will be furnished upon request.

Test Sets—For Testing High Resistances

The Test Sets listed below are contained in a solidly constructed box, provided with outside binding posts and equipped with a strap handle.

These Sets are equipped with a standard ringer and a strong 3-bar generator which will ring its own bell through the resistance for which it was designed.

The approximate overall dimensions of the Test Set are 6 5/8 inches high, 5¾ inches wide and 5¼ inches deep.

Code No.	*Will Ring Through Ohms*	*Contains*
90510	35000	1 No. 22-K Generator 1 No. 19-H Ringer and Gongs.
90511	50000	1 No. 22-N Generator. 1 No. 19-A Ringer and Gongs.
90512	100000	1 No. 22-N Generator. 1 No. 19-B Ringer and Gongs.
90530	10000	1 No. 22-K Generator. 1 No. 19-B Ringer and Gongs.

No. 90510

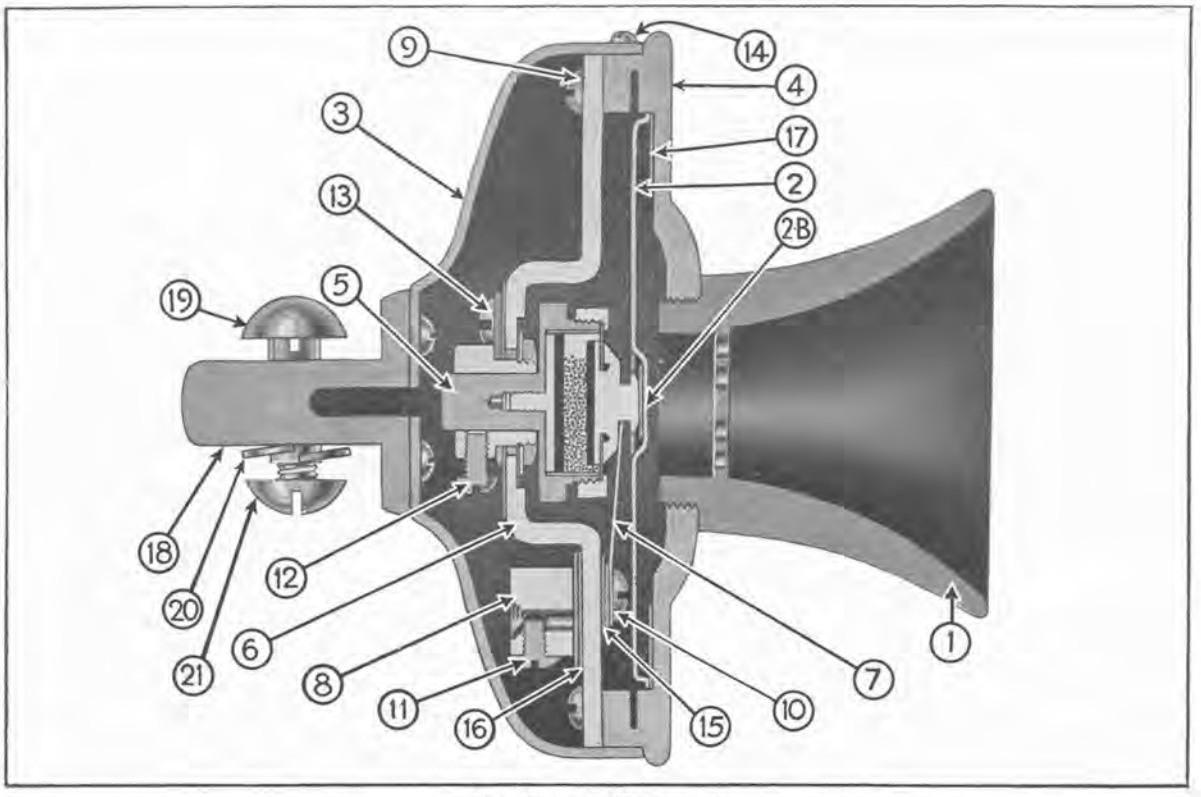
Terminal Strips

No. 65 Terminal Strip

The No. 65 Terminal Strip has a solid maple base upon which is assembled hard rubber insulating strips, which hold the terminal punchings in place. Each separate terminal has three lugs, one forms the terminal for the outside line, another for the jumper which connects with the protectors and the third terminal is available for testing purposes. The third terminal is also convenient when it becomes necessary to change numbers, as a new connection can be made before the old one is opened. The base is drilled to act as a fanning strip for wires and the edges of the holes are chamfered to prevent injury to the insulation.

This type of Terminal Strip is used on the main distributing frame, to accommodate cable conductors and jumper wires for twenty metallic lines.

Information on other types of Terminal Strips will be furnished on request.



Cross Section of Transmitter

Transmitter Parts

Symbol	*Name of Part*	*Transmitter Code Numbers* No. 323	No. 337
1	Mouthpiece	P.P. 1177	P.P. 1177
2	Diaphragm	P.P. 10662	P.P. 10662
2-B	Insulating Disc	P.P. 10661	P.P. 10661
3	Back, Case or Bell	P.P. 8262	P.P. 8262
4	Face	P.P. 10673	P.P. 12766
5	Carbon Button Assembly	P.P. 10670	P.P. 12162
6	Bridge and Centre Assembly	P.P. 9511	P.P. 9511
7	Damping Spring	P.P. 10660	P.P. 10660
8	Cord Tip Terminal	P.P. 10656	P.P. 10656
9	Machine Screw	P.P. 10696	P.P. 10696
10	Machine Screw	P.P. 8977	P.P. 8977
11	Terminal Screw	P.P. 10694	P.P. 10694
12	Adjusting Screw	P.P. 9521	P.P. 9521
13	Terminal Screw	P.P. 10694	P.P. 10694
14	Rim Mounting Screw	P.P. 10693	P.P. 10693
15	Insulator	P.P. 12744	P.P. 12744
16	Insulator	P.P. 12745	P.P. 12745
17	Cloth Washer	P.P. 10658	P.P. 10658
18	Lug	P.P. 8269	P.P. 8269
19	Bolt	P.P. 8264	P.P. 8264
20	Washer	P.P. 8272	P.P. 8272
21	Clamp Screw	P.P. 8271	P.P. 8271

Tools for Telephone Maintenance

The Northern Electric Company can supply suitable Tools for maintenance purposes on all types of telephone apparatus. A few Tools are listed below; information on other types will be furnished on request.

