

RURAL TELEPHONE LINES

HOW TO BUILD THEM



INSTRUCTIONS ON LINE CONSTRUCTION
AND THE INSTALLATION OF TELEPHONES

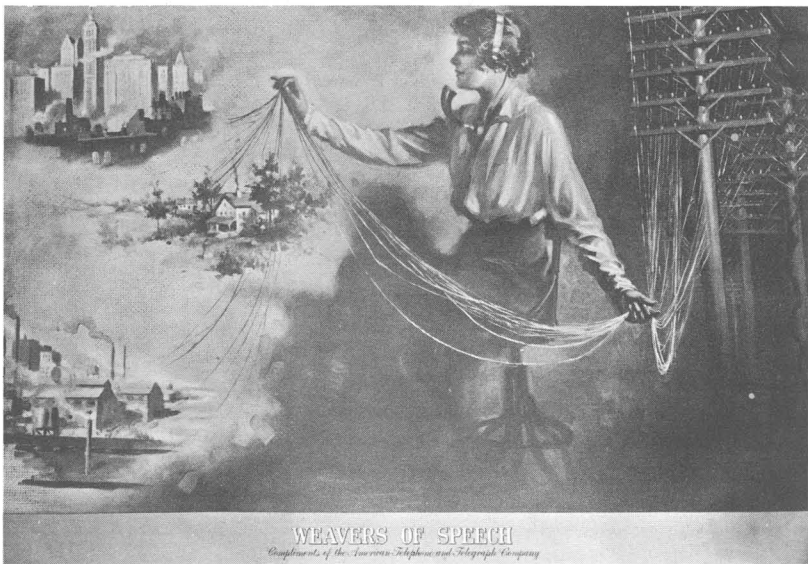
ALSO CONTAINS A LIST OF MATERIALS
AND ACCESSORIES REQUIRED ♦ ♦ ♦ ♦ ♦

MONTGOMERY WARD & CO.

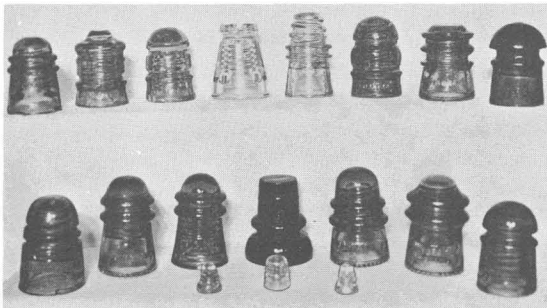
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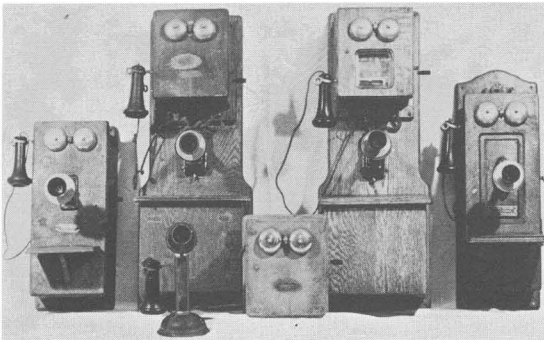
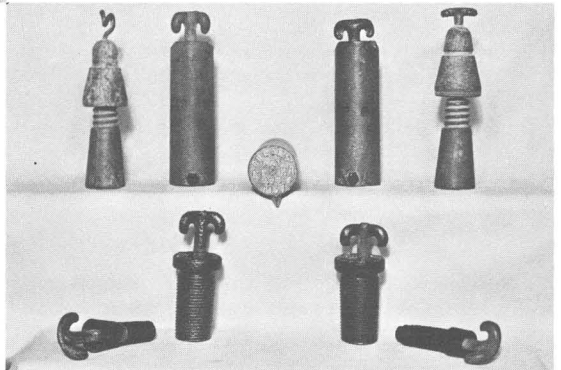


AT&T — This picture depicts an era fast disappearing from the American landscape with the advent of buried communication facilities. *Jerry's Photo & Copy, Dodge City, Kansas*



PONY INSULATORS — Types of insulators available at the time of publication of original instruction manual and catalogue. (Approximately 1900) Small commemorative insulators are also shown. *Jerry's Photo & Copy, Dodge City, Kansas*

METAL INSULATORS — Insulators as used on telegraph lines. Normally referred to as the "Ramshorn" type, they preceded the glass insulator, and were patented as early as 1851. The metal case is said to have provided protection for glass from Indians who used the glass for arrowheads and ornaments. *Jerry's Photo & Copy, Dodge City, Kansas*



TELEPHONES — Magneto phones, as distributed by Montgomery Ward & Co., near the turn of the century. *Jerry's Photo & Copy, Dodge City, Kansas*

FOREWORD

"Rural Telephone Lines — How to Build Them", is being republished as an item of interest to all who have been associated with the communications industry, as well as those who are accumulating memorabilia used in the industry and now defined as "collectibles".

Appreciation is extended to Montgomery Ward & Co. for their permission to reprint this publication and their efforts to define its date of origin. Following extensive research by Montgomery Ward & Co., we are advised that the company has found no information of record concerning the publication. They have placed the approximate date of issue at the turn of the century.

Since the time of the first telephone patent issued to Alexander Graham Bell on March 7, 1876, which preceded by three days the transmission of the first complete sentence, "Mr. Watson, come here; I want you.", the telephone industry has expanded at an accelerated rate. The magneto telephone, as illustrated in this publication, has served that industry in essentially the same form for a period of approximately 90 years. Few other products of American Industry can claim such an enviable record. Though in limited quantity, these instruments are today continuing to operate as a part of a complex communication network, but at the same time, are a valuable "collectible".

The rural telephone line, for which instructions for construction are included in this publication, have similarly served the industry, without major change, for the same period of years. The insulators, as the telephone, are still serving the industry well, and have also joined the ranks of "collectibles".

The magneto phone and the overhead wire line are soon destined to become a part of the history of the communications system.

It is of particular interest to note that a portion of the line over which Samuel F. B. Morse transmitted the first public telegram, "What Hath God Wrought!", consisted of an insulated lead-covered pair of conductors buried in the ground by means of an especially constructed plow. This line was replaced with overhead construction, as illustrated in this publication. Today, however, the overhead line is fast giving way to buried facilities, placed by a cable plow, as was done so many years previous.

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INTRODUCTION

By most people, the construction and installation of a telephone system has been looked upon as a complicated process, requiring the services and skill of experts. In this belief, they are entirely mistaken; because the operation of a telephone system depends on a very few general principles, which can be easily understood. To show how very easy and simple it is to construct a rural telephone system, we have published this booklet in which we have aimed to give clear instructions covering each step to be performed. The skill and technical education required is in building the instrument. When a reliable telephone has been produced, the rest is simple.

If there are any points we have not made clear, any additional information you want, or any trouble you are having with your line or instruments, write us—we will gladly assist you.

We wish to impress prospective purchasers that our telephones are **GUARANTEED** against inherent defects in either material or workmanship, and **GUARANTEED** to give satisfactory service in the line of work for which they are designed.

We will repair or replace, free of all cost, and prepay transportation charges on any part or parts which prove to be defective, when instrument has been properly installed. This **GUARANTEE** is without time limit, and applies to the completed instrument as well as its parts.

YOU TAKE NO RISK IN BUYING OUR TELEPHONES. YOU ARE FULLY PROTECTED BY OUR GUARANTEE.

Further, all telephone supplies handled by us are fully up to the standard in every respect, and meet with any reasonable requirements which may be put upon them, and **OUR PRICES** on telephones and supplies are considerably lower than those of other concerns handling materials of equal quality.

CONSTRUCTING THE LINE.

A **RURAL PARTY LINE** is a telephone line upon which any number of bridging telephones, from two up to any number within reason, can be installed, no switchboard or other device, other than the line wire being necessary to connect the different instruments. Bridging telephones only are suitable for this kind of service.

GROUNDING AND METALLIC SYSTEMS.—Before arrangements are made for building the telephone line a choice should be made between a grounded system and a metallic system. In the **grounded system**, Fig. 1, only one line wire is necessary, and each of the telephones has one wire connected to line and one wire to ground. This system gives good results if properly installed and there are no electric light, power or trolley wires in the vicinity; otherwise, there is likely to be much objectionable humming and buzzing in the receivers.

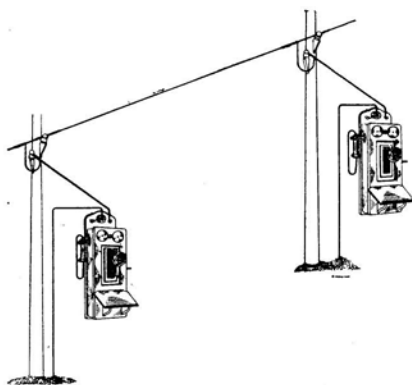


Fig. 1.

Diagram showing connections of ground wire (one wire) system.

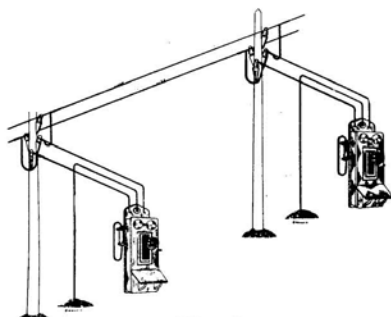


Fig. 2.

Diagram showing connections of metallic (two wire) system.

In the **metallic system**, Fig. 2, there are two line wires, to which each of the telephones is connected by the wires. This is the better system and should be adopted whenever the Company can afford it. Whenever the line is built in the neighborhood of electric light, power or trolley wires, a metallic system must be used in order to get quiet lines and clear talking. Its only disadvantage is the cost of the extra wire, brackets, etc. This extra cost, however is slight, amounting to but four or five dollars per mile.

ROUTE OF THE LINE.—The line should run past or nearby the buildings in which the telephones are to be placed. It is not necessary to run the main line to the buildings and thus save wire and simplify the construction. Reference to Fig. 3 will make this point clear.

