Building and Maintaining

RURAL TELEPHONE LINES

The Pacific Telephone and Telegraph Company

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General

In furnishing telephone service, the company owning the telephone exchange normally offers to furnish a grade of service known as "Farmer Line Service." This service is furnished under certain conditions and within designated areas. It is selected in some cases as a matter of expediency and in other cases for the purpose of securing the advantage of a low rate given where farmers, at their expense, furnish and maintain the telephone plant, equipment and other facilities outside of the telephone company's base rate area of the exchange from which the service is furnished.

This booklet is intended to serve as a help for the construction and maintenance of the telephone plant in such cases.

The kind of telephone service obtained is dependent to a very large degree upon the manner in which the outside plant is built and maintained and upon the maintenance of the telephone instrument. The user cannot expect to receive any better service than the quality of the line and instrument will afford. Good telephone service can only be had with properly constructed and maintained outside plant and equipment. Even the best of telephone plant and equipment requires some maintenance and repair work to insure that the service may always be good and dependable. Poor construction and maintenance methods are followed by poor service—not only to subscribers on the line itself but to anyone, anywhere, endeavoring to call them.

A list of the materials recommended for rural line construction is included on the last page of this booklet.

Constructing the Line

In the interest of service, in those instances in which the subscribers will provide, own and maintain a portion of the outside plant, it is advisable to consult freely with the Manager of the Telephone Company who will gladly give advice regarding construction standards and all details supplemental to the information contained in this booklet.

In considering the construction of a line, an effort should be made to limit the number of subscribers and not exceed ten per line. Every telephone added to a line increases the number of conversations over it and makes it more difficult for subscribers to obtain use of the line.

It is especially important to avoid increasing the number of telephones on a line to more than ten so that new types of Central Office equipment and improved methods of operation of advantage to rural subscribers may be introduced by the Telephone Company as required.

Wherever practicable, all telephone lines along the same route should be placed on the same poles. This plan is cheaper for everyone as there is only one pole line to build, and with all wires on a crossarm instead of on brackets, better clearance and facilities for future wires are provided. Along the highway, except in municipalities, locate the line close to or along the fence line and keep the telephone pole as far away from electric power lines as is possible.

METALLIC AND GROUNDED CIRCUITS

Metallic circuits are strongly recommended. The single advantage of a grounded circuit over a metallic circuit is its slightly lower initial cost. Today so many electrical circuits of all kinds exist along or adjacent to our highways that it is seldom possible to build a telephone line which will not be exposed to inductive disturbances from some other telephone, telegraph or power circuit. Even if there is no such exposure when the line is built, there is no assurance that an exposure will not develop shortly afterwards. If a grounded circuit were built initially and an exposure developed later, it would then be necessary to place a second wire and thus provide a metallic return instead of the ground return. From a cost standpoint, it may be just as cheap to build a full metallic circuit initially if the original grounded circuit is to be converted to a metallic circuit within five or six years.

PLANNING THE LINE

A general plan should be prepared on a map of the area under consideration. On this map there should be shown diagrammatically:

(a) The location of existing farm houses.

(b) The location of existing telephones.

(c) The route of existing telephone pole lines and the number of wires carried.

(d) The route of proposed telephone pole line.

(e) The number of poles per mile of the telephone lines or the number of poles between stations or on each branch line.

(f) The length and class of telephone poles.

(g) The location of existing and proposed electric power lines.

(h) The point where the lines will connect on to the Telephone Company's lines.

(i) The Telephone Company's exchange boundaries within which the lines are to be constructed.

ROUTING OF THE POLE LINE

Using the plant plan as a basis, and with due regard to local geographical conditions, the route of the telephone line should be laid out so as to reach the various subscribers with the minimum number of pole line miles. In selecting the route, particular attention should be given to the avoidance, wherever practicable, of paralleling on the same highway or the same private right-of-way, proposed or existing high tension lines. In no case should a telephone line be built over a high tension line, nor should telephone attachments be placed on the same poles with high tension wires.

The route should be as direct as possible but should preferably run along highways in order to facilitate the construction, inspection and maintenance of the line. However, where the length of the line can be substantially reduced without excessive cost for right-of-way, the question of crossing over private property should be carefully considered.

SELECTION OF POLES

Certain kinds of timber have a much longer life than other kinds when used as telephone poles. The kind of timber which should be used will vary in different sections of the country. The following kinds of wood are considered good pole timber and one or more of them may be generally obtainable in any section:

Western Cedar
Redwood
Fir (Oregon Pine)

Of the above mentioned timber, Fir (Oregon pine) has the shortest life in the ground, and for lasting qualities is not to be compared with Cedar or Redwood.

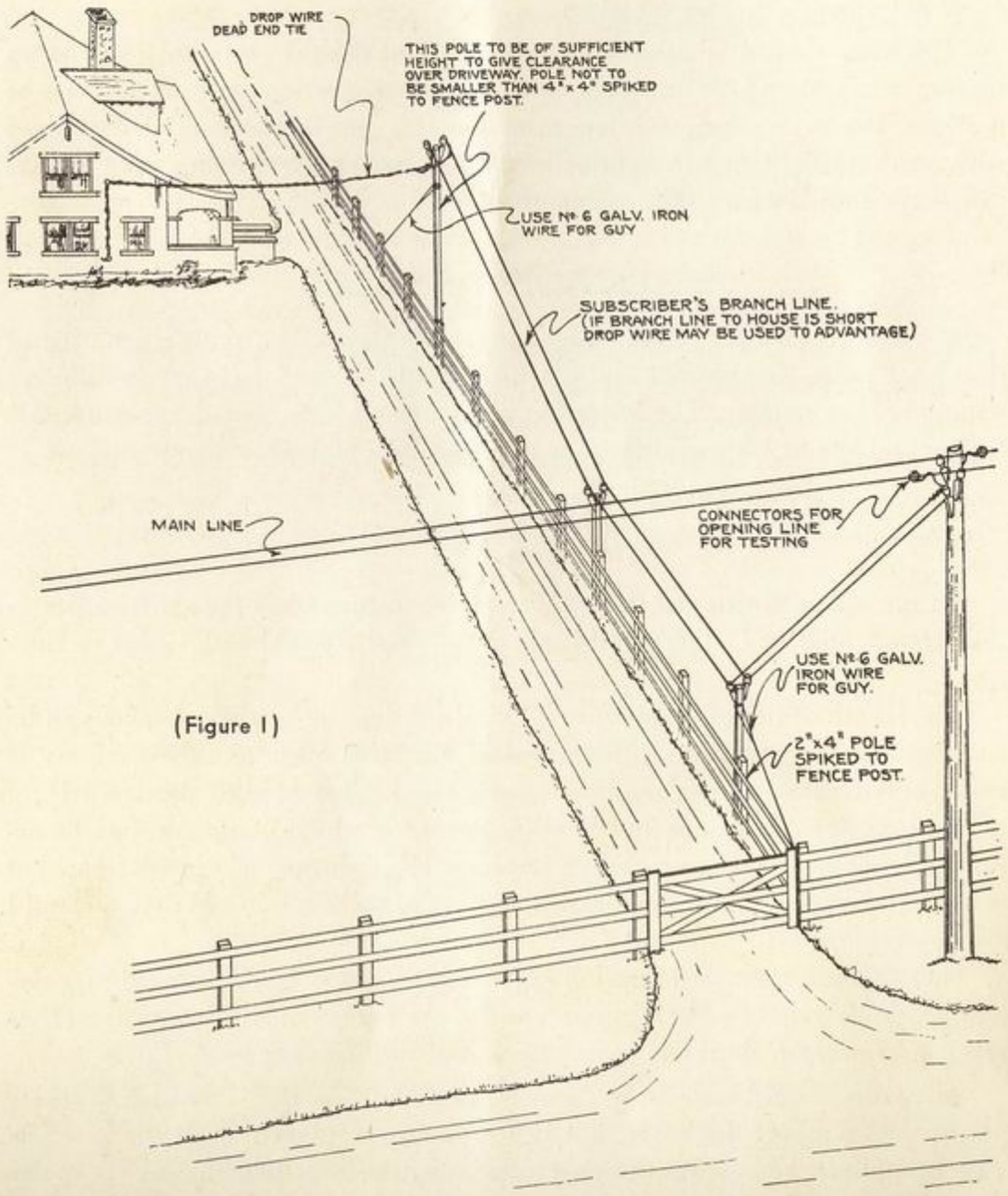
The length of life of practically all kinds of timber, *except redwood*, can be substantially increased by a proper preservatory treatment, and the economy of using butt treated timber should be considered. This applies particularly to poles along the main lines and to other poles for which treatment may be arranged for at the time of purchase. Experience has indicated that brush treatment is not satisfactory. Redwood poles, on account of their manner of decay, should not be treated.