Code No.	*Description*
40	Double Screw-driver, one end bent to an angle of 90 degrees. Intended for use on Drops. Overall length 7 inches.
71	Wire Skinner, intended for use in removing the insulation from braided rubber covered wire. Has adjustable blades arranged to receive wire of different gauges.
96	Double Screw-driver, for use on Ringers. Overall length 3¼ inches.
277	Open end off-set Wrench, intended for use on mounting nuts of Nos. 18 and 19 type Resistances when wired in position. Overall length 9¼ inches.
311	Double end Socket Wrench for use on 3/8 inch and 7/16 inch hexagonal nuts on Cable Terminals. Is also provided with slots at either end for inserting a screw-driver.
KS-2827	Pliers for use in handling Heat Coils of protectors.

Transmitters

Our Transmitters are designed to meet many different requirements. They have high transmitting efficiency over long as well as short lines, permanent adjustment, and are of simple, light, strong and durable construction. They are designed to exclude outside noises or "side-tone" which would make the conversation indistinct. This has been accomplished without sacrificing the clear-cut reproduction of the spoken word, and has made our Transmitter the standard throughout Canada.

The carbon used in these Transmitters is obtained from a selected mineral vein and is especially treated. Northern Electric Transmitters do not pack and their battery consumption is low. They can be installed or removed without the use of a soldering iron.

The mouthpiece is made of black composition, and has an inner perforated plate of the same material to protect the diaphragm from mechanical injury.

No. 232

No. 232—Switchboard Operator's suspended type Transmitter. Arranged to be suspended by means of two transmitter cords. Has a black finish and is intended for use at magneto and central battery switchboards where a hanging Transmitter is employed.

No. 234

No. 234.—Operator's chest type Transmitter having an adjustable mouthpiece, arranged for, but not equipped with a No. 3 transmitter attachment. Has a black finish and is intended for Operator's use at magneto and central battery switchboards.

No. 266—Transmitter used in the No. 1017 type test sets. Mounts on back of perforated plate in test set. Has black finish and is equipped with mounting screws.

No. 266

No. 267—Transmitter arranged to be fixed to the No. 1002 type handset handle. Has a nickel-plated finish.

No. 323 or No. 337

No. 323—Our standard Transmitter for general use on wall and desk telephones. Finished in black unless nickel finish is specified in order.

No. 337—A high efficiency Transmitter similar to the No. 323. For use on long central battery subscribers' loops, where the transmitter must operate with a reduced current supply.

Wires

The materials entering into the construction of our Telephone and Telegraph Wires are of the best quality; this, combined with rigid inspection maintained throughout the process of manufacture, insures a quality product.

Information is given in the following paragraphs on various types of Telephone Wires in order to assist in making a decision on the type of wire to be used for any given service.

Wires recommended for various services

Type of Service	*Wire Recommended*
Telephone Lines	
1. Rural lines	Galvanized Iron.
2. Town lines (open wires)	Galvanized Iron.
3. Toll or other long lines where best transmission is very important.	Hard Drawn Copper, or if tensile strength is the deciding factor and the transmission less important use Copperweld.
4. Lines running through trees where it is impractical to trim.	Weatherproof Copper or Weatherproof Iron to correspond with remainder of wire on the line.
Subscribers' Station Wiring	
1. Drops or Loops (pole to protector)	Drop Wire, size No. 16 B & S Copper or No. 17 B & S Copperweld.
2. Interior Wiring (protector to instrument)	Style "C" Telephone Wire in sizes No. 19 and No. 20.
3. Ground Wiring (protector to ground rod or other ground connection).	Substation Ground Wire.
Miscellaneous	
1. Pothead Wire (for making lead cable potheads).	Style "A" Telephone Wire.
2. Switchboard and Telephone Wiring.	Switchboard Wire.
3. Cross Connecting on Distributing Frame.	Style "H" Distributing Frame Wire.
4. For underground Crossings and places requiring special protection.	Style "D" Lead Covered.
5. Bridle Wire for use from Cable to Bare Wire.	Style "G" Copper.
6. Keyboard Wiring.	Keyboard Wire.

Galvanized Telegraph and Telephone Wire

C.E.S.A. Standard

There are many grades of Galvanized Iron Wire, but only one is suitable for telephone and telegraph lines. The wire listed below is recognized as standard by the Canadian Engineering Standards Association (C.E.S.A.) and covers all the regular requirements for Telephone and Telegraph Wire. The galvanizing on this wire consists of a continuous coating of pure zinc of uniform thickness, which gives the finished product a very smooth surface.

We carry in stock as standard, wire having a constant of "5600" commonly referred to as "5600 mile-ohms" wire. The term "constant" meaning, equivalent of weight per mile, times resistance per mile. On special orders, other "constant" wire can be supplied.

C.E.S.A. (5600 mile-ohm) Galvanized Telephone and Telegraph Wire.

Birmingham Wire Gauge B.W.G.	*Nominal Diameter in Mils*	*Breaking Weight Lbs.*
12	109	460
9	148	850
8	165	1060
6	203	1600
4	238	2210

Galvanized Steel Wire Strand

Galvanized Steel Strand is used for guying poles on telephone lines, suspending telephone cables, and many other purposes. The finished product consists of seven wires twisted into one strand, the single wires being drawn to SWG gauge and galvanized before twisting. We supply three grades, which are known as Soft, Hard and Crucible. The galvanizing is smooth and the Strand can be supplied in what is known as Commercial Galvanized or galvanized to stand four one-minute immersions. All Strand is inspected before leaving our works and is guaranteed to conform to C.E.S.A. specifications. In ordering, special care should be taken to specify the grade wanted, also specify whether Commercial Galvanized or Four-Immersion Galvanized is required.