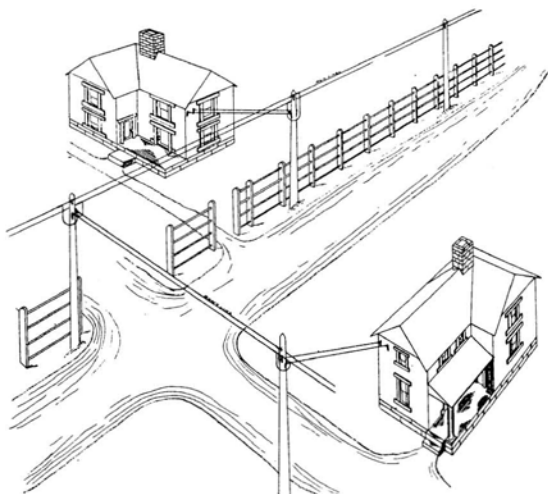


Fig. 3.—View Showing Relation of Branch Wires to the Main Line.

LOCATING LINE.—Starting from the initial point, measure off the distance at which poles are to be set, and locate stakes as near to these measurements as possible. Each stake should have plainly marked upon it the size of the pole to be set. Follow straight line as near as possible.

GRADING.—The length of pole set should be such that abrupt changes in level of the line will be avoided.

CROSSINGS.—At all railroad crossings, use poles of a length sufficient to insure a distance of at least 22 feet between the top of the rails and the lowest point to which the lowest wire to be used may sag. At the crossing of all streets and roads, use poles that will insure a distance of at least 20 feet between the ground or road and the lowest point to which the lowest wire to be used may sag. In crossing above the lines of telegraph or other electric companies, use poles that will insure a distance, in the clear, of at least four feet between the tops of the poles in the line crossed and the lowest wire on the pole.

Poles about 22 or 25 feet high should be used on level stretches. All poles must be reasonably straight, squared at both ends, well proportioned from butt to top, preferably of live white cedar, peeled, and have knots trimmed close. Poles which do not conform to the following specifications should be rejected.

Length	Diameter at Top	Circumference at Top Not Less Than	Circumference 6 Feet From Butt Not Less Than
20 feet.	4 inches.	12 inches.	20 inches
25 feet.	5 inches.	16 inches.	25 inches
25 feet.	6 inches.	20 inches.	30 inches.
30 feet.	7 inches.	22 inches.	36 inches.
35 feet.	7 inches.	22 inches.	38 inches.

SETTING POLES.—Poles should be set to depths specified below, except in solid rock, where the depths may be one foot less, and on curves, where the depth should be six inches more in each case: 20-foot pole, 4 feet; 25-foot pole, 4½ feet; 30-foot pole, 5 feet; 35-foot pole, 5½ feet; 40-foot pole, 6 feet; 50-foot pole, 6½ feet.

All holes should be large enough to admit the pole without hewing or cutting, and to permit the free use of the tamping bar around the bottom. All poles should be set perpendicularly, with brackets or cross-arms at right angles with the direction of the line. The refilled earth should be thoroughly tamped, and the soil should be firmly packed around the pole to a height of at least 12 inches above the surface of the ground.

All blasting should be in charge of men experienced in use of explosives, and, if possible, be let to a contractor who shall be responsible for and assume all risk of damage to persons or property.

The heaviest poles should be placed on corners and curves, and the straightest and best-looking poles should be placed in cities and towns, and in front of residences. The dimensions of each pole must conform to the dimensions of the marking stake.

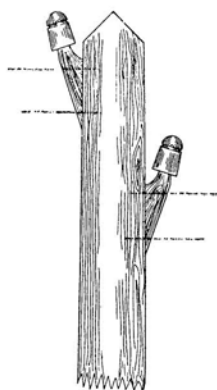


Fig. 4.



Fig. 5.

FRAMING POLES.—The roof of the pole shall be framed by sawing the top in plane at an angle of 45 degrees from the squared top of the pole, so that the ridge will be in the center. (See Fig. 5). All roofs should be painted with one thick coat of metallic paint, mixed in ratio of seven pounds dry paint to one gallon linseed oil.

POLE FITTINGS.—Where only one or two line wires are to be mounted on the poles, oak brackets fitted with glass insulators are fastened to the pole as indicated in Fig. 4 for straight lines, or as shown in Fig. 5 at curves. The brackets should be attached to the poles before the poles are raised. If more line wires are to be strung, cross-arms properly braced are required.

In this case pins instead of brackets are used to support the insulators.

Where soft ground is encountered, a packing of concrete, consisting of

one part of cement, two parts sand and five parts stone, should be used for filling. The holes being dug from 6 to 12 inches deeper than holes would be dug on curves for poles of corresponding length, and the poles should rest on a foundation formed by two planks one inch in thickness, 12 inches wide and from 24 to 30 inches long, laid at right angles. (See Fig. 6).

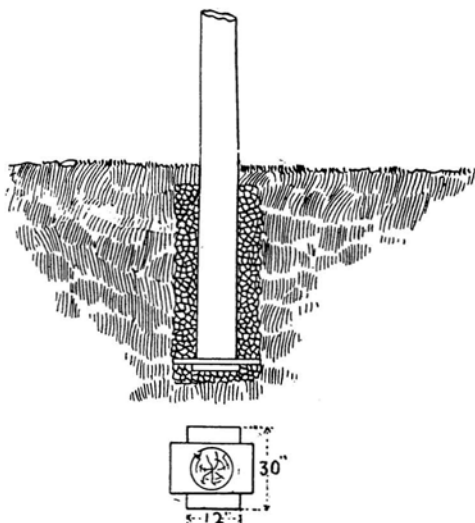


Fig. 6.—Pole Set in Concrete

Where quicksand is encountered, a barrel should be driven down, the pole placed within the barrel and the barrel then broken and withdrawn. Small rocks and stones should then be driven down by tampers in the sand surrounding the pole until no more can be forced downward; rocks should then be piled about the pole if possible.

TREE TRIMMING.—All trees should be trimmed so as to clear the circuits at least 18 inches on all sides, and in such a manner as to cause the least possible injury to the tree or its appearance. Remove all brush, tree trimmings and debris of every character within twenty-four hours after cutting same. Wherever it is likely that the line wire will come in contact with trees, rubber covered or weather proof wire should be used to prevent short circuiting.

LINE WIRE.—No. 12 B.B. double galvanized iron telephone wire should as a rule be used for rural lines, although smaller sized wire (No. 14 B.B.) may be used on lines up to twelve miles in length. However, the No. 12 gauge wire is recommended, especially if it is likely that the line will be lengthened at any time in the future.

DO NOT USE FENCE WIRE.—Although commercial fence wire costs less at the outset than the standard B.B. grade telephone wire, it is in the end more expensive because the galvanizing on it being much lighter allows the wire to rust more quickly. Ordinarily, its life is only about one-third that of

double galvanized iron telephone wire. It has also a higher resistance which interferes with the ringing and talking on the line.

STRINGING THE WIRE.—The line wire should be carefully unwound along the line of poles so it will be free from twists and kinks, and then drawn to the top of each pole and tied to the insulators.

TYING.—On straight lines, the wire should be tied to the insulators, in the position as shown in Fig. 11-A.

On curves and corners, the wires should be tied to the side of the insulators away from the strain, as shown in Fig. 11-B.

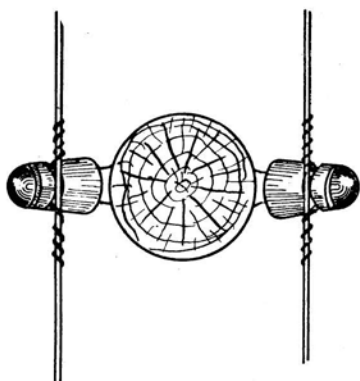


Fig. 11-A.

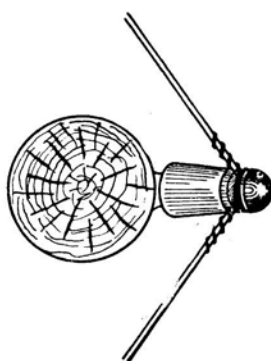


Fig. 11-B

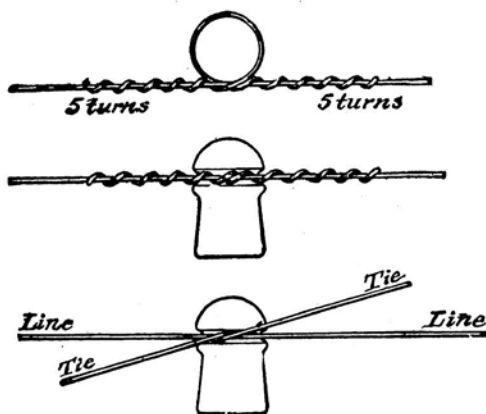


Fig. 12.

Details of the method of tying are shown in figure 12. Both ends of the tie wire should pass under the line wire and make two and one-half complete turns. In tying the wire to an insulator the tie wire should be of same size and material as the line wire, and should be about 20 inches long.

JOINING OR SPLICING.—When it is necessary to connect two line wires, the connection should be made as shown in Fig. 13. All joints or splices must be well soldered in order to insure permanency.

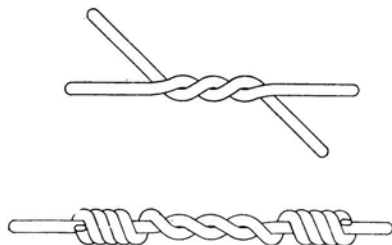


Fig. 13.

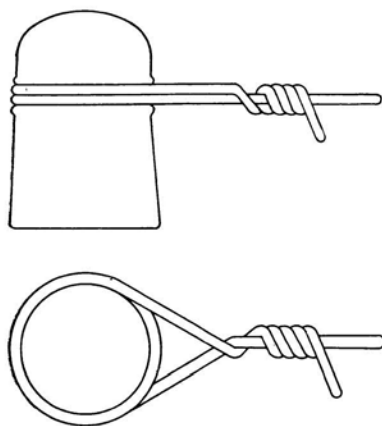


Fig. 14

When a branch line is connected to the main line or when connection is made between the main line and a house by means of a drop line the branch or drop wires should be dead ended on separate insulators, see Fig. 14. and their ends left long enough to be connected to the line wires as shown in Fig. 15.