NOTE: *Advice and information regarding selection and treatment of poles will be gladly given by the representative of the Telephone Company as well as other information relative to construction and maintenance of the line.*

The poles should have a top diameter of about 4 inches if wooden brackets are used to support the wires, but if a crossarm is placed, or if the brackets will eventually be replaced with a crossarm, the top diameter of the poles should be about 5 inches.

Branch lines to individual subscribers, where there is a suitable fence, and provided the line is entirely on the property of the subscriber, may be constructed as shown in Figure 1.

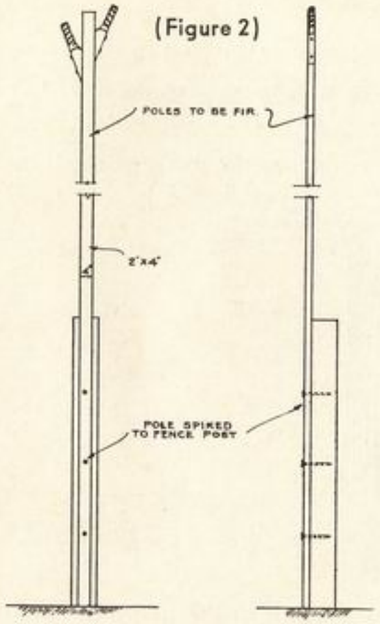
On main suburban lines located along the highways 4 in. x 6 in. x 20 ft. sawed redwood poles or sawed and split cedar poles may be used to advantage, except in the State of Oregon where only round cedar poles are allowed on State highways.



(Figure 1)

SPACING

Spacing of poles should be governed by the strength of the wire and of the poles themselves. Under ordinary weather conditions poles should be spaced from 150 to 175 feet apart. If the line will be exposed to sleet storms or high winds, heavy poles with long spacing will provide the least expensive construction while lighter poles with shorter spacings will help to reduce the wire breaks that are caused by excessive strains.



(Figure 2)

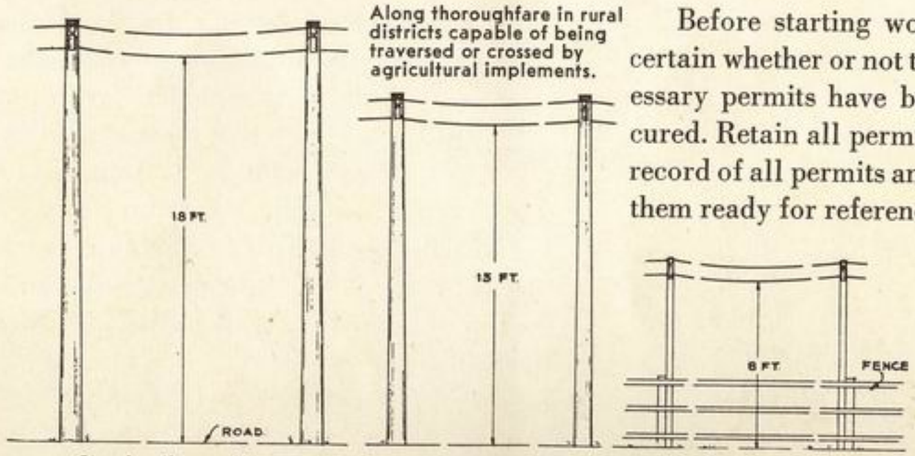
Method of construction for branches to individual subscribers, where there is a suitable fence, and provided line is entirely on the property of the subscriber.

Where 2 in. x 4 in. poles spiked to fence posts as shown in Figure 2 are used, the spacing should not exceed 100 feet. Where no road or driveway runs underneath, the poles should be long enough to provide at least 8 feet clearance above ground for the lowest point of the wires between the poles. Where the line crosses a roadway, the clearance shall not be less than 18 feet.

PERMITS

Permits or other forms of right-of-way may be required for the following:

(a) Placing, replacing, moving or removing poles, guys, stubs or pole braces on—
  (1) Private Property.
  (2) Railroad Company's right-of-way.
  (3) Public Highways.
(b) Entering upon or occupying Town, County, State or Federal Property.
(c) Pruning or removing trees.
(d) Attaching guys to trees or foreign poles or structures.



(Figure 3)

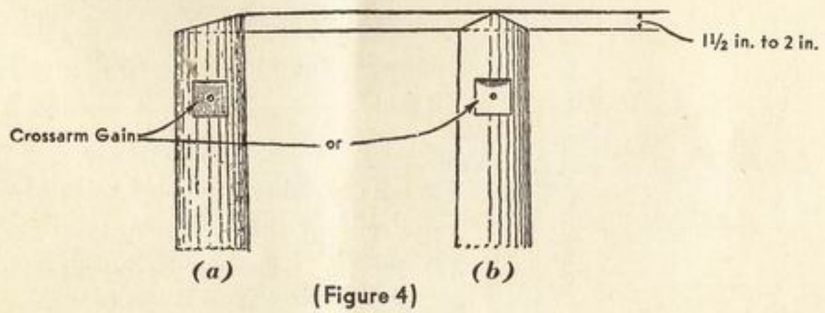
Before starting work, ascertain whether or not the necessary permits have been secured. Retain all permits or a record of all permits and have them ready for reference.

CLEARANCES

Clearances above ground, as shown in the above illustration, are recommended heights. Do not decrease proper sag (see page 15) to obtain proper clearance. Where crossing under power lines secure 4 feet clearance to power lines of less than 7500 volts, 6 feet clearance to lines over 7500 volts. The clearance above railways should be 25 feet.

PREPARING POLES

The tops of poles should be prepared with sloped roofs as indicated in the illustrations ***a*** or ***b*** in Figure 4. Cut the gain to fit the width of crossarm used. If the pole is curved, always cut the gain on the concave side; that is, the side which bows inward. Do not provide a gain if the wires are to be supported on brackets.

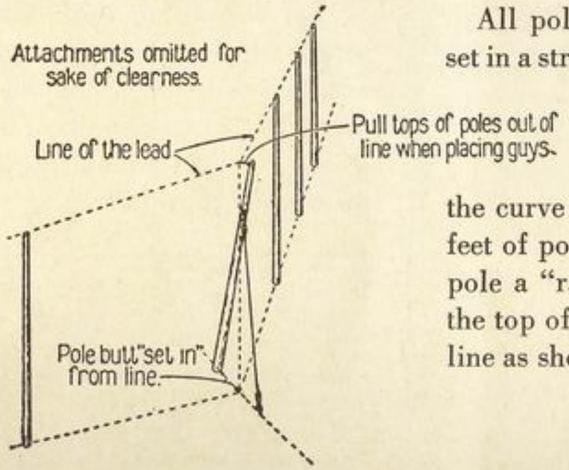


(Figure 4)

SETTING POLES

The poles should be set with about one-fifth of their length in the ground. With 16-foot and shorter poles the depth of set should not be less than 3½ feet.