E. S. A. Standard

Standard British Wire Gauge S.W.G.	*Nominal Diameter of Strand inch*	*Nominal Diameter of each Wire mils*	*Maximum length of Lay inches*	*Minimum Breaking Load, Lbs.*		
				Soft Grade	*Hard Grade*	*Crucible Grade*
16	3/16	64	3	....	2300	4200
14	1/4	80	3½	2300	3400	....
13	9/32	92	3½	....	....	8100
12	5/16	104	4	3800	5300	10000
10	3/8	128	4½	5600	7500	14600
9	7/16	144	5	....	9200	18000

Wires—*continued*

Hard Drawn Bare Copper Line Wire

Copper Wire for Telephone Lines is desirable where transmission is an important factor, or where climatic conditions are unfavorable for Galvanized Iron Wire, such as in salt air or where considerable dampness is present. These conditions will corrode or rust iron wire in a few years, no matter how well it is galvanized. Copper Wire is not affected to any extent by smoke, gas or moisture and will last for an indefinite period. It has a definite junk value of approximately 60% of the original cost and in this way has an additional advantage over Iron Wire.

Size B & S Gauge	*Diameter in Inches*	*Weight in Lbs. Per Mile*	*Put Up In Coils of Lbs.*	*Resistance Ohms Per Mile*
10	.102	166	200 Approx.	5.275
12	.081	104	100 Approx.	8.386

Copperweld Line Wire

Copperweld Wire for Telephone Lines is desirable as a substitute for solid copper in cases where some of the conductance of the solid Copper Wire can be sacrificed for greater tensile strength, or where an iron or steel conductor would be subjected to rapid corrosion. It has approximately 50 per cent greater tensile strength than Copper or Galvanized Wire. It consists of a steel core over which a copper sheathing is permanently welded under very high temperatures by the Molten Welding Process.

Size B & S Gauge	*Diameter in Inches*	*Weight in Lbs. per Mile*	*Average Breaking Weight*	*Resistance 30% Ohms Per Mile*
8	.128	242	1200 lbs.	11.3
10	.102	154	800 lbs.	17.9
12	.081	96	520 lbs.	28.5

Weatherproof Copper Wires

No. 10 Solid Double Braid Weatherproof

Weatherproof insulation is for outside use where moisture is certain, or where the conductors may swing together and cause short circuits.

These wires have two closely woven braids saturated with black weatherproof compound which does not soften under ordinary temperature. The outer braid is smoothly polished.

Double Braid—Solid Conductor

Size B & S Gauge	*Approximate Weight Lbs.*		*Approximate Diameter Inches (over Insulation)*
	Per 1000 Feet	*Per Mile*	
10	46	241	.210
12	30	158	.185
14	21	107	.165
16	15	83	.150
18	12	64	.140

All sizes of Weatherproof Copper Wires can also be supplied with stranded conductors.

Weatherproof Iron Wire

This Wire is frequently used where telephone lines run through trees, to obviate the possibility of the lines becoming noisy. (It is better to avoid the trees if possible, or to trim them so that the branches cannot come in contact with the wires.)

The finished Wire has a smooth outer surface and is put up in burlap wrapped coils.

	Double Braided		*Triple Braided*		
Size B.W.G.	*Approximate Lbs. per 1000 Feet*	*Approximate Lbs. per Mile*	*Approximate Lbs. per 1000 Feet*	*Approximate Lbs. per Mile*	*Length of Coil*
6	135	710	147	775	¼ mile
8	93	490	103	543	¼ mile
9	77	407	85	449	⅓ mile
10	63	338	71	375	½ mile
12	46	243	52	275	½ mile
14	28	148	34	179	½ mile

"HC" Drop Wire (Copper)

Two twisted conductors of Hard-Drawn Copper, each rubber insulated, braided and impregnated in a moisture-proof compound. One conductor has a raised thread for tracing purposes. Single conductor can be supplied when specified. (This has in the past been generally known as Style "B" Copper.)

Size B. & S.	*Diameter Over Rubber*	*Approximate Weight 1000' (Twisted Pair)*
18	7/64"	32 lbs.
16	9/64"	47 lbs.
14	5/32"	61 lbs.
12	11/64"	81 lbs.

"CS" Drop Wire (Copperweld)

The standard Wire of this type is No. 17 B & S Copperweld insulated to .120 diameter over rubber.

No. 17 B & S .120" diam. 36 lbs. per 1000 ft.

Style "G" Copper Bridle Wire

Of similar make up to "HC" Drop Wire, except that the conductors are of Soft Drawn Copper. Generally called for in No. 18 B & S gauge insulated to 7/64" diameter over rubber.

Style "C" Interior Wire

This wire is used for interior connections between the telephone and the entrance to the building. It consists of annealed copper conductors, rubber insulated and braided with a dry glazed cotton. This Wire is furnished in either 1, 2, 3 or 4 conductors. Olive green braid is most commonly used, with a tracer thread in all but one conductor.

Style "C" Interior Wire

Wires—*continued*

The following sizes are carried in two or three conductors and may also be secured in one and four conductors on special orders.

Size B. & S.	*Diameter over rubber*	*Approximate Weight 1000' (Twisted Pair)*
20	3/32"	19 lbs.
19	3/32"	21 lbs.

Style "A" Pothead Wire

This Wire is composed of an annealed Copper conductor, carefully tinned and the insulation is of specially high quality rubber, suitable to withstand the effects of the hot compound without protecting braid. As a distinguishing mark the insulation of one conductor of the twisted pair is made with a raised tracer on the surface of the rubber.

