BELL SYSTEM PRACTICES
Outside Plant Construction and Maintenance

SECTION G34.101.2
Issue 1, January, 1957
AT&TCo Standard

B RURAL WIRE
PLACING

Contents **Page**

1. GENERAL

1.01 This section replaces Section G31.112.1, Issue 2 and describes methods of placing B Rural Wire. Because this section has been rewritten, the arrows indicating changes have been omitted. The changes, however, include the use of the Wirevise for pole attachment, a method of bonding the support wire to a cable or multigrounded neutral, and additional precautions on joint use construction. Other information concerning the placing of this wire may be found in other sections of the practices as follows:

(a) Protection and Grounding—G38 Series

(b) Guying—G23 Series

Note: the 109E support wire of B Rural Wire which is bonded to a grounded cable or to a multigrounded neutral within 1/4 mile from a guy location, is considered an effective ground for guys. Guys electrically connected to the support wire or attached to a pole carrying a support wire shall be grounded or insulated in accordance with the practices "Grounding or Insulating Exposed Guys," considering B Rural Wire as open wire.

1.02 When determining ground clearances as well as clearance and separations from other plant for B Rural Wire, use those specified for aerial cable.

1.03 The 109E steel support wire may be cut with the wire cutter which has been provided for cutting 109E steel line wire, or with 9-inch side cutting pliers. It is rather difficult to cut with 8-inch pliers.

2. DESCRIPTION

2.01 B Rural Wire consists of six twisted pairs of 19-gauge annealed copper conductors which are stranded around a 109E steel wire. The steel wire which serves as a support wire is insulated with polyethylene. Each conductor is insulated with polyethylene covered by a polyvinyl-chloride jacket. The polyvinyl-chloride jacket is color coded for pair identifications.

3. PRECAUTIONS

3.01 The safety precautions contained in the sections, "Safeguards to be Taken Before Climbing Poles, Precautions —General and Precautions—Aerial Work" shall be observed.

3.02 Do not ride or place a ladder against B Rural Wire.

3.03 The following precautions shall be observed when placing B Rural Wire on joint use poles, at power line crossings, and in nonjoint use situations involving electric induction from power lines:

(a) **Joint Use Construction:** Prior to placing the initial section of wire, when placing from a moving reel or prior to sagging when placing from a stationary reel, connect all conductors and the support wire to an effective ground such as a grounded metallic cable sheath, a multigrounded neutral or a metallic public water system. Additional sections of wire shall be grounded either as indicated for the initial section or by bonding the conductors and support wires of both sections. Adequate precautions shall be taken such as covered in the practice, "Wire Stringing Precautions—Jointly Used Lines" to prevent the wire from contacting power conductors. Rubber gloves shall be worn during stringing and sagging operations and during the operation of grounding the conductors when the wire has been placed from a stationary reel.

(b) **Power Crossings:** Temporary ties or supports as covered in the practice, "Wire Stringing Precautions—Electric Light or Power Crossings," shall be used to prevent contact with the electric conductors in the crossing span. Rubber gloves shall be worn during stringing and sagging operations.

(c) **Electric Induction from Power Lines:** In joint use construction or in nonjoint use construction, where electric induction is sufficient to require drainage, the precautions contained in Paragraph 3.03(a) will also serve to reduce the effect of electrical induction. In nonjoint use construction, where grounds as specified in Paragraph 3.03(a) are not available, connection of the conductors and support wire to ground such as anchor rods, down guys or ground rods should be made.

3.04 The polyvinyl-chloride jacket provides a tough abrasion resistant covering which will protect the polyethylene insulation against damage during usual placing operations. However, prolonged exposure of the conductors to abrasive action such as caused by whipping branches, brush, or rubbing against trees, guy wires, clamps, etc, may damage the insulation. At such locations the conductor insulation may be protected by placing a B Cable Guard or B Wire Guard around the group of conductors. In general, the B Cable Guard should be used at supporting attachments and dead ends. The B Wire Guard should be used where several feet of the wire must be protected, such as through trees where adequate trimming can not be obtained.

3.05 Vehicular traffic should not be allowed to pass over the wire during placing operations. The wires should be suspended temporarily above roads, driveways, etc, or adequately protected by planks or other means to prevent damage to the conductor insulation.

3.06 B Rural Wire should be placed with minimum sags only when necessary to provide clearance. The use of recommended or increased sags will reduce the wire tension and facilitate the placing operations.

3.07 The polyethylene jacket should be removed from the 109E steel support wire when using the wire grip or dead ending, to prevent possible slippage of the support wire when tension is applied.