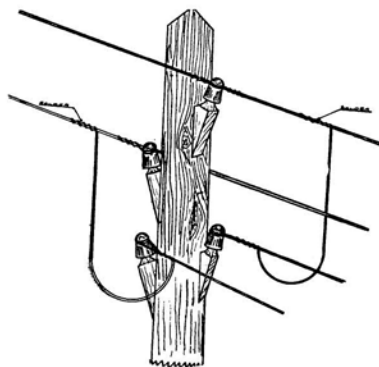


Fig. 15.

TRANSPPOSITIONS.—Metallic circuits on brackets should be transposed, as indicated for the wires a and b, in Fig. 16, at about every thirtieth pole, to prevent cross talk between circuits and interferences from foreign currents.

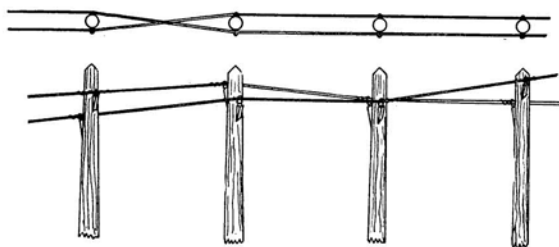


Fig. 16.

INSTALLING THE TELEPHONE INSTRUMENT.

FASTENING SET TO WALL.—A wall telephone set should be securely fastened to the wall with the screws supplied with the instrument. To fasten the set to a brick, cement or stone wall, holes should first be drilled into the wall at the proper position for the screws. The holes should then be plugged with wooden plugs and the wall set fastened to them with the screws. Care should be taken that thoroughly dry wood is used and that the plugs are large enough to hold securely.

PROTECTORS.—All our telephones are equipped with arresters, which will ordinarily protect the instrument perfectly from lightning. It often happens, however, that the telephone is placed in position a considerable distance

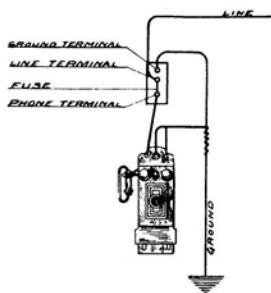


FIG. A

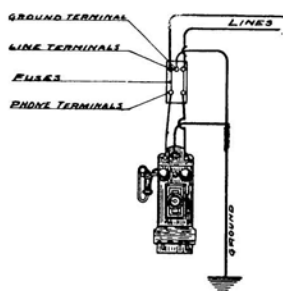


FIG. B

Fig. 17.

away from the point where wires are brought into the building, in which case it is desirable to additionally protect the instrument and building by installing arresters like those listed on Page 30, under Catalogue Number D42181. The arrester should be placed as near the point where wires are brought into the building as possible, and should be in a permanently dry

place. Details of wiring are shown in Fig. 17. In localities where there are power or telegraph wires, it is almost absolutely necessary to install these arresters in order to protect the telephone and building from stray currents and crossed wires.

CONNECTING THE TELEPHONE INSTRUMENTS TO THE LINE.

DROP WIRES.—Bare wire similar to that used on the main line should be run between the house and the nearest line pole. The method of attaching these drop wires to the pole is shown in Fig. 15, and the method of attaching

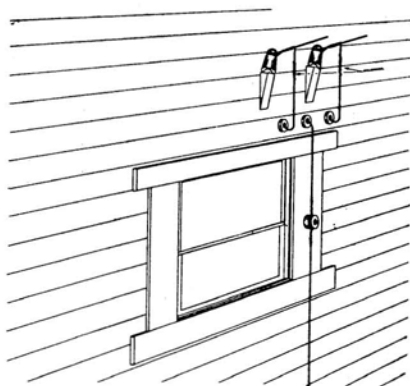


Fig. 18—The Drop Wires are Fastened to the House as Here Shown.

them to the house is shown in Fig. 18. If the wires run along the outside of the building they should be carried on insulators as shown in Fig. 15, to the point where they enter the house.

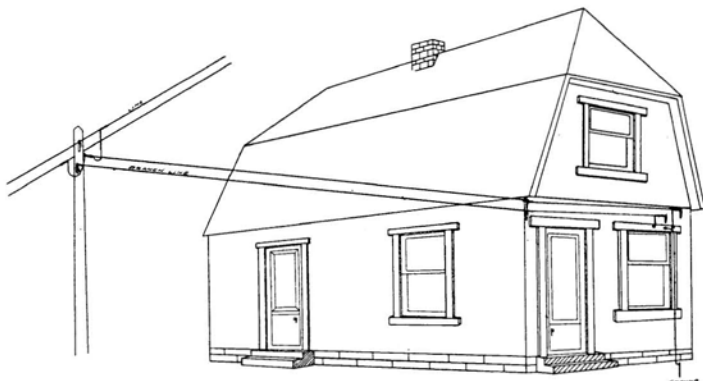


Fig. 19—View Showing How the Drop Wires, when Run Along the Outside of a House, are Supported on Insulators.

ENTRANCE HOLES.—Two separate holes at least 2½ inches apart and sloping upward from without should be made in the building near to the point where the protector is mounted.

LEADING-IN WIRES.—The leading-in wires which connect the drop wires with the terminals of the protector should be rubber-covered copper wire. They must be soldered to the end of the drop wires as shown in Fig. 18, where a and b represent the drop wires and c and d the lead-in wires.

A drip loop should be left in each leading-in wire at a point immediately below the entrance hole in the building. This is to prevent water from following the wire through the hole and into the building.

At the point where the lead-in wires pass through the holes in the building they should be protected by porcelain tubes as shown in Fig. 18 and in Fig. 20. The leading-in wires should not be left in contact with any sharp corners or edges on the outside of the building.

INSIDE WIRING.—No. 19 B. and S. gage braided and rubber-covered twisted pair copper wire should be used for connecting the telephone set with the protector. The methods of wiring the telephone set and protector on a grounded system and on a metallic system are shown respectively at A and B in Fig. 20.

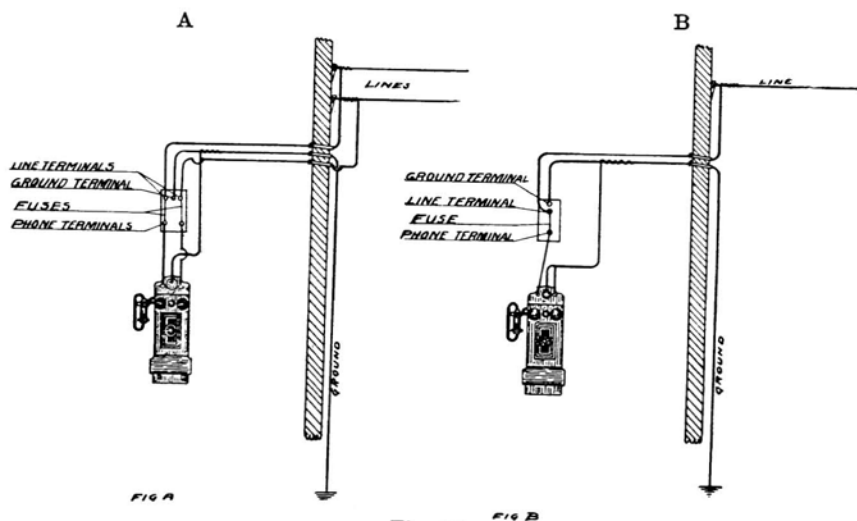


Fig. 20.

All inside wires should be installed in a neat manner. As far as possible they should be concealed. When it is impossible to conceal the wires they should be run along the door or window casing against the plaster, under the picture molding, or in the groove at the top of the base-board. When it is

necessary to install these wire in cellars or attics, care should be taken to avoid the possibility of damage from mechanical sources. Wet and damp places should be avoided for all inside wiring.

When it is necessary to cross pipes or other conducting materials, the wires should be protected by tubing or two wrappings of insulating tape. The tubing or tape should project at least one inch each side of the pipe or conducting material. Whenever practicable, the wires should be run above all pipes or conducting material that it is necessary for them to cross.

When necessary, wires within the building may be spliced and soldered. In splicing wires, soldering paste should be used as a flux for the solder. Joints must be soldered and carefully wrapped with insulating tape.

Wire should be fastened so as not to injure its insulation. For inside work, insulated staples driven between the wires may be used. Uninsulated staples should never be employed.

GROUND WIRE.—Single braided, rubber-covered copper wire should be used for connecting the protector with the ground rod. This ground wire from the protector should be led as direct and with as few bends as possible to the ground connection. A porcelain tube should be used where the ground wire passes through the wall, to prevent it from coming in contact with the house. There should be no spirals, coils, knots or sharp bends in the ground wire and it should never be enclosed in an iron pipe.

A good ground connection for the protector and one which will also serve well as ground connection of the telephone in a grounded system, can be obtained by soldering the ground wire to the top of an iron rod five or six feet long and one-half inch in diameter, driven into permanently damp earth.

BATTERIES.—Our telephones are listed with batteries which are packed in the cabinet of the telephone. The batteries, however, are not connected together when telephone is shipped. Connection should be made as shown in Fig. 21.

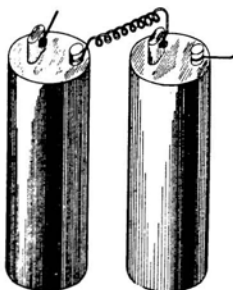


Fig. 21.

Material Required for the Main Line.

To afford an idea of what is required and what it costs to build a telephone line, we have arranged below lists of the material needed for the various kinds of lines.

CASE 1.—Where the line is to be not more than twelve miles long, and a “grounded”, one-wire line is put up, there will be required for each mile of line:

96 lbs. of No. 14 B.B. galvanized iron telephone wire. Our Catalog Number D46401. Price \$4.21 per 100 lbs.

30 No. 9 pony glass insulators, Catalogue Number D 46205. Price, each, 2c.

30 painted oak brackets, Catalogue Number D 46221. Price, each 1¼c.