Style "A" Pothead Wire

Size B. & S.	*Diameter Over Rubber*	*Approximate Weight 1000' (Twisted Pair)*
22	5/64"	12 lbs.
19	3/32"	17 lbs.
16	9/64"	33 lbs.
14	5/32"	51 lbs.
13	5/32"	56 lbs.

Style "D" Lead Covered Wire

Style "D" Lead Covered

This Wire consists of two tinned, annealed and twisted Copper conductors, each conductor insulated with rubber, twisted with jute and covered with a lead sheath 1/16" thick, usually supplied in No. 16 B & S gauge insulated to 9/64" diameter over rubber or in No. 18 B & S gauge insulated to 7/64".

Style "F" Flameproof (Jumper) Wire

A Flameproof Wire used principally for cross connecting on Distributing Frames. It consists of tinned annealed, Copper conductors, insulated with rubber and braided. The braid is saturated in a flameproof compound. It is supplied in single conductor, twisted pair, and three and four conductor form, each conductor having a different colored braid for tracing.

Style "H" Flameproof (Jumper) Wire

This is a Distributing Frame or Jumper Wire usually furnished in No. 22 B & S Gauge and used instead of Style "F" in humid localities. Consists of tinned annealed copper conductors, enamelled, insulated with servings of silk and impregnated. The Wire is then covered with a cotton braid and saturated in flameproof compound. It is supplied in the same number of conductors as Style "F."

The standard color scheme used is:—

Two Conductor.....White and Black.
Three Conductor....White, Black and Red.
Four Conductor....White, Black, Red and Green.

Single Sub-Station Ground Wire

The standard Wire for this use is No. 18 B & S gauge tinned Copper, rubber insulated to 7/64" diameter and covered with an impregnated cotton braid. It is also frequently called for in No. 16 or No. 14 B & S gauge.

Single Ground Wire

Switchboard Wire

Switchboard Wire consists of tinned Copper or enamelled tinned Copper Wire, insulated with two silk and one cotton servings applied in reverse directions and saturated in beeswax compound. It is furnished in single, double or triple conductor, usually in No. 22 or No. 19 B & S gauge.

Keyboard Wire

Another type of Switchboard Wire, commonly known as Keyboard Wire, consists of an annealed tinned copper conductor (solid) insulated with rubber and covered with a cotton braid. Supplied in the same sizes as Switchboard Wire and in any desired colors.

Construction Material and Supplies

In the following pages we list only the Construction Materials generally used in the building of Rural Telephone Lines. We carry complete lines of materials and tools, and shall be glad to give any information regarding them that is required.

Anchors

Slater Four-Way Guy Anchors

Hot Galvanized or Japanned Finish

Four-Way Guy Anchor

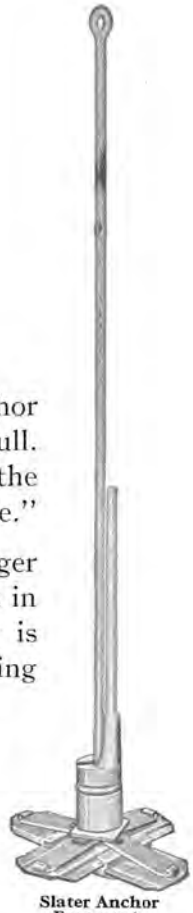
Expanding and Tamping Tool

Anchor and Guy Rod Assembled

The Slater Unbreakable four-way Expansion Anchor, is an all-steel Anchor of such balanced strength and pressure area that it has shown a strength that is surprising. It has four blades, in two pairs, which are extended by the action of the expanding tool which is also used for tamping the filling. The expansion links are made of steel strongly looped into the blades and into a square collar, which forms the expansion hinge.

Tests have shown that there is no creeping, while there has not been a breakage of the Anchor even up to 20,000 pounds pull. This is a record which warrants the use of the name "Unbreakable."

Installation is made by the auger method and the hole is sunk in the usual way. The Anchor is then opened with the expanding tool and the earth is tamped home by the same tool which holds itself in place encircling the rod. In ordinary soil this Anchor will hold more than the strength of a 5/8-inch anchor rod.



Slater Anchor Expanded

Never Creep Guy Anchors

The Never Creep Anchor consists of a galvanized rod with a drop forged "Thimbleye," and a certified malleable iron plate. The "Thimbleye," eliminates the use of guy thimbles.

Size of Plate	*Size of Rod*	*Weight lbs. each*
5x10	½"x5'	7
6x15	½"x6'	11
6x20	5/8"x7'	17
8x20	5/8"x6'	20
10x40	1"x7'	63

Anchor Rods

Drop forged Anchor Rods are now standard equipment with the large telephone, telegraph and electrical companies throughout Canada. The drop forged eye is stronger than the body of the rod.

Thimble Eye

List No.	*Diameter Inches*	*Length Feet*
1	½	5
2	½	6
3	½	7
4	5/8	5
5	5/8	6
6	5/8	7
7	5/8	8
8	¾	6
9	¾	7
10	¾	8
11	¾	9
12	¾	10
13	1	8
14	1	10
15	1	12

Thimble Eye drop forged Anchor Rods eliminate the use of thimbles and are supplied at the same price as standard drop forged oval eye Anchor Rods. State eye desired when placing order.

Size of Oval Eye, Inches		*Weight, Lbs.*
Width	*Length*	*Per 100*
¾	1	320
¾	1	375
¾	1	430
1½	2	540
1½	2	640
1½	2	740
1½	2	840
1½	2	910
1½	2	1060
1½	2	1210
1½	2	1360
1½	2	1510
1½	2	2230
1½	2	2760
1½	2	3290


Oval Eye

Bolts

Crossarm or Machine Bolts

Galvanized or plain, with square heads and square nuts.