At railroad crossings and other points where poles longer than 25 feet are used, they should be set at a minimum depth of 5 feet.

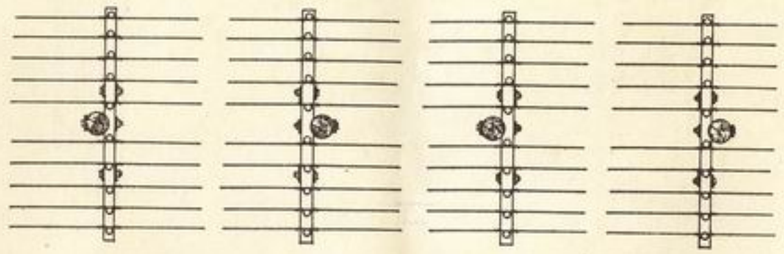


(Figure 5)

All poles except corner poles should be set in a straight line. In setting a corner pole, the butt should be slightly out of line; that is, it should be "set in" towards the inside of the curve not less than 1 foot for every 20 feet of pole length. This is done to give the pole a "rake"; that is, in placing the guy, the top of the pole is to be pulled over into line as shown.

Poles carrying crossarms in straight sections of the line should be turned so that the crossarms will alternately face one way and then the other, as shown.

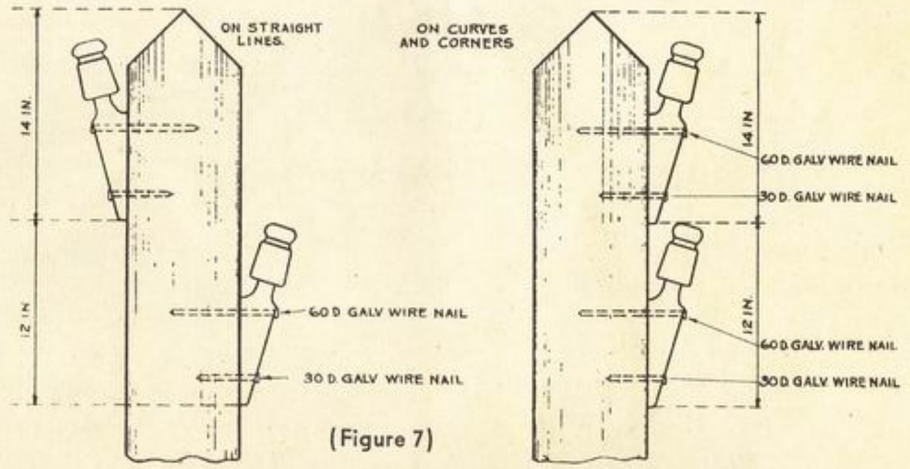
When there is any unbalanced strain backward or forward on a pole carrying a crossarm, the pole should be turned in setting so that the greater strain will tend to pull the crossarm against the pole.



(Figure 6)

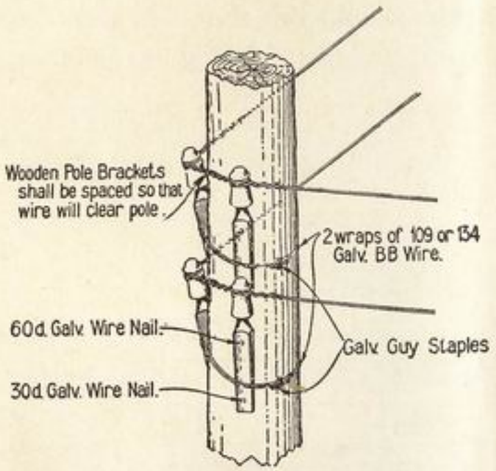
ATTACHING BRACKETS

Attach brackets as shown in Figure 7.

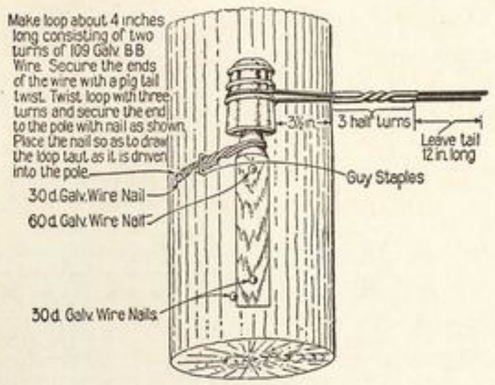


(Figure 7)

The brackets should always be placed on the outside of the curve or corner.



(Figure 8)



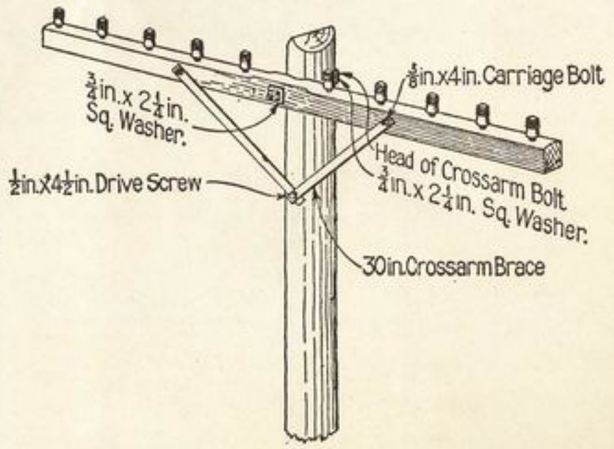
(Figure 9)

At sharp curves or right-angle corners two wooden pole brackets should be placed for each wire, so that wire will clear pole.

At terminating points the brackets should be guyed to the pole with a twisted loop of wire anchored by a nail.

ATTACHING CROSSARMS

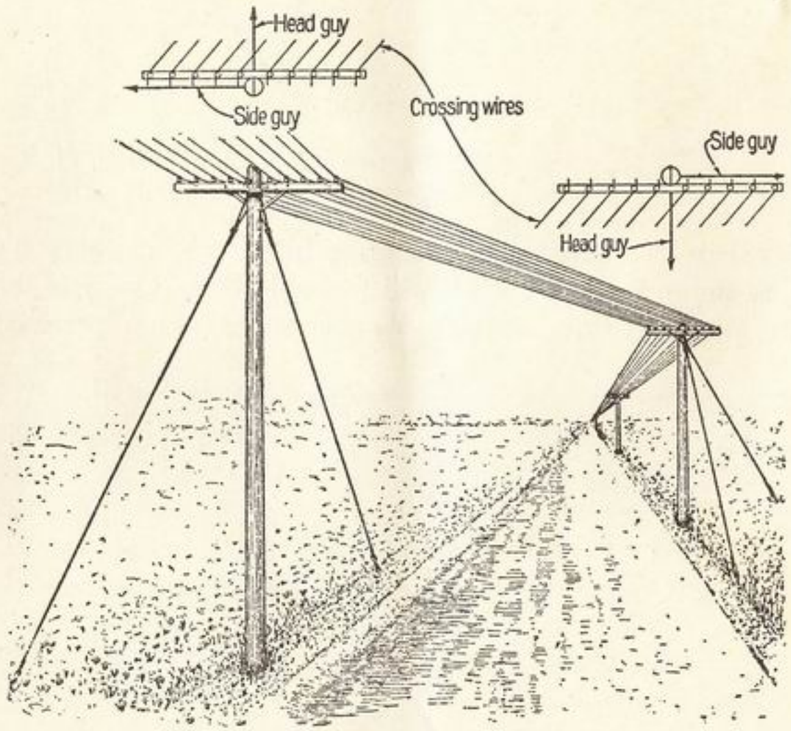
Braces and bolts will last much longer if galvanized.



(Figure 10)

GUYING

In all cases where the strain of the wires is heavy enough to pull over the top of a pole, the pole should be guyed. The usual conditions under which guys are required are shown in Figure 11.