30-40 penny and 30-60 penny wire nails. There are 16-40D and 11-60D nails to the lb. Catalogue Number D-special, at 3c lb.; \$2.30 per 100 lbs.

Total cost per mile, not including poles, about \$5.22. Shipping weight, about 145 lbs.

CASE II.—When a metallic two-wire line, not more than twelve miles long, is to be built, there will be required for each mile:

192 lbs. No. 14 B.B. galvanized iron telephone wire (D 46401) at \$4.27 per 100 lbs.

60 No. 9 pony glass insulators (D 46205 at 2c each.

60 painted oak brackets (D 46221) at 1¼c each.

60-40 and 60-60D wire nails at 3c lb. 16 and 11 respectively to the lb. 30-22 or 25 foot poles.

The total cost of this material, less poles, is about \$10.34 per mile. This cost can be considerably reduced when a quantity of these materials is purchased.

CASE III.—When the line is to be more than twelve miles long, if a “grounded” one-wire line is to be put up, there will be required, for each mile:

165 lbs. of No. 12 B.B. galvanized iron telephone wire (D 46402) at 3-9-10c per lb. (In 2,000 lb. lots.)

30 No. 9 Pony glass insulators (D 46205) at \$1.87½ per C (In bbl. lots).

30 painted oak brackets (D 462221) at \$1.05 per C.

30-40 and 40-60D nails at \$2.30 per C lbs.

30-22 or 25 ft. poles.

The total cost of this material less poles is about \$7.40. The shipping weight about 225 lbs.

CASE IV.—When a metallic two-wire line more than twelve miles long is to be built, there will be required for each mile:

330 lbs. No. 12 B.B. galvanized iron telephone (D 46401) at 3 9-10c lb. (In 2,000 lb. lots).

60 No. 9 pony glass insulators (D 46205) at \$1.87½ per C. (In bbl. lots).

60 painted oak brackets (D 46221) at \$1.05 per C.

60-40 and 60-60D wire nails at \$2.30 per C lbs.

30-22 or 25 ft. poles.

The total cost, per mile, of this material is about \$14.80.

The shipping weight, about 450 lbs.

Material Required for Each Station.

At each telephone station, on either kind of line, there will be required:

1 Telephone, as per selection. (Remember that all telephones on the same line must have ringer movements of the same resistance.)

Sufficient amount of No. 14 rubber covered wire to run from arrester to the ground, and to run from line wire inside of house. D50040 wire at 13-8c per foot is best.

Sufficient amount of wire to connect telephone to lead-in wires. Either single or duplex office wire, or dry, braid twisted pair wire, can be used. The later is to be preferred in most instances.

3 or 4 Porcelain Knobs (D 46216) at 1c.

3 or 4 2½ inch Iron Screws, to fasten knobs (D-Spec.) at 8c doz.

2 or 3-6 inch Porcelain Tubes (D 51727) at 18c doz.

1 pkg Insulated Staples (D 53216) at 13c.

1-6 Ft. Galvanized Iron Ground Rod (D-Spec.) at 18c.

The above material will cost, on the average, from \$10.30 to \$13.80, according to telephone selected and amount of wire required.

A Few Words About Our Telephones.

WHEN YOU BUY ONE OF OUR TELEPHONES you are getting one which you can depend upon; a telephone which has been carefully planned in every detail by expert practical telephone men; a telephone which has proven to be of the best and is **GUARANTEED**. Every part is as efficient, strong and drable as we can make it. We build for quality first of all; and then, by factory economies and large productions, we have put the price down to a competitive basis.

Guaranteed Without Time Limit.

THERE ARE good telephones—a few—and there are poor telephones—many. We know our telephones are right at the top with the best. We are sure of it, that is why we **GUARANTEE** them so strongly—**guarantee them without a time limit**—to be perfect in electrical and mechanical construction; **guarantee to replace** free of any cost any part which proves to be defective.

WE TAKE THE RISK.—You are protected by our written guarantee, which we send with every Diamond and Thornward telephone we sell.

Probably there are a few of our telephones in operation in your vicinity. If there are, ask the owners what they think of them. They will tell you that our telephones **talk plainer, receive better and ring louder** than any other phone on the line. Ask them. We are willing to accept the verdict.

OUR PRICES ARE RIGHT.—They are the lowest at which telephones of quality can be sold. If you see lower prices rest assured that they are for phones which represent lower values. We could offer you the same telephones at probably a lower price. We could, but we know it is not policy to do so. Also you may pay more for other phones, but you cannot buy better phones—there are none better.

We want to sell you the best. We want to sell you a telephone that will

give you service and will continue to give you service—a telephone that is right and will stay right.

What Telephone to Order.

BRIDGING TELEPHONES are recommended for any kind of telephone service (private exchange, or party line) and are specially designed for use on either long distance or short rural party lines. Outside of cities and large towns telephone service is usually secured by bridging telephone party lines, and the uses of Bridging Telephones far exceeds the use of all other types and kinds in rural service.

IF THERE IS A LINE ALREADY IN OPERATION in your neighborhood, and you wish to go in on it, no matter if the instruments already in use are not our make, you can use the Thornward or Diamond phone on that line. Our phones work equally well in connection with instruments of other makes.

A MOST IMPORTANT POINT TO REMEMBER when constructing a bridging party line or when installing an instrument on a line already in operation: All of the telephones on any one line must have Ringer Movements wound to the same Resistance. Bridging telephones are made with ringer movements of either 1000 ohms, 1600 ohms, 2000 ohms, or 2500 ohms resistance.

Therefore, before ordering your telephone, find out the resistance of those already installed on the line and order yours with ringer movements of the same resistance.

IN ESTABLISHING A NEW LINE there is no special reason for adopting the extremely high resistance ringers. The talking quality of telephones having 1600 ohm ringers is just as good as those with 2500 ohm ringers or 1000 ohm ringers. In regular use the 1600 ohm ringer movements have practical advantages in signaling. We therefore recommend the use of 1600 ohm ringer movements on new lines. Do not forget, however, that all the telephones on any one party line must have all the ringers alike.

THIS GUARANTEE PROTECTS YOU

WE TAKE THE RISK, READ CAREFULLY.—While all manufacturers declare their product best, isn't it better to choose a telephone with a guarantee? The test of quality is the willingness of the dealer to back his claims and promises with a tangible, definite contract that will protect the customer. We know the quality of our telephones to be unsurpassed, and in distinctive features absolutely unequalled. To prove our faith in this knowledge we issue with every telephone purchased of us, a **Guarantee Bond, without Time Limit**. If any part of these telephones proves defective, we will replace it without charge and pay all transportation charges. This applies to the complete instrument and all of its parts. **Buy the Guaranteed Telephone.**

Following is a copy of the guarantee which we send, properly executed, with every Diamond and Thornward telephone:

"This is to certify that Telephone Model 41121 is constructed throughout of perfect materials, made and assembled by experienced workmen, and is hereby guaranteed to give efficient service, when properly installed, in the line of work for which it has been designed. Each part is carefully constructed to meet its especial requirements. If, with proper use and care, a defect develops in either material or workmanship, we hereby agree to replace such defective part or parts, free of all expenses, including transportation charges, and without regard to time elapsed from date of purchase. We guarantee every part, as well as the complete instrument. There is absolutely no time limit to the guarantee."

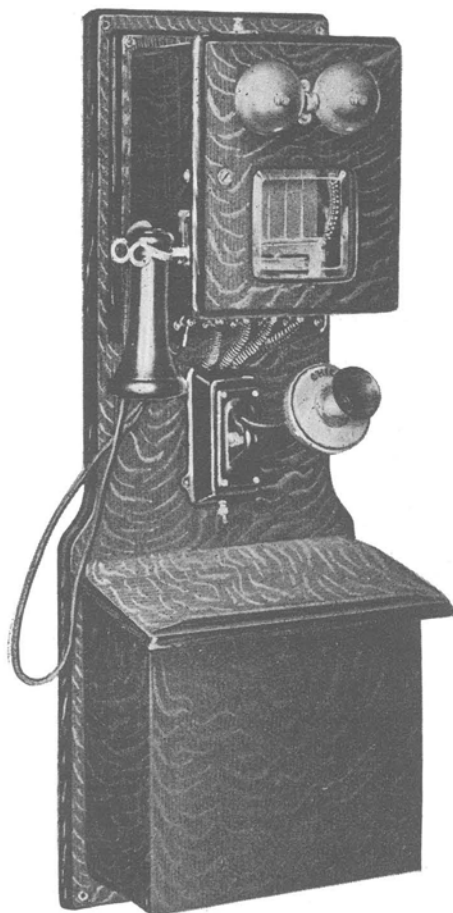
MONTGOMERY WARD & CO.

INSURANCE POLICY.

To convince our customers of the efficiency of the lightning arresters with which our telephones are equipped, we issue with each Diamond and Thornward telephone, a lightning insurance policy, in which we agree to replace any part or parts of the telephone which become damaged by lightning within one year of date of purchase, provided telephone has been properly installed.

DIAMOND BRIDGING TELEPHONE.

Six Bar Generator Glass Front Cabinet.



SPECIFICATIONS.

Cabinet.—Medium length, with plate glass front. Finest wood-work and finish ever used in telephone work.

Generator.—Six bar; laminated magnets; strongest ringing generator made. Visible parts nickel plated.

Switch.—Long lever; automatic.

Contacts.—Platinum.

Ringer Movement.—Long pattern; resistance as required.

Transmitter.—Genuine solid back; long distance.

Transmitter Arm.—Adjustable, with induction coil mounted in base.

Induction Coil.—High grade; long distance.

Receiver.—Bipolar with cord.

Battery.—Two cells dry battery.

Lightning Arrester.—Fully protects the instrument from lightning.

This telephone is the same in every respect as our DF 41121 etc., telephones, except the style of cabinet. Besides having the working parts the best, from the standpoint of quality, efficiency and reliability, this telephone is equipped with a very fine cabinet, and

is the neatest and best looking telephone obtainable. It is a handsome addition to the furniture of any room, a telephone that is designed especially for use on lines that are, or are likely to be, heavily loaded.