Size Inches	*Weight Lbs. per 100*
5/8 x 10	101
5/8 x 11	109
5/8 x 12	118
5/8 x 13	126
5/8 x 14	134
5/8 x 15	142
5/8 x 16	150

Carriage Bolts

Galvanized or plain

Length Inches	*Diameter Inches*	*Wt. Lbs. per 100*
3	3/8	13.0
3½	3/8	14.4
4	3/8	15.8
4½	3/8	17.2

Double Arming or Spacing Bolts

Galvanized or plain

Size Inches	*Weight Lbs. per 100*
5/8 x 12	138
5/8 x 13	145
5/8 x 14	153
5/8 x 15	162
5/8 x 16	168

Bolts for Telephone Brackets

Hot Galvanized

These Bolts are used for attaching porcelain knobs to Nos. 9200, 9202, 9204 telephone brackets shown on page 81.

	Dimensions in Inches		*Wt. Lbs.*
	Diameter	*Length*	*Per 100*
Stove Bolt.....	5/16	2	6
Stove Bolt.....	5/16	2¾	8
Stove Bolt.....	5/16	3	9
Stove Bolt.....	5/16	3½	12
Machine Bolt....	3/8	3	13.1
Machine Bolt....	3/8	5½	18.9

Cable Rings

National Cable Rings are made of a high carbon spring steel wire, hot-dip galvanized after forming. They are much superior to the older types of flat wire aerial rings and due to their formation, National Rings are easily attached to the supporting messenger by hand. This feature is of great value as it enables National Rings to be placed on the strand with ease and rapidity. National Rings have a self-locking feature and need no tools to make them fast, nor do they depend upon the spring tension of the wire to hold them in place. They positively cannot creep. They can be removed by hand at will and used over again if so desired.

National Cable Ring—Hot Galvanized

National Rings have a factor of safety of from 30 to 100 times the load they are called upon to bear. Due to the special high-grade steel used in their manufacture and of the recognized high quality of Slater double hot-dip galvanizing, National Rings are good for the life of the strand.

National Rings are standard with the leading telephone and telegraph companies.

Size	*Size of Cable Strand Inches*	*Wt. Lbs. 1000 Pieces*
1½	1/4, 5/16,	41
2	9/32, 5/16, 21/64	90
2½	9/32, 5/16, 23/64, 3/8	100
3	7/16, 3/8	125
3½	7/16, 3/8	130

When ordering specify size of strand the rings are to be used upon.

Clamps

Cable Suspension Clamps—Hot Galvanized

These, the standard A. T. & T. Company Cable Suspension Clamps, are shaped so as to securely grip messenger strands of the sizes shown.

The one-hole type being used for light cables and on cable arms, and the three-hole Clamp for heavy cables and long spans. The one-hole Clamp is furnished without a bolt, as the 5/8-inch machine bolt is used both for attaching the Clamp to the pole and tightening the Clamp on the strand.

The three-hole clamp is furnished with two

Clamps—*continued*

½-inch high carbon steel bolts, the center hole being left blank for the 5/8-inch machine bolt.

In attaching to the pole, a nut and square washer are placed between the Clamp and pole to provide clearance for the cable. Where cables are to be mounted on both sides of the pole, a 5/8-inch double arming bolt is usually used instead of the machine bolt.

Type	*Length In.*	*Size Strand Inches*	*Wt. Lbs. per 100*
1-hole	2½	¼ to 7/16	74
3-hole	5¾	¼ to 7/16	220

Rolled Steel Guy Clamps—Hot Galvanized

These Clamps are made from hot rolled open hearth steel plates 1 9/16 inches wide by 3/8-inch thick. The ½-inch bolts furnished are made of special steel and will stand a pull of 10,000 pounds without breaking or stripping their threads. They have an elliptical shoulder which fits into an elliptical hole in one plate and keeps the bolts from turning when the nuts are tightened.

No.	*Type*	*Length Inches*	*Wt. Lbs. per 100*
10	3-bolt (Heavy)	6	237
20	2-bolt (Heavy)	3	143
30	3-bolt (Light)	5	155
40	2-bolt (Light)	3	100

Coach and Lag Screws

Galvanized or Plain

Coach Screw Gimlet Point

Fetter Drive Screw

Twist Drive Lag Screw

Weight Pounds, per 100 Lag Screws.

Length Under Head	*Diam. ¼ Inch*	*Diam. ⅜ Inch*	*Diam. 7/16 Inch*	*Diam. ½ Inch*	*Diam. ⅝ Inch*	*Diam. ¾ Inch*	*Diam. ⅞ Inch*	*Diam. 1 Inch*
1½″	2.7	5.8	9.1	....	....	....	....	....
2 ″	3.5	7.1	11.0	15.0	26.3	....	....	....
2½″	4.2	8.5	12.9	17.3	29.9	....	....	....
3 ″	4.7	9.8	14.8	19.5	33.5	46.1	71.8	103.0
3½″	5.2	11.1	16.5	21.6	37.1	51.5	78.5	112.0
4 ″	5.7	12.5	18.2	23.8	40.7	57.1	85.3	121.0
4½″	6.5	13.8	19.9	26.3	44.5	62.9	92.0	130.9
5 ″	7.0	14.9	21.8	28.8	48.3	68.8	98.6	141.0

Length Under Head	*Diam. ¼ Inch*	*Diam. ⅜ Inch*	*Diam. 7/16 Inch*	*Diam. ½ Inch*	*Diam. ⅝ Inch*	*Diam. ¾ Inch*	*Diam. ⅞ Inch*	*Diam. 1 Inch*
5½″	7.5	16.0	23.5	31.3	52.0	74.7	105.3	153.0
6 ″	8.0	17.2	25.2	33.8	55.7	80.5	112.0	164.0
7 ″	....	....	....	38.9	63.2	92.3	125.4	185.0
8 ″	....	....	....	44.0	69.3	104.0	138.8	205.0
9 ″	....	....	....	48.5	76.4	115.4	156.3	225.0
10 ″	....	....	....	53.0	83.5	126.8	173.8	245.0
11 ″	....	....	....	57.5	90.6	138.2	191.3	265.0
12 ″	....	....	....	62.0	97.8	149.5	208.8	285.0

Crossarms

Douglas Fir

Size 3¼ x 4¼ inches, pin boring 1¼ inch, center boring for one 5/8 inch machine bolt, brace bolt boring for 3/8 inch bolts. Arms can also be supplied in other sizes bored to customers' specifications.