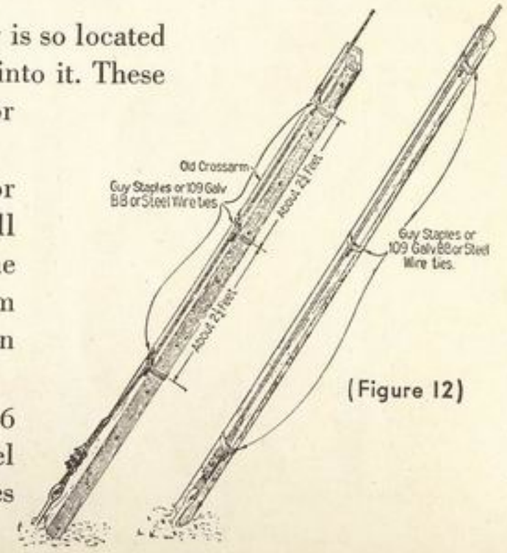


(Figure 11)

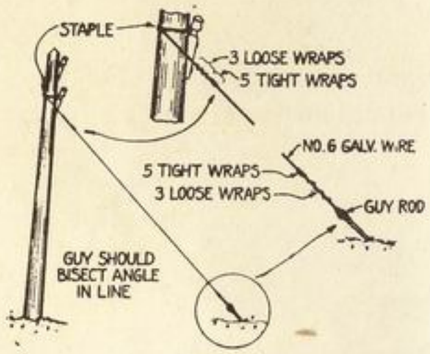
Place guy shields where an anchor guy is so located that persons or animals are liable to run into it. These may be built with suitable pipe, wood or metal moulding as shown in Figure 12.

Guys should be attached to an anchor which will not "give," as only a small amount of "give" is needed to slacken the line wires and cross them up or foul them against a wire fence or other obstruction underneath.

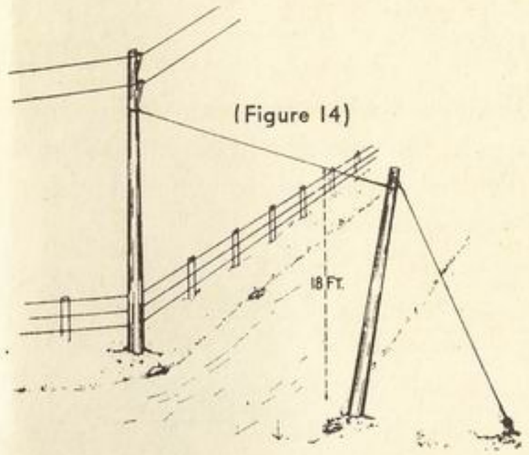
The guy can be a single piece of No. 6 galvanized iron wire, 2200 pound steel strand or two No. 12 galvanized iron wires stranded.



(Figure 12)

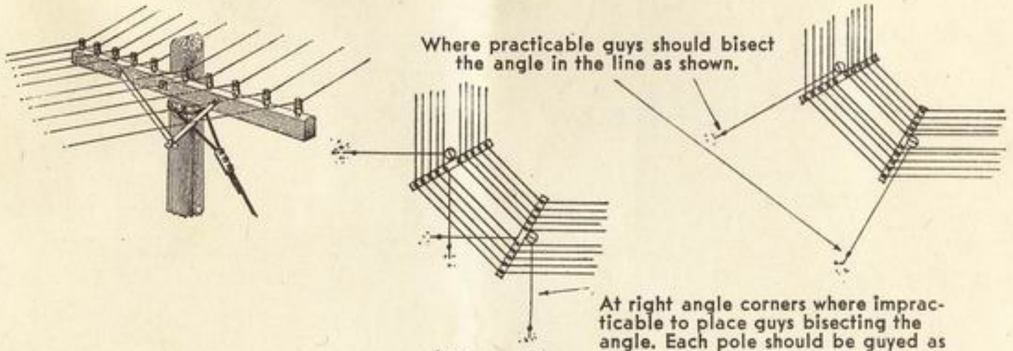


(Figure 13)

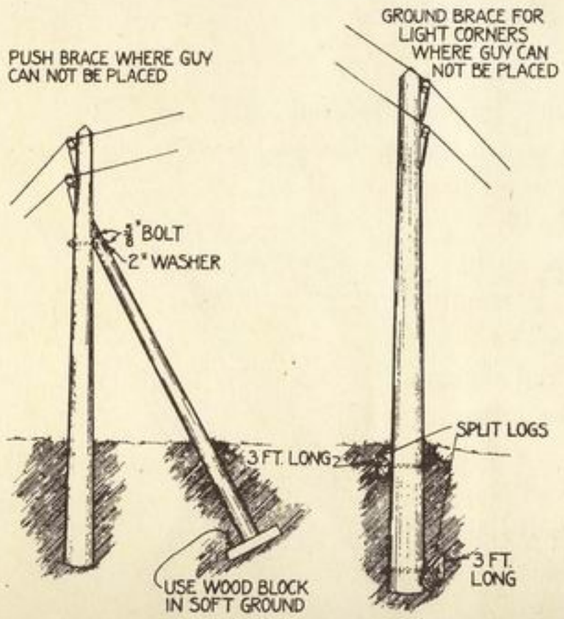


(Figure 14)

If the pole is located at a sharp corner and there are to be several wires on the pole, as shown in Figure 15, it will probably be necessary to double the No. 6 wire, especially if the anchor cannot be located far out from the pole.



(Figure 15)



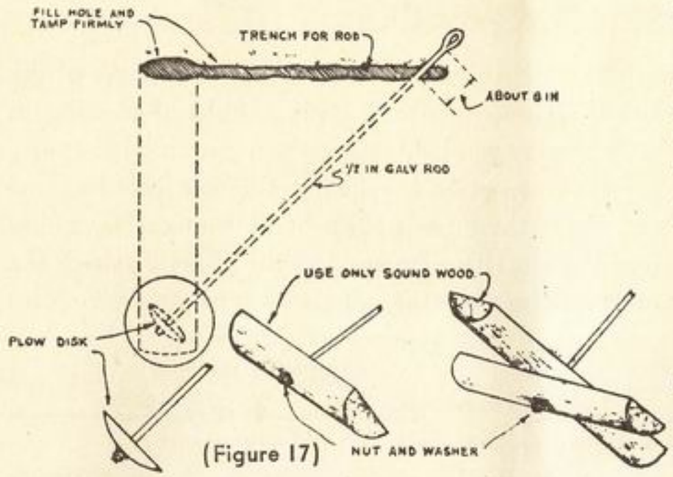
(Figure 16)

Where two brackets are required for each wire, as shown in Figure 8, such as at sharp corners or where a branch line connects to the main line, attach the guy below the lower brackets.

Where a pole cannot be guyed, it should be braced as shown in Figure 16.

TYPES OF ANCHORS AND METHOD OF SETTING

Any of the following materials will make good anchors if properly set in the ground:



(Figure 17)

Large rock which can be fastened securely.

An old plow disk

Patent guy anchor.

Two split logs set crosswise.

The trunk of a strong tree.

Piece of split wood log with the flat side up. (This log should be 8 or 9 inches across and about two feet long.)

All anchors should be set in the ground at a depth of four or five feet as shown in Figure 17.

WIRE

No. 12 BB galvanized iron or steel wire should be satisfactory for both main and branch line wires where the ultimate length of the main line will not exceed ten (10) miles and the combined length of the main line and any branch line does not exceed twelve (12) miles. Connection with outside markets, switching to other rural lines and nearby towns for social or business reasons will result in an increase in the length of line used as the length of the second line must be added to the line used by the calling party. In order to secure reasonably good telephone conversations under these conditions it may be desirable to consider something better than No. 12 iron or steel wire and in some cases copper wire may be desirable. In any case it will be advantageous to consult the manager of the exchange to which the line will connect, who will be able to arrange for competent advice regarding the best type of construction.