The guaranteed telephone. In buying it, you take no risk and get the best obtainable.

PRICES.

Each telephone supplied with two batteries; complete in every detail, ready to use as soon as unpacked. Shipped from factory in Northern Indiana. Shipping weight, 50 lbs. each. Freight rates are about the same as from Chicago.

Diamond Long Cabinet Type Bridging Telephone, as illustrated above, with 6-bar generator. Complete, F. O. B. factory.

DF 41151—With 1000 ohm ringer movement, each	\$11.95
DF 41153—With 1600 ohm ringer movement, each	12.25
DF 41154—With 2000 ohm ringer movement, each	12.45
DF 41155—With 2500 ohm ringer movement, each	12.65

In lots of SIX we offer 2 per cent discount. In lots of TWELVE we offer 3 per cent discount. No further discounts allowed.

DIAMOND BRIDGING TELEPHONE—Six Bar Generator; Compact Cabinet.



From the standpoint of quality, efficiency and reliability, our 6-bar generator Diamond Telephones are far superior to any other telephone made. In building this telephone, we have aimed to make absolutely the best—a telephone designed especially for use on heavily loaded lines—a telephone that will ring, talk and receive through any resistance ever encountered, and more; a telephone having more power than you will ever need under ordinary circumstances, but available if you should ever want it. A telephone carefully planned in every detail—simply wired and equipped with parts as described above. The guaranteed telephone. In buying it you take no risk and get the best.

PRICES.

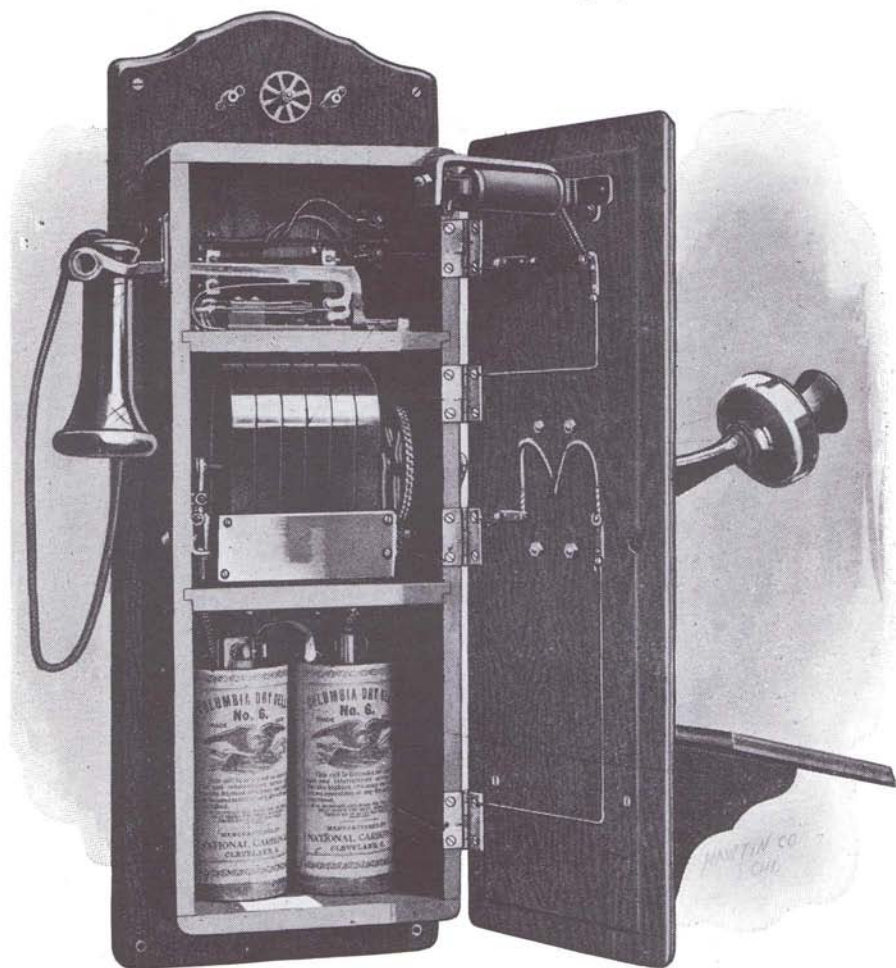
Each telephone snupplied with two batteries, complete, in every detail, ready to use as soon as unpacked. Shipped from factory in Northern Indiana. Freight rates are about the same as from Chicago. Shipping weight, 50 pounds each.

Diamond Compact Type Cabinet Bridging Telephone, as illustrated above, with 6-bar generator, complete, as described, F. O. B. factory.

DF 41121—With 1000 ohm ringer movement, each	\$11.15
DF 41123—With 1600 ohm ringer movement, each	11.50
DF 41124—With 2000 ohm ringer movement, each	11.80
DF 41125—With 2500 ohm ringer movement, each	12.00

In lots of 6 we offer a 2 per cent discount. In lots of 12 or over, we offer a 3 per cent discount. No further discounts made.

DIAMOND BRIDGING TELEPHONE---Showing Open Cabinet



SPECIFICATIONS.

CABINET.—Compact pattern, the finest woodwork and finish ever used in telephone work.

GENERATOR.—Six-bar; laminated magnets; strongest ringing generator made.

SWITCH.—Long lever, automatic.

CONTACTS.—Platinum.

RINGER MOVEMENT.—Long pattern; resistance as required.

TRANSMITTER.—Genuine solid back; long distance.

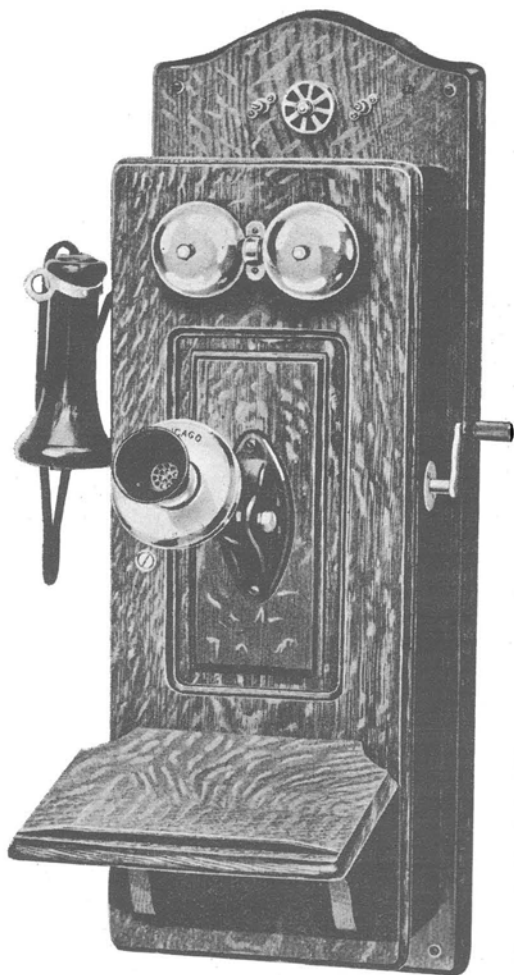
TRANSMITTER ARM.—Adjustable.

INDUCTION COIL.—High grade; long Distance.

RECEIVER.—Bipolar, with cord.

LIGHTNING ARRESTER.—Fully protects the instrument from lightning.

THORNWARD BRIDGING TELEPHONE—Five Bar Generator; Compact Cabinet.



Our Thornward Five-Bar Bridging Telephone is built in the same careful manner as the Diamond Six-Bar telephone. It will give the best possible service on any ordinary line. In material, workmanship, and efficiency it is superior to any other telephone on the market, our six-bar Diamond Telephone alone excepted.

WE GUARANTEE it to be perfect in material and workmanship, and will replace at any time, free of all cost, including transportation charges, any part which proves to be defective in material or construction. The parts of our Thornward 5-bar telephone are of the same general excellence as those used in our Diamond telephone, the transmitter, receiver, ringer movement, switch hook and lightning arrester being the same in every respect. The 5-bar generator has laminated magnets, and its general construction is identical to the Diamond Six-Bar Generator. It is the strongest ringing five-bar generator made.

Five-bar generator telephones are usually accepted as standard, and as such we recommend our Thornward Five-Bar Bridging Telephones for use on any line, except those which are very heavily loaded, for which purpose we recommend the Diamond Six-Bar Telephone.

These telephones are guaranteed to ring as many bells as any five-bar telephone produced by other factories, regardless of price. In transmitting, receiving and lasting powers they are the equal of any made.

Note our guarantee on the Thornward. Compare our prices with any you have ever seen, heard of, or read about. Then compare the instrument with the best you have ever seen and you will agree with us that, with the single exception of our Diamond, the Thornward is the best finished, most complete and efficient, and lowest priced high-grade telephone possible to produce.

SPECIFICATIONS.

CABINET.—Compact pattern; fine woodwork, with real piano finish.

GENERATOR.—Five Bar; laminated magnets; strongest ringing five-bar generator made.

SWITCH.—Long lever; automatic.

CONTACTS.—Platinum.

RINGER MOVEMENT.—Long pattern; resistance, as required.

TRANSMITTER.—Genuine solid back; long distance.

TRANSMITTER ARM.—Adjustable.

INDUCTION COIL.—High grade; long distance.

RECEIVER.—Bipolar, with cord.

BATTERY.—Two cells; dry battery.

LIGHTNING ARRESTER.—Fully protects the instrument from lightning.

PRICES.

Prices of Thornward compact cabinet, five-bar bridging telephones, at factory in northern Indiana.

DF 42050—Thornward Telephone, with 1000 ohm ringer.	Each	\$ 9.60
DF 42055—Thornward Telephone, with 1600 ohm ringer.	Each	9.90
DF 42060—Thornward Telephone, with 2000 ohm ringer.	Each	10.25
DF 42065—Thornward Telephone, with 2500 ohm ringer.	Each	10.50

In lots of 12 or over, we allow a 2 per cent discount. In lots of 25 or more, we allow 3 per cent discount. No further discounts allowed.