Length Inches	*No. of Pins*	*Standard Spacing Centre*	*Side*	*End*	*Weight Each Lbs.*
48	4	16 in.	12 in.	4 in.	14
72	6	16 in.	12 in.	4 in.	21
120	10	16 in.	12 in.	4 in.	35

Crossarm Braces

Furnished in sizes 1x¼ inch or 1¼x¼ inch, and in any length desired. Punched 7/16 inch hole one end and 9/16 inch hole in the other end, both holes being one inch from centre to end. Specify if hot galvanized or plain required.

Size	*Weight per 1000*
1 x ¼ x 20 in.	1395 lbs.
1 x ¼ x 22 in.	1530 lbs.
1 x ¼ x 24 in.	1670 lbs.
1 x ¼ x 26 in.	1805 lbs.
1 x ¼ x 28 in.	1945 lbs.
1 x ¼ x 30 in.	2085 lbs.

Size	*Weight per 1000*
1¼ x ¼ x 20 in.	1670 lbs.
1¼ x ¼ x 22 in.	1835 lbs.
1¼ x ¼ x 24 in.	2000 lbs.
1¼ x ¼ x 26 in.	2165 lbs.
1¼ x ¼ x 28 in.	2335 lbs.
1¼ x ¼ x 30 in.	2505 lbs.

Ground Rods

Galvanized or Plain—With or Without Connecting Wire

Made of stiff, high carbon open hearth steel, with long sharp points.

Rods without Wire

List No.	*Diam. Inches*	*Length Feet*	*Wt., Lbs. per 100*
9555	3/8	5	152
9556	3/8	6	196
9565	½	5	300
9566	½	6	360
9567	½	7	420

A galvanized iron connector, same pattern as illustrated on page 78 is available for use with iron ground rods.

Rods without Wire

List No.	*Diam. Inches*	*Length Feet*	*Wt., Lbs. per 100*
9576	5/8	6	600
9577	5/8	7	700
9578	5/8	8	800
9598	1	8	2167

Ground Rods—*continued*

With Wire Attached

Similar to the unwired Rod except that No. 12 Copper wire is soldered to the Rod.

May also be obtained with Iron wire if specified on order.

Rods with Copper Wire

List No.	*Diameter Inches*	*Length Feet*	*Wt., Lbs. per 100*
9505	½	5	320
9506	½	6	395
9516	5/8	6	595
9538	1	8	2133

Copperweld Ground Rod and Connector

This Ground Rod is easily driven and by means of the Connector makes a perfect connection in the shortest possible time. The Rod is made of a molten welded jacket of Copper upon a steel core. The Connector is made of bronze.

Diameter of Rod, Inches	*Length Feet*	*Weight, Lbs. per 100*
3/8	6	240
½	6	420
5/8	6	650
¾	6	940
1	6	1690
1	8	2250

Guy Hooks

Hot Galvanized

No. 7586

The 1¾"x3/8" Guy Hook is the A. T. & T. Company's standard and is in general use. For light work the 1¼"x¼" and the 1½" x 3/8" give very satisfactory results.

List No.	*Size Steel Inches*	*Length In.*	*Diam. Holes*	*Wt., Lbs. per 100*
7583½	1¼x¼	3½	.9/16	39
7584	1¾x3/8	4	11/16	87
7585	1½x3/8	3½	9/16	59
7586	1½x3/8	6	9/16	88

Nos. 7583½ 7584 and 7585

Guy Wire Protectors

Hot Galvanized

This is the latest improvement in Guy Wire protection. It is made of strip steel stamped in semi-circular form and reduced at the upper end to fit neatly over the wire. The lower end is stamped with a curve taking off all sharp corners, making the Guy Wire safe to pedestrians. These protectors are very quickly and easily installed.

Length Feet	*Number of Bolts*	*Weight, per 100*
7	2	1000 lbs.
8	3	1080 lbs.

Pole Pulling and Straightening Jacks

No. 325 Simplex Single-acting Automatic Lowering Jack

For the telephone company or municipality that occasionally requires pulling, moving or straightening of poles, the No. 325 Simplex 5-ton Pole Jack is a necessity that defrays its cost.

The No. 325 Simplex is a light, durable and inexpensive jack, designed expressly for pulling 25 and 30-foot poles—straightening poles of any size—and for tightening guy lines.

One man with the No. 325 can easily and efficiently handle any pulling or straightening of light poles. Extra help is unnecessary. This saving in labor pays for the jack. After that, it will pay for itself again and again for many years.

The No. 325 Simplex is furnished complete with the following equipment:—

4-foot steel pinch bar lever.

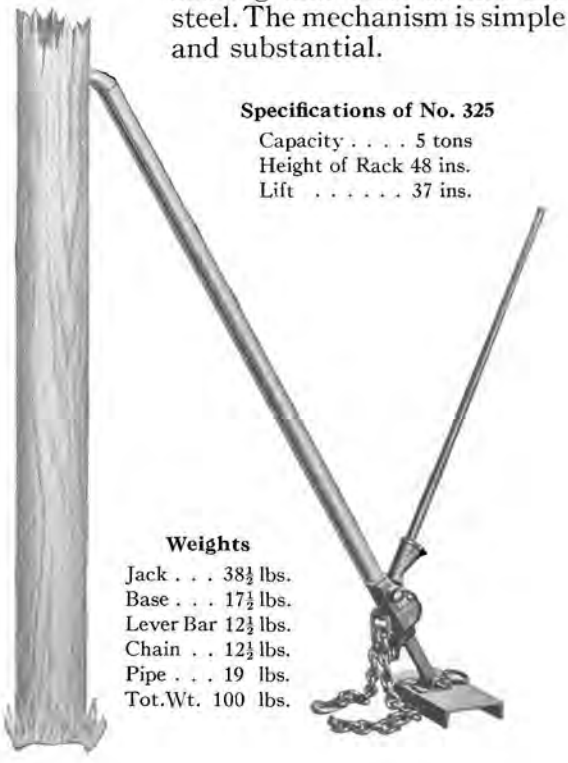
52-inch steel chain for pulling.