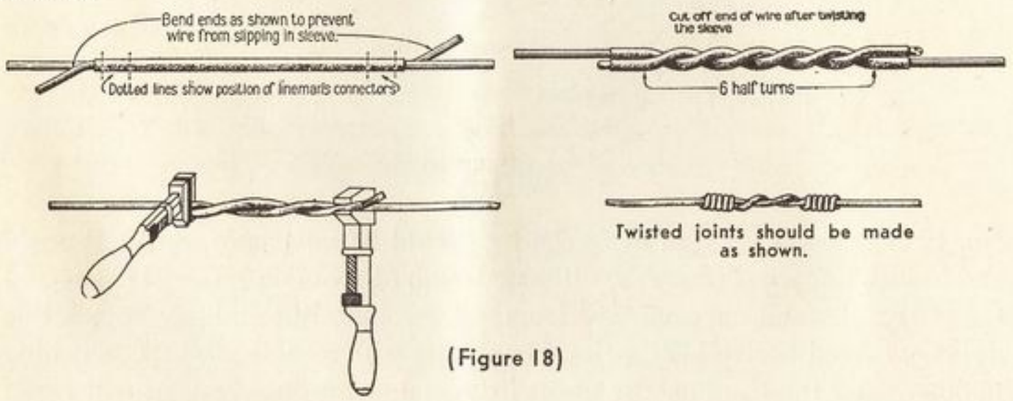
In placing the wire on the poles it should be strung so that it will sag 15 to 20 inches between the poles, to prevent breakage when it contracts in cold weather. All wires on the same poles should be strung with the same sag so that the wind will not swing them against each other.

TRANSPOSITIONS

Where two or more pairs of wires are carried on the same pole lead for a distance greater than one mile, transpositions should be introduced to reduce the interference between the two circuits. The transposing is accomplished by reversing the relative positions of the two wires. Transpositions are also often very helpful in reducing interference picked up from nearby electric power lines. The Telephone Company will be glad to furnish the information necessary for any project being considered.

SPLICING WIRES

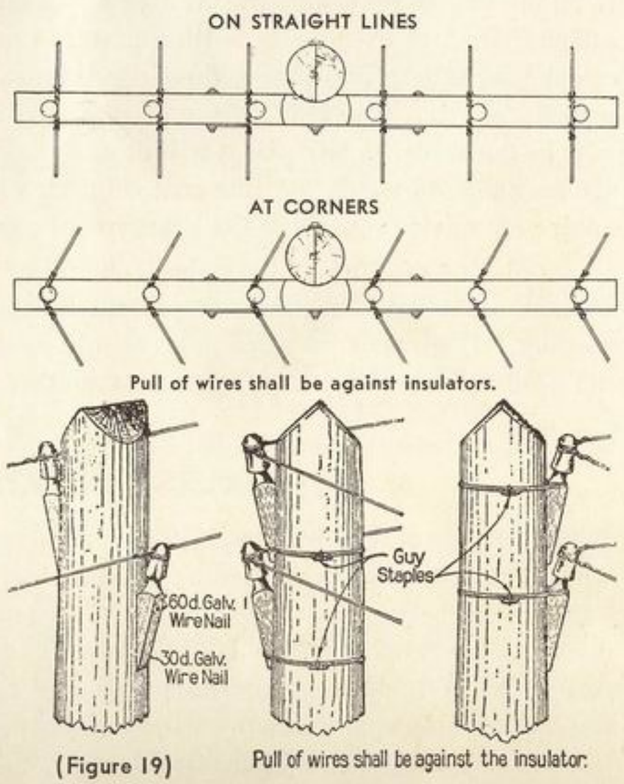
In splicing wires be sure to make good joints, as bad joints cause much of the trouble on rural telephone lines. These joints preferably should be made with tinned steel sleeves, but twisted joints are also satisfactory, provided they are well made (preferably soldered). In twisting the sleeves this can best be done with two linemen's connectors, but if these are not on hand, monkey wrenches may be used as illustrated (see Figure 18). The ends of the wires used for the splice should always be thoroughly clean whether a twisted joint or sleeve joint is used.



(Figure 18)

POSITION OF WIRES

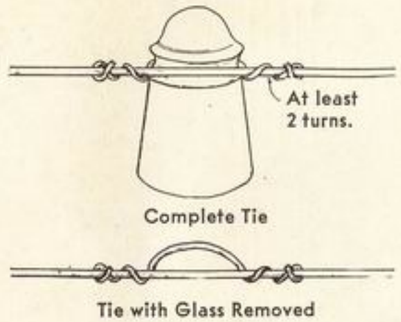
The position of the wires on brackets and crossarms should be as shown in Figure 19. At corners the wire should be placed on the side of the insulator which will bring the strain against the insulator.



(Figure 19)

ATTACHING WIRES TO INSULATORS

Glass insulators should be used on brackets and crossarms. When crossarms are used it will be necessary to provide wooden pins for mounting the insulators. Pins made of locust are best. The standard pin is 8 inches long. The pins should be anchored in the crossarm with a six-penny galvanized wire nail driven through the side of the arm, midway between the top and bottom of the arm. The tie wires should be of the same size as the line wire and may be cut from this wire. Annealed wire of the same size, however, makes a more satisfactory tie. The insulators should be carefully screwed down on the brackets or pins and the line wire tied in as shown.

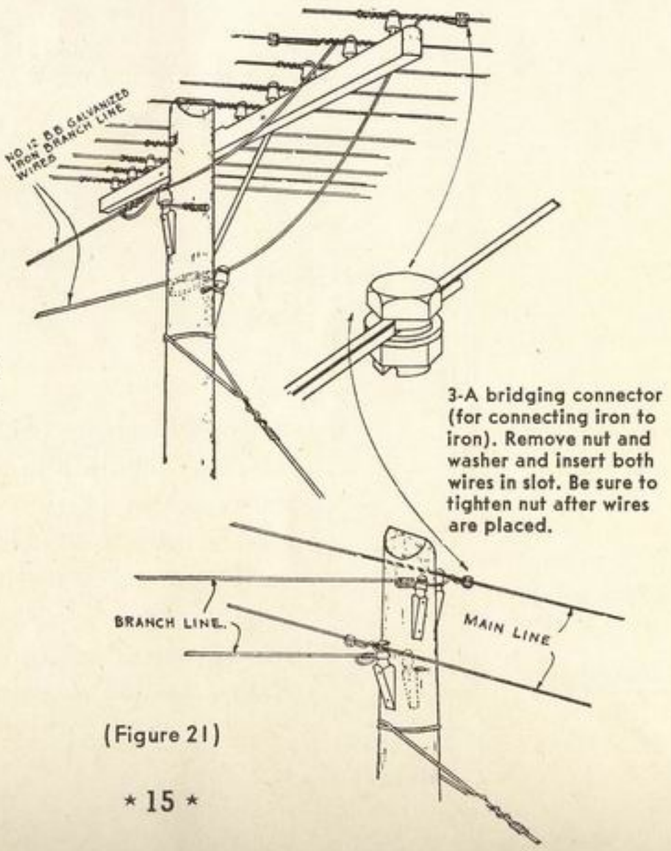


(Figure 20)

In building telephone lines, 8-inch side cutting pliers will be found the most suitable size of pliers for use in the wire work. In tying in the line wire these pliers should be used in making the turns in the tie wire and in this operation care should be taken not to nick or injure the line wire in any way. Be sure to take up all slack in the tie wire, so the back side of the line wire will be held firmly against the insulator.

BRANCH LINE CONNECTIONS

Connect branch lines to the main line as shown in Figure 21.