PRIVATE LINE TELEPHONES.



A high-grade, compact series telephone, for use on private lines of any length up to 5 miles. Most efficient where but one telephone at each end of the line is required. However, with the proper wiring, several of these telephones can be used, and will give satisfactory service on well insulated short lines not over a few miles in length. It frequently happens that a private telephone line is a much needed convenience. For instance, a merchant may want a private line to his residence; a physician may want such service from his office to the drug store; a farmer might wish to have a private line with his neighbor. For all these purposes, and many similar uses, these are the ideal telephones. Easy to install and cost practically nothing to maintain. All parts

are neatly mounted on compact cabinet, except the batteries, which can be placed in any convenient, out of the way place. Weight, complete, 45 lbs.

PRICES.

D 42106—Price, per pair (two telephones), including 4 dry batteries \$10.30

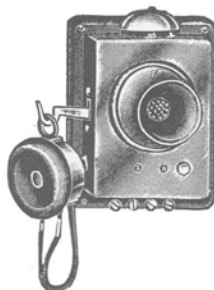
BATTERY TELEPHONES.

The most useful and inexpensive telephones yet devised. Good use can be found for a set of these phones in every home, office, store and shop. They save many steps and much time. Install them anywhere, from the first floor to the basement, to the laundry or upstairs; from the house to the garage or barn; from the office to the workshop; from room to room; from neighbor to neighbor—in fact, in any of the thousand places not over 500 feet apart—which readily suggest themselves. A press of the button instantly calls the person you want to speak to. They replace speaking tubes, being much more efficient and convenient.

We are offering these instruments at a figure heretofore unheard of. We guarantee them to be high-grade in every respect, to be mechanically and electrically perfect. They are of permanent value; reliable and will give perfect satisfaction at any distance not over 500 ft. long. Being entirely made of metal, they are not affected by atmospheric conditions.

A pair of telephones, four batteries, and a connecting wire, comprise a complete system.

A wiring diagram is supplied with each set. Anyone can quickly and easily install them.

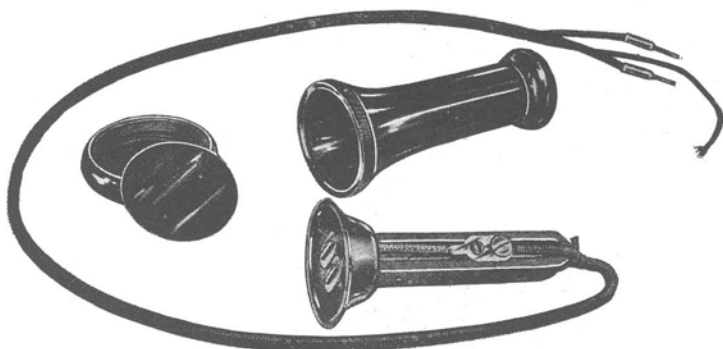


PRICES.

D 42107—Battery Telephones. Price, per pair (two telephones), without batteries (shipping weight, 5 lbs.) \$3.50

D 42108—Battery Telephones, per pair (two telephones), with four dry batteries (shipping weight, 5 lbs.) \$4.05

BIPOLAR TELEPHONE RECEIVER.



The receiver used on our telephone is made after the standard pattern adopted by all manufacturers. It is bipolar and equipped with laminated magnets, a distinctive feature which none other possesses. This construction insures an absolutely permanent receiver, which can be relied upon at all times. The shell is extra heavy, the binding posts are concealed inside the case, the cord is heavy and will wear well. The whole receiver can be easily and quickly taken apart and again assembled if necessary.

This Receiver can be used on any telephone. Price, when purchased separately.

D. 42355—Bipolar Telephone Receiver. (Postage 20c), complete with cord. Each 93c

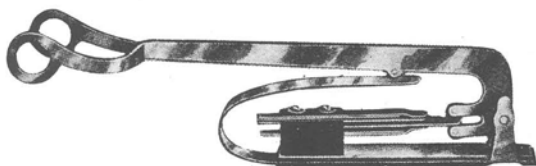
Repair Parts.

D 42375—Receiver shells. Each 26c

D 42380—Receiver cap. Each 11c

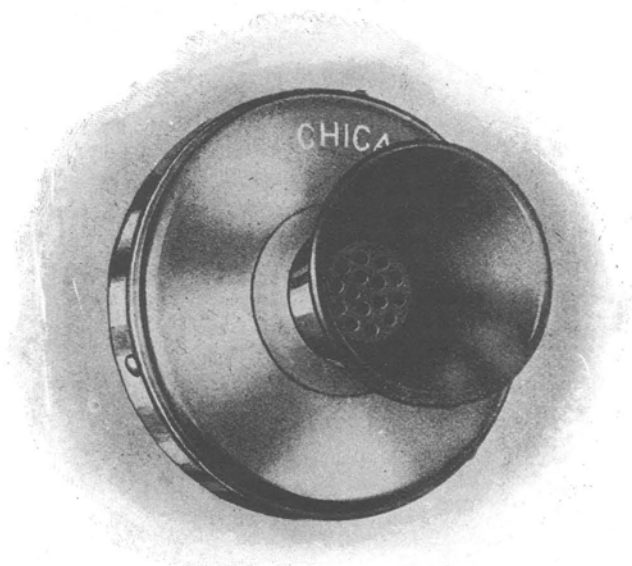
D 42385—Receiver cord, 36 in. long. Each 15c

SWITCH HOOK SWITCH.



The Receiver Hook Switch is of the long lever type, with heavy German silver springs and pure platinum contacts. The hook is carefully insulated, so that all danger of an accidental shock is eliminated. The bearings are frictionless and absolutely permanent. All connections are carefully soldered. The superior construction of our switch eliminates all trouble from this source and insures positive, quick contacts.

DIAMOND SOLID BACK LONG DISTANCE TRANSMITTER



The transmitter is the most delicate part of the telephone, and performs the most important part of the work. It must be so built that it will accurately transmit every possible tone, from the lowest to the highest, and yet have the delicate mechanism required for this purpose, so enclosed mechanically as to stand up in service for a lifetime and be ready for use at any time that it may be wanted.

The transmitter, used on our Thornward and Diamond telephones, is of the long distance, solid back type, and will give the best of service under any conditions. It will transmit the lowest articulate sounds distinctly over the longest lines, and through the highest resistance. It is built like a watch, and every part receives the utmost care in every process of production. The diaphragm is of frosted aluminum, and will not break, as do the carbon diaphragms in the cheaper transmitters. The bridge and front are extra heavy, to prevent vibration. The carbon cup is of the most scientific design, so constructed that the carbon granules cannot become packed. This transmitter, if not tampered with, will ordinarily last indefinitely, and requires no attention nor repairs.

This transmitter will work on any telephone, and is supplied separately when desired.

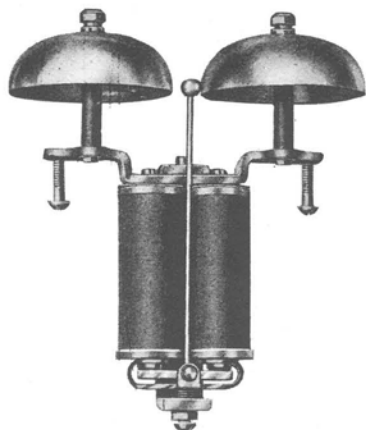
PRICES.

- D 42340—Long distance, solid back transmitter (postage 18c). Price.. \$1.35
 D 42345—Long distance, solid back transmitter with adjustable pony
 arm. Price \$1.80

REPAIRS FOR TRANSMITTERS.

- D 42360—Black composition transmitter mouthpiece. Fits all standard
 transmitters (postage 2c). Price 9c
 D 42365—Carbon diaphragms for old style transmitters. Each 12c
 D 42370—Carbon granules for transmitters. Per charge 11c

BRIDGING RINGER MOVEMENT.



The ringer movement in our telephone is of the most improved form. It will ring loudly and clearly, and its construction is so planned, and the parts so balanced, that continued use will never decrease its efficiency. The coils are wound of the best grade silk and enameled wire. The gongs are heavy and give a loud, clear tone. On account of the special construction of our ringer, it will ring clearly on a very weak current, which will hardly tingle the ringer of some telephones.

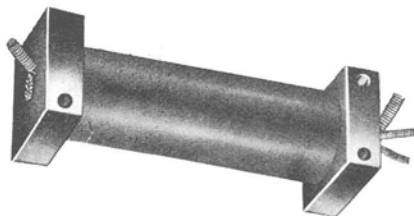
Ringer movements supplied separately, when wanted. Will work in any telephone.

PRICES.

No. D 42320—Bridging ringer movements—

1000 ohm resistance.	Shipping weight, 25 oz.	Price	\$1.72
1600 ohm resistance.	Shipping weight, 25 oz.	Price	2.10
2000 ohm resistance.	Shipping weight, 25 oz.	Price	2.45
2500 ohm resistance.	Shipping weight, 25 oz.	Price	2.90

INDUCTION COIL.



Of all parts of the telephone, the induction coil is the most mysterious in its action. Its function is to transform the low voltage battery current, which passes through the transmitter, into a higher voltage current, which will properly carry over any resistance which might be encountered in any ordinary line. To do this, the induction coil must be constructed so that all current from the transmitter is utilized to the best advantage.

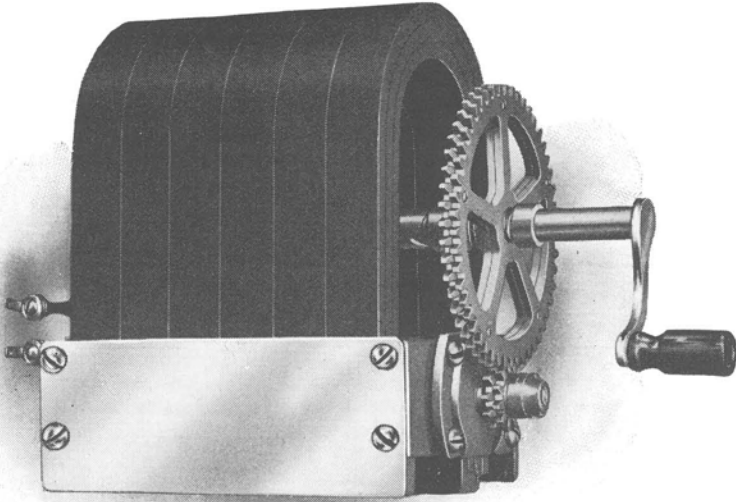
The induction coil used on our telephones is scientifically designed and will give satisfactory service on any line.