A portable 8-inch x 15-inch steel channel which provides a firm base support.

An 8-foot pipe (seamless tubing) equipped with a malleable iron forked cap for biting into the pole when the jack is used for straightening.

The long pipe is especially desirable when it is found necessary to straighten crooked poles located alongside of ditches.

Every detail of construction and workmanship of the No. 325 provides for permanent service. The rack bar is chrome nickel steel—the pawls are drop forged steel—and the housing and lever socket are steel. The mechanism is simple and substantial.



Specifications of No. 325

Capacity . . . . 5 tons
Height of Rack 48 ins.
Lift . . . . . 37 ins.

Weights

Jack . . . 38½ lbs.
Base . . . 17½ lbs.
Lever Bar 12½ lbs.
Chain . . 12½ lbs.
Pipe . . . 19 lbs.
Tot.Wt. 100 lbs.

Pulling poles with No. 325—a one-man job

For taking up slack in guy wire a No. 325 is speedy and efficient

Knobs for Telephone Brackets

No. 6061

No. 6062

The Knobs illustrated are of dry process white glazed porcelain, and are for use with the Telephone Brackets listed on page 81.

		Dimensions in Inches		*Wt., Lbs.*
List No.	*Type*	*Bolt Hole*	*Height*	*per 100*
6061	Two-groove	3/8	1 7/16	18
6062	Four-groove	7/16	2 1/4	33

Pins and Brackets

Standard Pin

Wood Bracket

Transposition Pin

Telephone Wood Top Pins are available in birch, oak, white or yellow locust and Wood Brackets in oak or birch and can be supplied either untreated or creosoted. There are two standard methods of applying this latter treatment as listed below.

Size Inches	*Weight in Pounds per 1000 Pieces* *Plain*	*Open Tank Treatment*	*Pressure Treatment*
	Wood Pins		
1¼ x 8	280	300	350
*1¼ x 9	320	340	380
*Transposition Pin.			
	Wood Brackets		
1½ x 2 x 12	460	600	600
1⅝ x 2 x 12	560	700	700
1¾ x 2 x 12	660	825	825

Poles

Section of one of our Pole Yards

We are in a position to furnish Western Red Cedar, Northern White Cedar, or Eastern Cedar Poles, either plain or with any of the standard creosote treatments. Our several concentration yards make it possble for us to meet any demand on short notice.

Pole Steps for Wood Poles

Hot Galvanized

No. 7125

No. 7126

These Pole Steps are made of the best grade of open hearth steel, fully hot galvanized after forming. The No. 7125 Hook Head Steps have fetter drive thread which makes them easy to install and does not tear the wood of the pole when driven. The No. 7126 Long Hook Head Step has fetter drive thread and is used at points on the pole where the Lineman stands while working. The 3-inch hook prevents the foot from slipping off the end of the step.

List No.	*Type*	*Diameter Inches*	*Length Inches*	*Wt. Lbs. per 100*
7125	Hook Head	5/8	10	95
7126	Long Hook Head	5/8	10	115

Strain Plates

Hot Galvanized

No. 7575

The Strain Plate is used for the same purpose as Guy Shims but gives better protection to the pole, costs less, and is cheaper to install than shims. From two to four Plates are required per pole, depending on its diameter.

List No.	*Type*	*Dimensions In Inches*	*Wt., Lbs. Per 100*
7575	Standard	4 x 8 x 12 Ga.	85

Telephone Brackets

Hot Galvanized

No. 9200 House Bracket

No. 9204 Corner Bracket

No. 9202 Pole Bracket

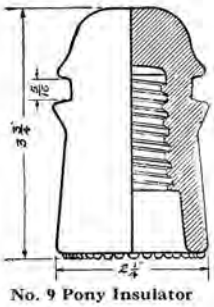
These brackets are used by nearly all telephone companies. The No. 9200 is used for attaching drop wire to the building. The No. 9202 is used for attaching up to

Telephone Brackets—*continued*

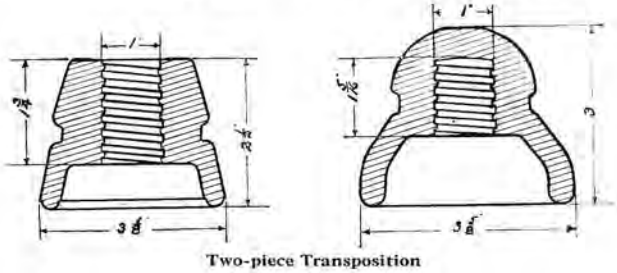
four drop wires to the pole. The No. 9204 is used for passing drop wire around the corner of the building. The brackets are equipped with either No. 6061 or 6062 knobs.