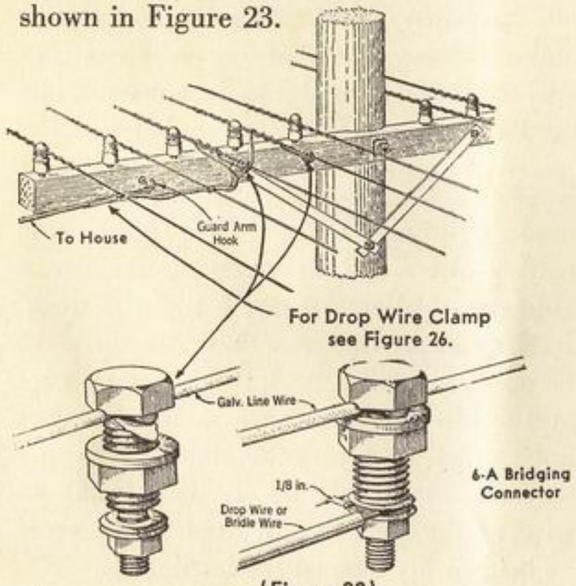


(Figure 21)

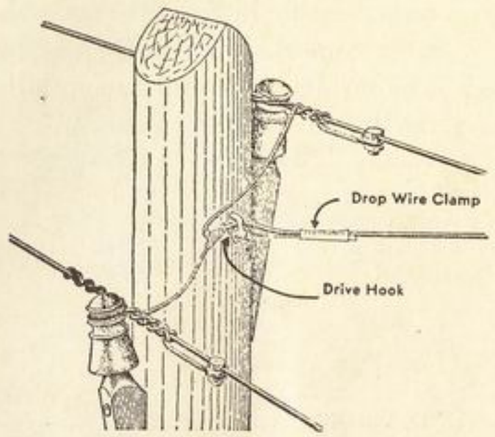
HOUSE LINE CONNECTIONS

Connect from line to house as shown in the following figures. From crossarm, connect as shown in Figure 22.

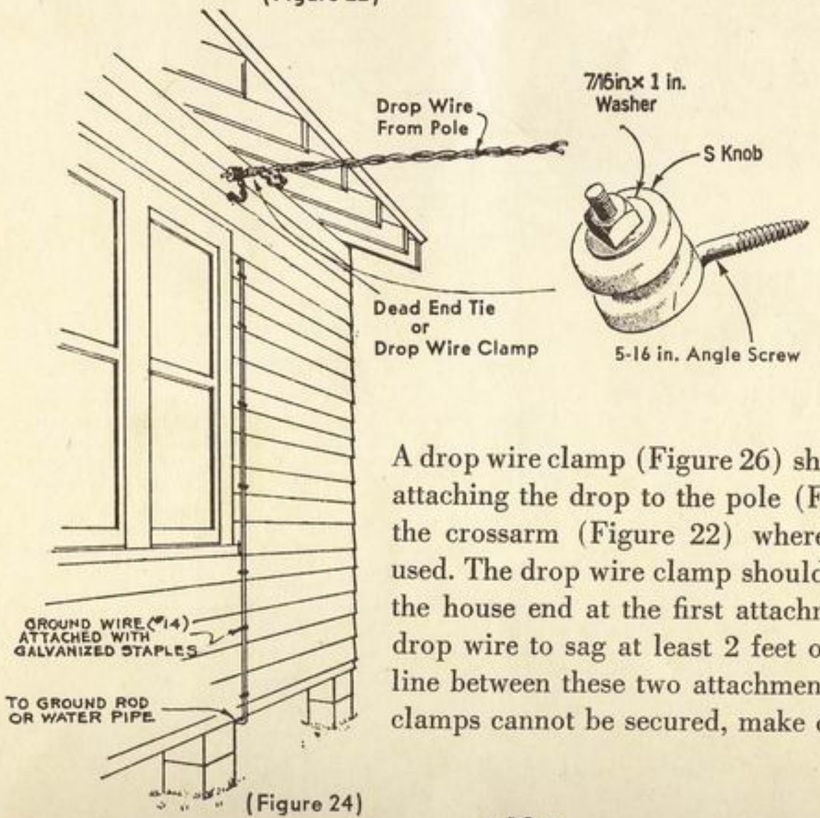
When extending covered or bare wire from the bracket line, connect as shown in Figure 23.



(Figure 22)



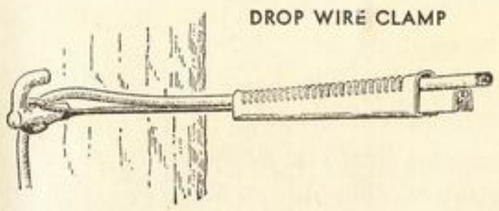
(Figure 23)



(Figure 24)

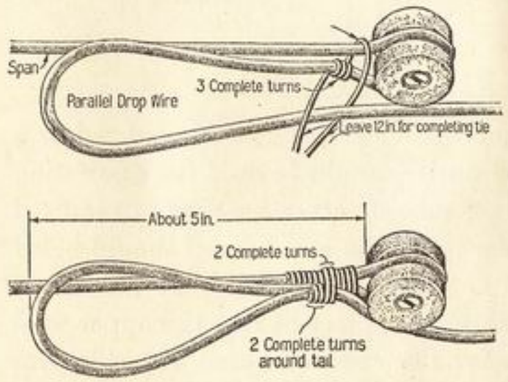
A drop wire clamp (Figure 26) should be used for attaching the drop to the pole (Figure 23) or to the crossarm (Figure 22) where crossarms are used. The drop wire clamp should also be used at the house end at the first attachment. Allow the drop wire to sag at least 2 feet out of a straight line between these two attachments. If drop wire clamps cannot be secured, make dead end ties as

shown in Figure 25, fastening the drop wire to the insulator on the end pin of a crossarmed lead, or placing another bracket and insulator on a bracket line. The house contact can be made on the knob and angle screw illustrated in Figure 24. If the wire does not reach the house at an angle, the knob may be fastened by a galvanized screw. If additional fastenings on the side of the house are required, they should be made as shown in Figure 27.



(Figure 26)

DEAD END TIE
Use a 36-inch length of TP wire, or a 45-inch length if tying BR wire.

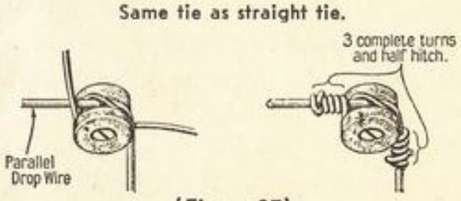


A drop wire clamp may be used in lieu of a dead end tie.

(Figure 25)

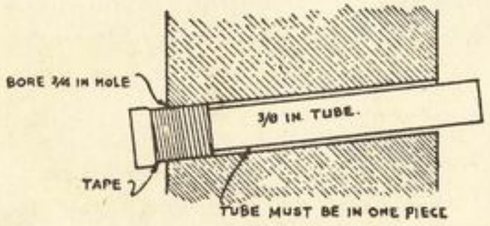
STRAIGHT TIE
Use 30-inch length of TP Drop Wire.

CORNER TIE
Same tie as straight tie.



(Figure 27)

The entrance hole should be made through the window or door casings, but if the house is of frame construction, the entrance may also be made through the plastered wall or through the baseboard if the building has a basement.