It is supplied separately when wanted.

PRICE

No. D 42315—Induction Coil. Weight, 5 oz. Each\$0.57

BRIDGING GENERATOR.



The function of the generator is to provide electrical energy to ring the bells of other telephones along the line, and thus signal the party desired. On rural party lines this requires especially heavy and powerful construction, because the character of the service is such that not only does the energy produced by the generator ring the bells of the subscriber wanted, but also those of other subscribers on the line. A large amount of current must therefore be developed, which makes a properly designed generator an absolute necessity.

The generator of our telephone is the most efficient, in every detail, of any made. It is constructed on strictly scientific lines, and retains its power permanently, without deterioration. Each bar of the generator is made up of three distinct magnets, so that every 5-bar generator has 15 magnets and every 6-bar generator has 18 magnets. This method of construction is superior to the solid bar construction, as the generator is enabled to supply more power and retain its efficiency longer. While this way of making the magnets is more expensive than any other, the superior results obtained justify the higher cost. The double sprocket gear, an exclusive feature of our generator, is made of two pieces of cold-rolled, stamped steel, which are permanently united. The teeth of each side are offset against each other, on the principle used in clothes wringer gears, so there is no lost motion, no noise and the least possible wear. This gear is a great improvement over the old design brass gears, and will last almost indefinitely. The armature is laminated and wound with silk insulated wire. The automatic cut-in is self contained and mounted in the cabinet in such a manner that it may be removed instantly, if it ever should be desirable to do so.

The 5-bar generator is standard, with power more than enough for any line of standard construction, and with more magnet steel, and more wire, than any 5-bar generator made. For all ordinary lines, it will give perfect satisfaction. The 6-bar generator is in a class by itself. There is none other that approaches it. It is the acme of telephone luxury, and will ring through rusty joints and past eavesdropping subscribers. It is especially recommended for long, heavily loaded lines, and will ring strongly where no other generator could penetrate.

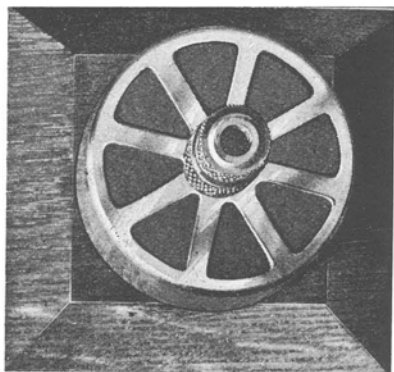
We can supply these generators separately, if desired for experimental work, or for repair work on other telephones.

PRICES.

D 42300.—Diamond Six-Bar Generator, same as used in our Diamond telephones. Weight 12 lbs. Dimensions $6\frac{1}{2} \times 5\frac{3}{4} \times 3\frac{3}{4}$ inches. Price, at Chicago or factory, \$4.50

D 42305.—Thornward Five-Bar Generator, same as used on our Thornward telephones. Weight, 9 $\frac{1}{2}$ lbs. Dimensions, $6 \times 5\frac{3}{4} \times 3\frac{3}{4}$ inches. Price \$3.65

LIGHTNING ARRESTER.



The lightning arrester with which we equip our telephones, is most up-to-date in every respect. It positively protects the telephone against lightning. It is enclosed in a metal casing, which prevents any accidental injury to it. So strong is our faith in this arrester that we issue a lightning insurance policy by which we agree to replace any parts of the telephone damaged by lightning within a year from date of purchase, provided telephone has been properly installed.

CONDENSERS.

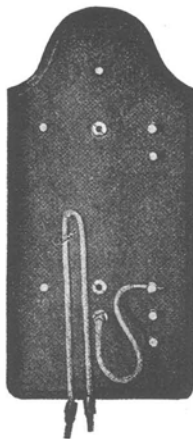
For thirty-five cents extra per telephone, we will equip any of our telephones with condensers. If all telephones on the line are equipped with condensers, and the party you wish to call has his receiver on the hook, you can easily call him, no matter how many other receivers are off the hook. In this way, condensers greatly improve the service on any line.

PUSH BUTTON DEVICE.

PUSH BUTTONS.—For 20c extra per telephone, we will equip any of our telephones with a push-button device, by means of which the central station, if so equipped, can be signalled without ringing any other telephone on the line. This device can only be used on metallic circuit lines; it will not work on grounded circuit lines.

PLUG BOARD.

For connecting converging lines, where all the lines employ the ground circuit. This board is so arranged that each line terminates in a socket and an extension bell for each line (but one) is bridged between the line and the ground. The telephone at the board is equipped with a plug which normally is inserted in the socket terminal of that line which has no extension bells; the signals on all of the lines but one are therefore received by extension bells, and on the remaining line by the telephone. Suitable for use in connecting from two to ten lines. Board is polished Oak. With a 2-line board, one extension bell is needed, with 3 lines two, etc.; bells in each case must be wound to same resistance as ringer movement on main line, to which they are connected.

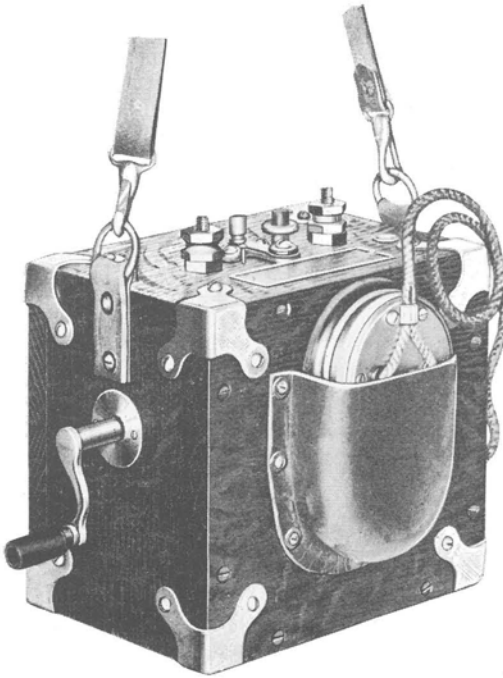


PRICES.

- D 42110—Plug board, to accommodate two lines (postage 40c) \$1.85
D 42112—For every additional line to connect with the board, per line 70c

We can also supply boards for metallic circuits. Prices quoted on request.

THORNWARD TEST SET.



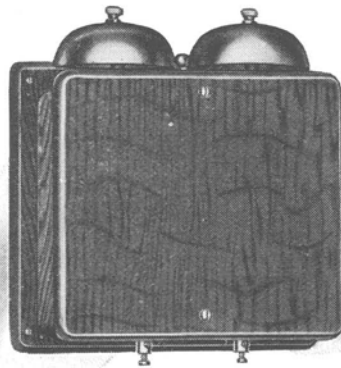
D 42157—An instrument for locating grounds, crosses and opens on ground and metallic circuit lines, either bridging or series. It weighs 12 lbs, measures $6 \times 6\frac{3}{4} \times 4\frac{3}{4}$ inches, and can easily be carried along any line. However, no good points are sacrificed in making this a light weight, compact instrument, and it is a model of efficiency and reliability. The inside wiring is very simple and well insulated, all connections are carefully made and soldered and every part is solidly and securely fixed in its place. Set is equipped with compact watch case combined receiver transmitter; buzzer; adjustable detachable carrying strap and powerful 5-Bar Laminated Magnet generator, strong enough to ring through any ordinary line even under adverse circumstances. Simple directions for its use always accompany it.

PRICE.

Price \$9.75

EXTENSION BELLS.

For receiving signals in out-of-way places where it is not desired to place a telephone. Can be installed in any desired place and connected by wires with the telephone. Whenever the telephone bell is rung the extension bell will likewise ring. The bells are to receive signals only. They cannot be talked through, nor can they signal other stations. The ringer movement must have exactly the same resistance as the ringer movement on telephones with which they are to be used. Made of the finest materials. Cabinet is highly finished oak. Series bells cannot be used in connection with Bridging Telephones. No batteries are necessary in connection with extension bells. Postage, Series, 50c, Bridging, 60c.



PRICES.

D 42130—Series of 80 ohms. Each	\$1.57
D 42135—Bridging 1000 ohms. Each	2.40
D 42140—Bridging 1600 ohms. Each	2.79
D 42145—Bridging 2000 ohms. Each	3.05
D 42151—Bridging 2500 ohms. Each	3.20

LINE CONSTRUCTION MATERIALS.

B. B. GALVANIZED TELEPHONE WIRE.

Best grade B. B. galvanized telephone wire; put up in half-mile coils, all in one piece, without splice or joint; has extra heavy zinc covering, protecting wire from corrosion. No. 10 wire weighs about .260 lbs. to mile; No. 12, about 170 lbs.; No. 14 about 96 lbs. We do not break standard half-mile coils.

D 46401—No. 10 B. B. Galvanized Iron Wire. Per 100 lbs.\$3.95
No. 12 B. B. Galvanized Iron Wire. Per 100 lbs. 4.15
No. 14 B. B. Galvanized Iron Wire. Per 100 lbs. 4.27

Price is subject to market fluctuations. On all orders for 2,000 lbs. or over, we allow a discount of 1/4c per lb.



BARE COPPER WIRE.

D 46415—Pure Soft Drawn Copper Wire, for short line Telephone and Telegraph Lines; No. 12 measures about 50 ft.; No. 14, 80 ft.; No. 18 200 ft. to the lb.; Postage, 19c per lb., extra.

Size	12	14	18
Price, per lb.	26c	27c	28c

RUBBER-COVERED TELEPHONE WIRE.