List No.	Style Bracket	Size of Mounting Holes	Dimensions in Ins. Size of Steel	Length of Legs	Wt., Lbs. per 100
9200	House	5/16	1¾ x 3/16	2 3/16 x 3 11/16	51
9202	Pole	13/32	2 x 1/4	3 x 4	87
9204	Corner	7/16	1 7/32 x 7/32	4 x 5	65

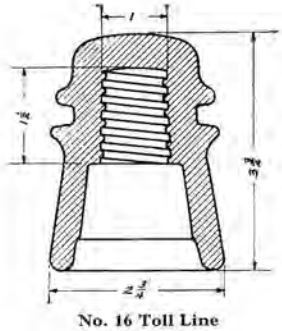
Telephone Insulators



No. 9 Pony Insulator



Two-piece Transposition



No. 16 Toll Line

	Approx. Weight Each	Quantity per Case	Approx. Packed Weight per Case
No. 9 Pony Insulator	8¾ oz.	256	163 lbs.
No. 16 Toll Line	15 oz.	144	161 lbs.
Two-piece Transposition	23½ oz.	75	131 lbs.

Transposition Brackets

Hot Galvanized

The three kinds of Transposition Brackets listed are similar to No. 9251. They are provided with a 3/8-inch round hole for a 2 x 5/16 inch galvanized lag screw used to prevent the bracket from pulling to one side on the arm.

The No. 9250 is the Western Union standard and is made for a 3 x 4 cross arm. This bracket is clamped on the arm by a 3/8 x 4-inch carriage bolt.

Bracket No. 9251 is the A. T. & T. Co. standard for one wire, and No. 9252 for two wires on a transposition insulator. These brackets are supplied with a 3/8 x 4½-inch carriage bolt and 5/16 x 2 inch lag screw. All brackets have holes for ½-inch insulator pins.

No. 9251

Insulator pins are not included in the bracket prices.

List No.	Dimensions in Inches Steel	Cross Arm	Wt., Lbs. per 100
9250	1¼ x 5/16	3 x 4	230
9251	1¼ x 5/16	3¼ x 4¼	242
9252	1½ x 3/8	3¼ x 4¼	368

Washers

Hot Galvanized or Plain

Galvanized Washers are cleanly cut and are galvanized in such a manner as to insure a heavy, even coat of pure zinc with no large drops to interfere with the fit of the bolt or nut. Special sizes of round Washers for use under the heads of carriage bolts are listed, No. 3 being the standard of the A. T. & T. Company.

Square Washer No. 7 is the standard of the A. T. & T. Company for cross arm and double arming bolts, and Nos. 9 and 12 for anchor rods.

Round Washers

List No.	Outside Diam.	Dimensions in Inches: Diam. Hole	Size Bolt Mach.	Size Bolt Carriage	Thick Gauge	Galv. Wt. lbs. per 1000
1	1	7/16	3/8	..	14	16
2	1 1/4	1/2	..	3/8	14	30
*3	1 3/8	9/16	1/2	3/8	12	42
4	1 3/4	11/16	5/8	1/2	10	75
5	2	13/16	3/4	5/8	9	112

*A. T. & T. Standard

Square Washers

List No.	Size Washer	Dimensions in Inches: Diam. Hole	Size, Bolt or Rod	Galv. Wt. Lbs. per 1000
6	2 x2 x1/8	11/16	1/2 or 5/8	145
*7	2 1/4 x2 1/4 x3/16	13/16	5/8 or 3/4	240
8	3 x3 x3/16	13/16	5/8 or 3/4	435
*9	3 x3 x1/4	13/16	5/8 or 3/4	585
10	4 x4 x3/16	13/16	5/8 or 3/4	830
11	4 x4 x1/4	13/16	5/8 or 3/4	1170
*12	4 x4 x1/2	1 1/8	1	2150

Wireholders

Hot Galvanized

No. 396

No. 296

No. 191

No. 2920

No. 501

No. 1607

No. 190

No. 191A

The Peirce Wireholders come completely assembled with insulators, packed in wooden boxes, with insulators protected by corrugated fibre sleeves. They get to the job with minimum labor, and absolutely no breakage. Their first cost is less than any other form of wall bracket.

They largely eliminate tie wires, thus saving labor and material, and are approved by the Underwriters' Laboratories. They are de-

Wireholders—*continued*

signed so that all metal is in tension, and all porcelain in compression; they are mechanically correct for all secondary work.

List No.	*Number Wires*	*Wire Spacing Inches*	*Std. Pkg.*	*Wt., Lbs. per 100*
190	1	0	50	78
191	1	0	50	96
191-A	1	0	25	76
296	2	6	25	204
299	2	9	25	208
394	3	4½	25	284

The broad base pressed steel type is furnished in the sizes listed below. The No. 1607 is an all-porcelain type holder.

List No.	*Number Wires*	*Wire Spacing Inches*	*Std. Pkg.*	*Wt., Lbs. per 100*
396	3	6	25	308
494	4	4½	25	390
501	Corner Iron	0	25	20
1607	1	With Galv. Screw	50	108
1617	1	With Brass Screw	50	108
2920	1	With Galv. Screw	100	44

Wire Connectors or Sleeves

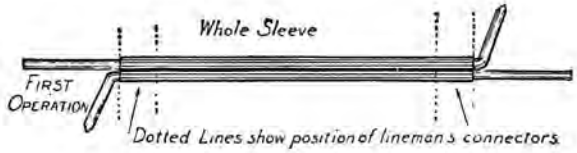
Double Tube Sleeve

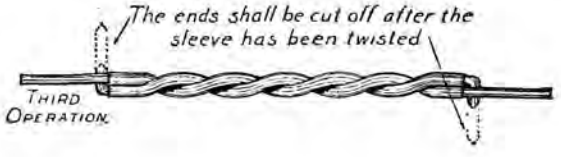
Sleeves and Wire Formed Together in One Solid Piece

Our Sleeves are made accurately and very close to the size of the wire for which they are intended. When twisted the Sleeve is drawn snugly around the wire, forming a solid joint which air and moisture cannot penetrate.

Standard Method of making Line Joints by means of Sleeves

This method should be used for either Copper or Iron Wire. Use Copper Sleeves for Copper Wire and tinned Copper Sleeves for Iron Wire. All Sleeves to be twisted with two pairs of Lineman's Connectors.





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