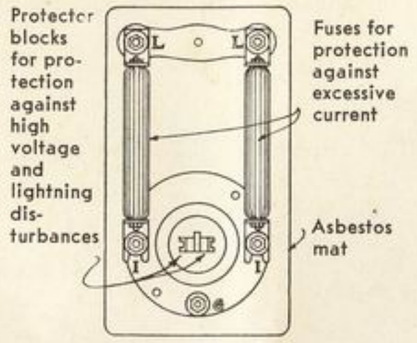
(Figure 28)

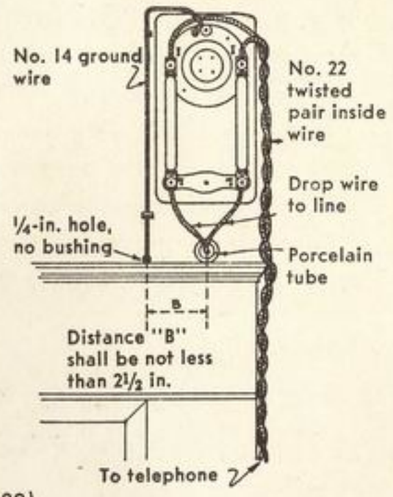
The entrance hole should always be bushed with a porcelain tube. The size of hole and method of installing the tube are shown.

The tube should be sloped upward from the outside to keep water out and the head of the tube should be outside. The tube must be securely held in place and, if necessary, should be wrapped with tape.

PROTECTORS

A protector should be installed at all rural telephones to protect against lightning or other excessive currents which might flow through the wire and damage the telephone or cause a fire. The protector should be installed where it will not be subject to moisture.





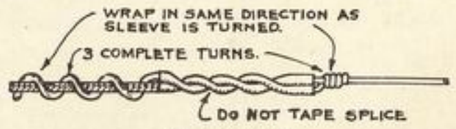
(Figure 29)

GROUND WIRE AND GROUND

Be sure the protector is connected to a good ground such as a ground rod or a water pipe. No. 14 insulated copper ground wire should be used for connecting the protector to the ground. No porcelain tube or other bushing is required where the ground wire passes through the wall. The ground rod should be of iron, half an inch in diameter and about five feet long. It should be pointed at one end for driving, and should have a three-foot piece of No. 12 copper wire soldered to the upper end. Such a ground rod can be purchased with this wire

(Figure 30)

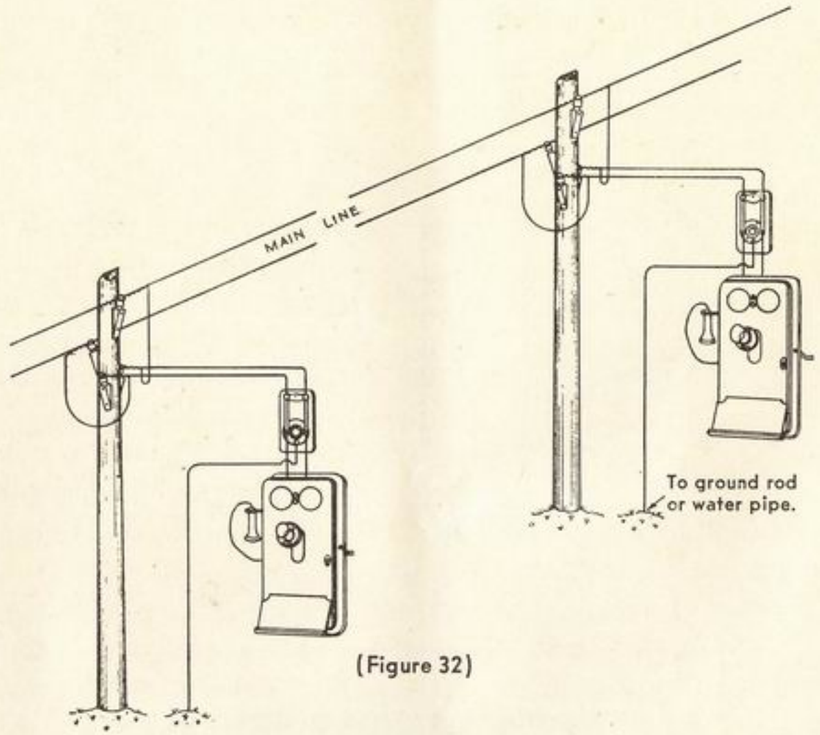
attached. To connect the No. 14 ground wire to the wire on the ground rod, a combination No. 12 x 14 copper sleeve should be used as shown in Figure 31. The rod should be driven into the earth and staples should be used to attach the ground wire to wall of building.



(Figure 31)

DIAGRAM OF LINE AND TELEPHONE CONNECTIONS

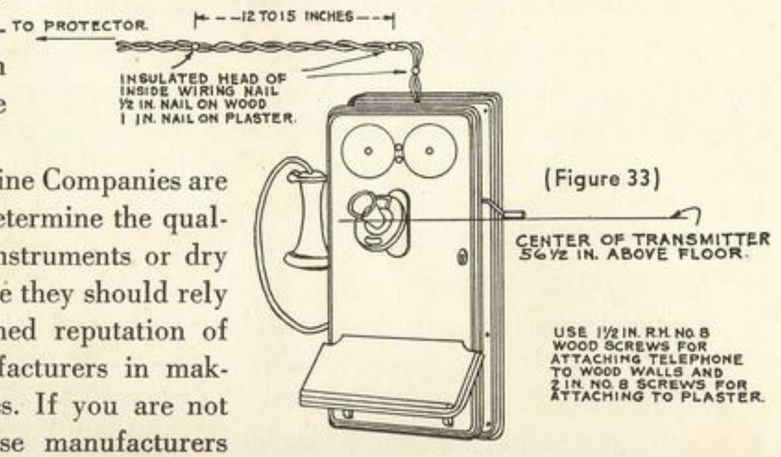
The following diagram shows the general lay-out of the wire connections from the pole line to the protector and telephone, and from the protector to the ground.



(Figure 32)

THE TELEPHONE

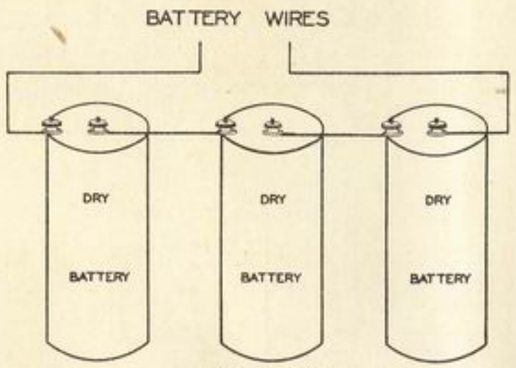
It is important that the telephones on each line be of the same type. All telephones must have the same electrical characteristics if good service is to be obtained and the standard rural telephone should have a five-bar generator and 2500 ohm ringer. In connecting telephone to the protector, paired insulated copper wires not smaller than No. 22 B & S gauge should be used. This wire should have a rubber insulation covered with cotton braid. Attach to the wall as shown.



(Figure 33)

Most Farmer Line Companies are not equipped to determine the quality of telephone instruments or dry batteries. Therefore they should rely upon the established reputation of well-known manufacturers in making such purchases. If you are not familiar with these manufacturers

consult with the local Telephone Company's manager and he will gladly advise you as to your requirements.



(Figure 34)

Proper dry batteries are very essential and many dry batteries on the market are not desirable for telephone service. Nearly all battery manufacturers make a battery especially for this demand, and such batteries are as a rule so marked. The better batteries will usually give about 9 months of service, and we suggest that you mark your batteries with the date you commence their use.

The above illustration (Figure 34) shows the proper method of connecting dry batteries.

CAUSE OF TELEPHONE TROUBLES AND HOW TO REMEDY THEM

To assist in properly maintaining the line and repairing troubles as they appear from time to time, it is suggested that an individual be appointed secretary of the line. Small semi-annual or annual dues made available to the secretary, will enable him to carry out his responsibility for the proper maintenance and repair of the line. Such an arrangement will generally result in a much better quality of telephone service.

GENERAL MAINTENANCE AND REPAIRS

In order to minimize the occurrence of troubles, it is desirable that occasional general inspections be made of the line and that conditions, which may be the cause of future troubles, be corrected. Such inspections made once or twice a year, say in the late fall and again in the spring, will help greatly to keep the line in good working order. After severe storms it is usually also desirable to look over the line and correct any bad conditions which may have developed as a result of the storm.