D 46421—Twisted Pair Rubber-Covered, Saturated Braid Telephone Wire, for outside use. Price per 100 ft. 68c
D 46423—Twisted Pair Rubber-Covered, Dry Braid Telephone Wire, for inside use. Price, 100 ft. 68c



RUBBER-COVERED WIRE.

D 50040—1909 Code, Rubber-Covered Wire. Used extensively for general wiring; especially suitable for telephone work. Should be used in every instance to connect telephone to ground-rod. Price per foot 1 3/8c; per 100 ft., 98c; per M ft. \$8.50.



OFFICE WIRE.

D 46430—Office Wire; for inside wiring of telephones, door bells, etc. One wire, double-braided, and saturated in paraffine. Size, 18, about 125 ft. to lb. Price per lb. coil 28c
D 46423—Duplex Office Wire, two wires each; insulated and then braided together and paraffined; about 65 ft. to lb. Price per lb. coil 34c

INSULATORS

D 46205—Pony Glass Insulators, for telephone and telegraph lines; the proper insulator for rural party lines; packed 400 in Bbl.; weight per Bbl., about 300 lbs. Price per Bbl. \$7.50
Less Quantity, Each..... 2c



PORCELAIN INSULATORS.

D 46216—New Code, No. 5 1/2 Porcelain Insulators; used to insulate wire which connects telephone to ground rod. Height, 1 3-16 in.; diameter, 1 1/4 in.; hole; weight 9 lbs. per hundred. Price per hundred 55c
Less quantity. Price, Each 1c



BRACKETS.

D 6221—For Holding Glass Insulators; best quality painted oak; can be fastened to side of pole or house. Weight, 50 lbs. per sack. Price per sack of 100 \$1.05
Less quantities. Each 1/4c



OAK PINS.

D 46226—1/2 in. Pony Oak Pins; for supporting insulators on cross arms; painted oak. Weight 75 lbs. per bag. Price per sack of 250 \$1.65
Less quantities. Each 1c



INSULATING TAPE.

For wrapping wires where insulation has been scraped off; 3/4 in. wide.

D 50270—Black friction tape. Per 1/2 lb. package .. 14c



D 53216—Insulated Staples, 3/4 in. high, for fastening bell and telephone wires. Per package of 100 13c

INSULATOR SCREWS

D 46228—Iron screws, 2 1/4 in. long, for fastening porcelain insulators. Price, per dozen 7c
Per gross 51c

GROUND ROD.

D 46229—Ground Rod, 1/2 inch diameter; 6 feet long. Made of iron, heavily galvanized. Price, each 18c

PORCELAIN TUBES.

Unglazed Porcelain Tubes, 5-16 inside; 9-16 outside; take either No. 12 or No. 14 rubber-covered wire. Required whenever a wire is drawn through a partition. Not less than 1 doz. sold. Weight, per 100, 14 lbs.
D 51727—6 in. long. Per doz. \$.18
Per 100 1.25
8 in. long. Per doz.35
Per 100 2.60

WIRE NAILS.

D 46230—40 Penny Wire Nails, for nailing insulators to poles. There are about 16 of these nails to the pound. Price, per 100 lbs. \$2.30
D 46231—60 Penny Wire Nails, for nailing insulators to poles. There are about 11 of these nails to the pound. Price, per lb., 3c; per 100 lbs ...\$2.30
Price of nails subject to market changes

LINE CONSTRUCTION MATERIALS—Continued



GASOLINE BLOW TORCH.

One of the finest and most popular torches on the market; made of polished brass, with bronze metal burner and improved air pump; easily regulated; indispensable to plumbers, tanners, electricians for soldering, etc.; every torch is tested and warranted perfect.

D 46270—Capacity, 1 pt.; Wt. 2¼ lbs. Each \$2.30
D 46275—Capacity 1 qt.; Wt. 2¾ lbs. Each 2.40

POCKET SOLDERING TORCH.

Slips in the vest pocket. Always ready for any emergency.

A practical torch that does the work of soldering joints and light brazing. Tank is 5 in. high and 1 in. in diameter. Made of brass and heavily nickel-plated. Will not leak. A handy torch for electricians and telephone men. Burns either gasoline, benzine or wood alcohol. Adjustable blow pipe for broad or pointed flame. (Postage 5c).

D 46280—Pocket Soldering Torch. Price 47c



D 46300 — Best grade plain wire solder, about ¼ in. diameter. Price per lb. 30c
Per 10 lb. coil \$2.80

Price of solder is subject to market fluctuations.



BAR SOLDER.

D 46310—Half and half bar solder. About 1½ lb to bar. Per bar 46c

ROSIN CORE SOLDER.

D 46300—Rosin core wire solder. Requires no flux, indispensable for soldering wire joints. Used extensively for all electrical work. Price per lb .. 42c



WELDWELL.

D 46325—A Pulverized Solder, combined with a non-corrosive flux. Makes a joint or mends a hole without the bother of solder or acid. Can be fused with a match, soldering torch or soldering iron. Is very convenient for soldering wire on telephone lines. Put up in collapsible tubes.

Price, per 1 oz. tube 13c
Per 5½ oz. tube 25c



ALLEN SOLDERING SALT.

D 46315—When dissolved in water makes an ideal flux for electrical work, or wherever soldering is to be done. Superior to acid, is non-corrosive, and does not injure hands or clothing.

Price per ½ lb. bottle ... 29c



SOLDERING PASTE.

D 46320— Soldering paste is a very convenient form of a high grade flux May be applied to connection and heated with solder.

Price, per 2 oz. box 13c

LINEMEN'S SPLICING CLAMP.



D 46115 — Best grade forged tool

steel clamp, with rounded handles; warranted against flaws; very strong handles, will not spring out of shape. Length 10¾ in. Shipping weight, 20 oz. Price, each \$1.10

LONG SHARP NOSE SIDE-CUTTING PLIERS.

D 46105—A high grade cast steel tool. Used a great deal on electrical work, and will be found handy around any workshop. Length 5 in. Postage, 4c.

Price 57c



FLAT NOSE, SIDE-CUTTING PLIERS.

D 46132—Black handle polished face and jaws; a heavy, high-



grade, drop forge steel tool, for linemen and electricians. Weight 6 to 12 oz.

Price, 5 in. long. Each 32c
Price, 6 in., long. Each 45c
Price, 7 in. long. Each 57c

HEAVY SIDE-CUTTING, SPLICING AND KNOT-TYING PLIERS.



D 46110—Extra heavy, highest quality tool

with side-cutting jaws, wire splicer and elevated knot-tying drum, made especially for heavy line work where a tool for general use is desired. Length, 7in. Postage, 13c. Price \$1.15

LINE CONSTRUCTION MATERIALS--Continued



WIRE STRETCHER.

D 46240—A complete Tackle Block Wire Stretcher; will grip telephone and fence wire securely; has lock device, so that wire can be held at any point; one man can handle this block and make a connection; supplied with 16 feet of 3-8 in. Manila rope. Weight 4¾ lbs.
Price 66c

HOLD FAST WIRE GRIP.

D 46245—Will grip telephone and barb wire securely; can be attached to any wire stretcher; the harder you pull the tighter it grips. Weight 14 oz. Price 21c



LINEMEN'S CLIMBERS.

A necessary and useful article in constructing a rural telephone line. Appreciating the fact that the life of the lineman depends upon the quality and temper of these climbers, we have taken every pains to not only make the best finished article, but to use nothing but the best material and workmanship in the construction of these goods. They are made from forged steel, and are extra heavy. We carry in stock 15, 16, 17 and 18 inch length climbers. State length wanted.



PRICES.

D 46251—Climbers, Eastern pattern, without straps. Wt. 3lbs. Per pair \$1.20
D 46257—Straps for above. Per set of 4 straps 0.76
D 46259—Knee Pads. Per pair 0.23

"VERIBEST" LIGHTNING ARRESTER.

A most effective apparatus for arresting lightning. It is not ordinarily necessary to install this arrester, as the one supplied on all our Diamond and Thornward telephones will give full protection from lightning. However, in any communities where it is at all likely that the telephone wire will become crossed with power or telegraph wires, we recommend them; or when wires are run inside house for any distance we would advise putting one of these arresters at the point where wires enter the building.

PRICES.

D 42181—Single Pole Arrester, for use on ground circuit lines; complete with carbon blocks and fuse. (Postage, 6c extra). Price 15c
D 42185—Double Pole Arrester, for use on metallic circuit lines; complete. (Postage, 10c extra). Price 20c
D 42187—Extra Fuses, ¼ Amp. (Postage, 2c extra). Per dozen 10c
D 42190—Extra Carbon Blocks. Per set of 2, with mica interpose. (Postage, 1c extra). Price 2c

ANTI-HUM.



D 46440—A device for prevention of humming of telegraph or telephone wires; should be placed at short intervals on every rural line, and will greatly improve service. Wt., 6 oz.
Price, each 15c

EVER-READY DRY BATTERIES.



D 65020—A high grade battery that will give excellent service on any telephone. Size, 2½x6 inches. Weight, 2¼ lbs..
Each 25c
Per dozen \$2.55

SPECIAL DRY BATTERY.

Our special dry battery is suitable for use on telephones. It has a very long life, but is not recommended for use where telephone is used more than a few times a day. Size, 2½x6 in. Weight, 2 lbs. Price, ea 14c
Per dozen \$1.60

D 67751—Upright Type Switch, with insulated handle. Single pole, single throw. Each 19c
Single pole, double throw Switch, Each 25c

KNIFE SWITCHES WITH PORCELAIN BASE.

Our switches are well made, the metal faces being nicely finished; handles ebonized, and mounted upon porcelain bases.

D 67720—Price, double pole, single throw. (Postage, 9c extra) 21c
D 67725—Price, double pole, double throw. (Postage, 14c extra) 31c

BATTERY SWITCHES.

Knife Switches, with practically unbreakable composition bases; for use on gasoline engines, telephones, telegraph and bell lines, etc. Handles cannot come loose. Posts are brass with copper levers.

D 67761—Side wall type Switch, plain handle. Single pole, single throw. Each 13c
Single pole, double throw Switch. Each 20c