In these general inspection and repair trips, such conditions as leaning or broken poles, slack guys, excessive wire sags, wires pulled loose from the insulators, broken or missing insulators or pins, bad joints in the wire, etc., should be noted and corrected. The wire should be kept clear of contact with

buildings or similar objects, and where branches of trees have grown into the wires, the branches should be carefully trimmed away to insure that the wire will not contact the trees and cause leakage and other troubles on the line.

UNABLE TO RING OTHER PARTIES

This trouble is usually caused by tree branches or other similar objects touching the wire, or when one wire crosses another or by opens or gaps in the line due to broken wires or poor splices. If the hand generator turns with difficulty this indicates that either there are leaks on the line (grounds or crosses) or the blocks in the protector need cleaning. If it turns easily, the line is broken or there is a poor splice or loose connection at the telephone or along the line.

UNABLE TO HEAR

Trouble of this nature is usually found to be in the receiver circuit. The receiver cord may have become damaged or wet. The diaphragm of the receiver may be bent or rusty or the receiver cap may be loose and should be tightened. Sometimes the diaphragm is dented by tapping it with a sharp instrument through the hole in the receiver cap. A dented diaphragm will not vibrate properly and it should be replaced with a new one. The telephone instrument should be checked over every three years or whenever it is not working satisfactorily.

UNABLE TO BE HEARD

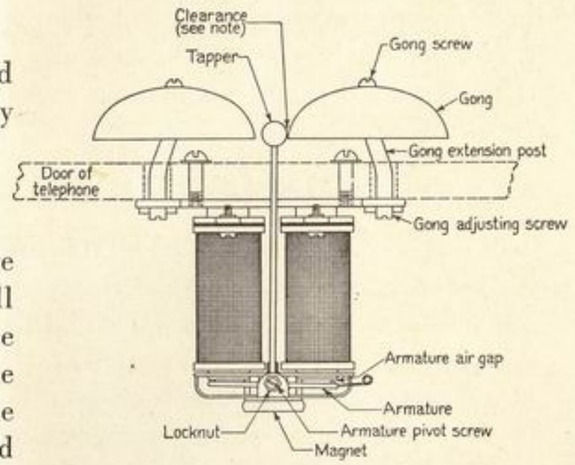
Weak dry cells are usually the cause of this trouble. If new dry cell batteries do not correct the fault, there is probably something wrong with the set. The telephone should be inspected by a telephone man from the exchange to which the line is connected about every three years. Deteriorated transmitters are frequently a cause of poor transmission and, if this or any part of the set is defective, necessary replacements or repairs should be made.

NOISE AND CUT OUTS

A noisy line may be caused by loose, rusty or poor splices in the wire. When wires swing in the wind, they may rub together at bad joints, causing interruptions in the connection. If the line is noisy immediately after a lightning storm, it may be that the protector has operated and the dust or other matter should be cleaned from between the blocks of the protector. This can best be done by removing the protector blocks and brushing their carbon surfaces with a small clean brush.

BELL ADJUSTMENT

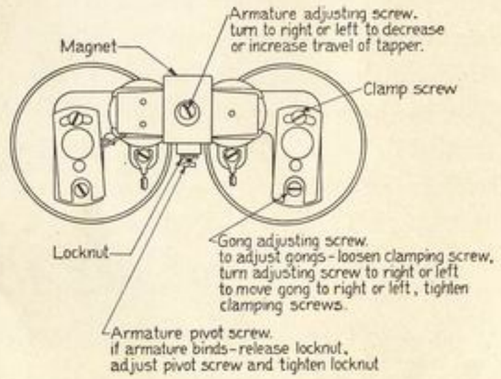
The figures opposite show the method of adjusting the type of bell usually used in rural line telephones. These bells are adjusted at the factory and should give satisfactory service over a long period of time without change in the adjustment. Failure of the bell to operate properly is often due to line trouble or to receivers left off the switchhook by other parties on the line. Adjustment of the bell should not be made until it is first determined that other troubles do not exist.



Note—With armature fully operated (to right or left) clearance between tapper and gong should be equal to the thickness of an ordinary sheet of writing paper.

GENERAL

If further information is needed to clear trouble on a line, or if advice or help is desired towards improving the service, the local Manager of the exchange to which the line connects will be glad to furnish it.



(Figure 35)

SERVICE REMINDERS FOR USERS OF RURAL TELEPHONES

The service you get depends a great deal upon yourself. Courtesy counts.

Always listen to ascertain if the line is in use before ringing or dialing.

To call a subscriber on your line, be sure you have the right signal and make your rings clear and distinct, or if using a dial-operated telephone be careful to dial the number correctly.

Answer the telephone by giving the name of your station, and not by saying "Hello."

When through with your conversation, hang the receiver on the hook and ring off by giving one sharp ring whenever using the magneto type of telephone.

Conversation should be brief. Remember that when you are using the line other subscribers may be waiting.

Reference should be made to the preliminary pages of telephone directories for suggestions which will be helpful in furnishing service.

MATERIALS

The following list of materials is recommended for use in connection with rural line construction. They have been selected with a view of providing economical construction with satisfactory service.

Anchors: Discarded Plow Disk
Logs (bark removed)
Logs, Split
Patent, 6-inch

Bolts: ⅜"x4" Galv. Carriage
(Length) ⅝" Galv. Crossarm

Braces: 30" Crossarm

Brackets: 10" Wooden Pole
12" Wooden Pole

Clamps: A-1-S Blackburn Ground
Drop Wire (TP or TR)

Connectors: 3-A Bridging
6-A Bridging

Crossarms: 10-pin

Hook: 1½"x4½" Galv. Drive
Guard Arm

Insulators: Exchange

Knobs: Single Groove Porcelain "S"

Nails: 30D Galv. Wire
60D Galv. Wire
½" Inside Wiring
⅞" Inside Wiring

Pins: 1¼"x8" Locust

Poles: (Length) Ft. Round Cedar
(Length) Ft. Sawed Poles
(2"x4")
(4"x4")
(4"x6")

Protectors: Lightning and Strong Current

Rods: Anchor ½"x7'
Ground ½"x5' Galv. with No. 12 Copper Wire Attached

Screws: Angle ⅜"
1½" R.H. No. 8 Wood
2" R.H. No. 8 Wood

Sleeves: Copper Double Tube, Size —
Tinned Steel Double Tube

Staples: ½" Galv. Wire
1½" Galv. Wire

Telephone: *Wall* or *desk* type magneto subscribers' set equipped with 5-bar generator, 2500 ohm ringer, transmitter, receiver and receiver cord. Instruments using three dry cell batteries should be used. (Consult Telephone Representative for information as to dial or common battery type telephones, hand sets and proper type of transmitter, receiver and induction coil.)

Tubes: ⅜"x(Length) Porcelain

Washers: ¾"x2½"x3/16" Galv. Square
¾"x3"x¼" Galv. Square

Wire: No. 22 Paired Inside
No. 14 Ground
No. 6 Galv. Iron
No. 12 Galv. Iron or Steel BWG Gauge
TP Parallel Drop
TR Parallel Drop
No. 14 Bare Copper NBS Gauge
No. 12 Bare Copper NBS Gauge

*See discussion on "Wire," Page 14.

REMEMBER—

Our interests and the interests of our subscribers are entirely mutual and consistently good telephone service requires close co-operation in providing and in the daily use of such service.

Advice and information will be gladly given by the representative of the telephone company on any matter relative to building and maintaining rural telephone lines.

This booklet is a part of our co-operation to this end.

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THE PACIFIC TELEPHONE & TELEGRAPH CO.
BELL SYSTEM
AMERICAN TELEPHONE & TELEGRAPH CO.