3.08 At locations where the polyethylene jacket on the support wire is damaged or has been removed, the insulation should be restored by applying two half-lapped layers of 3/4-inch DR tape followed by two half-lapped layers of 3/4-inch friction tape or one half-lapped layer of D Vinyl Tape. Start the tapes at the center of the damaged insulation, except the D Vinyl Tape, and extend them approximately 1/4-inch onto the good insulation at both ends. It will not be necessary to apply the tape at dead ends, splices, clamp attachments, etc, where the conductors are enclosed in a B Cable

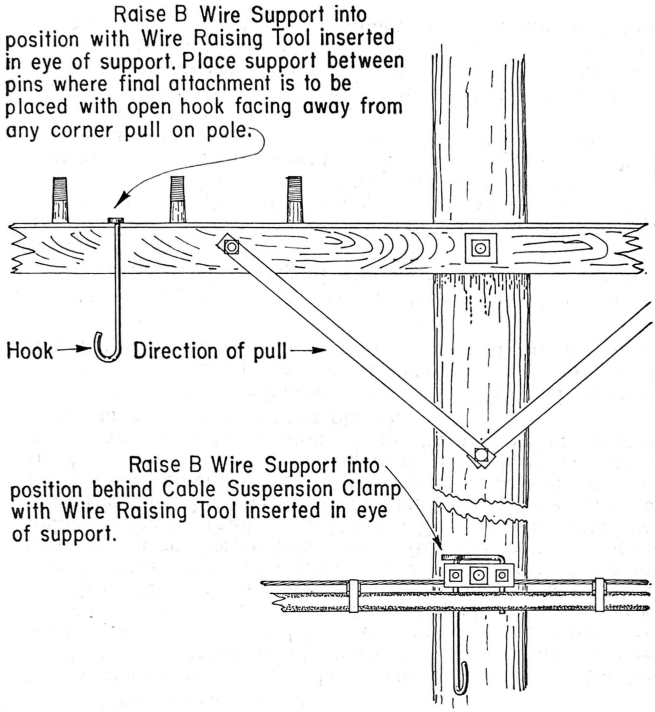
Guard and are not in contact with the bare support wire or clamp.

4. PLACING

4.01 When practicable B Rural Wire should be placed along the lead from a moving reel.

4.02 Where obstructions prevent the use of a moving reel, the wire may be pulled in along the lead from a stationary reel. At such locations, it may be possible to eliminate a splice and to reduce the length of wire pulled in by locating the reel between the obstructed and unobstructed sections of the lead. The wire should first be pulled in along the obstructed section of the lead. The wire may then be placed along the unobstructed section of the lead from a moving reel. When pulling wire over the ground care should be taken to prevent damage of the conductor insulation by sharp rocks, scrap metal, barbed wire, etc.

4.03 B or C Wire Brackets or B Wire Supports may be used to support the wire temporarily during placing and sagging operations. The wire should be placed in the support or bracket at each pole as it is payed out along the lead. When B Wire Supports are used they should be placed on the crossarm or behind the cable suspension clamp as illustrated.



4.04 Where there are no pole attachments from which the B Wire Supports can be suspended, they may be lashed directly to the poles at sufficient height above the ground to permit final sagging of the wire. After the wire has been sagged as described in Part 5, the pole attachments may be placed at the required height and wire raised into place and secured.

4.05 At highway crossings, driveways, etc, where a workman on the pole can pull the wire up by hand sufficiently for clearance, a D Drop Wire Clamp may be used to snub the wire temporarily.

5. SAGGING WIRE

5.01 Sag tables for B Rural Wire are contained in Section G34.101.4.

5.02 During final sagging operations where **recommended** sags are used, wire should not be tensioned around corners exceeding 5 feet or pulled over wire supports or wire brackets where there is a downward change in grade exceeding 10 per cent. If **minimum** sags are used, the wire should not be tensioned around corners exceeding 2 feet or over wire supports or wire brackets where there is a change in grade exceeding 5 per cent. Where such conditions exist, it will be necessary to sag the wire by sections. Each section should consist of those spans between corner poles or an end pole and a corner pole. Starting at one end of the lead, each section should be sagged progressively to the other end.

5.03 If sagging the wire as described in Paragraph 4.05 will provide adequate clearance for all conditions, this method may be used to sag the entire lead. Further details of this method are described below:

(a) A workman on the pole should pull up the wire by hand until sufficient clearance has been obtained. The wire should not be pulled by a workman on the ground as the conductor insulation may be damaged when the wire is pulled across the supporting attachment or the tension may be great enough to cause the D Drop Wire Clamp to damage the conductor insulation. After the wire has been pulled to the required sag, a D Drop Wire Clamp should be placed around the wire as far out from the pole as can be reached conveniently. A hand line should be passed through the tail of the clamp and fastened to the pole or crossarm at the approximate location where the supporting attachment for the wire has been placed.

(b) Separate the conductors from the 109E steel support wire and fasten the support wire in the supporting attachment. Place a B Cable Guard around the group of conductors.

5.04 Three-inch double sheave rope blocks or a chain hoist may be used to sag B Rural Wire as given in the following method:

(a) Secure the rope blocks or chain hoist to the pole or crossarm at the approximate location where the wire is to be attached. If existing attachments on the pole or crossarm are not adequate to support the unbalanced load caused by the sagging operations, a temporary arm guy or head guy should be placed.

(b) The workman on the pole should pull the wire up by hand as far as possible and snub with a D Drop Wire Clamp. Remove polyethylene jacket from 109E steel support wire and place wire grip. Complete the sagging operation

with the rope blocks or chain hoist. Replace insulation on support wire as indicated in Paragraph 3.08.

(c) Separate the conductors from the support wire and fasten the support wire in the supporting attachment. Place a B Cable Guard around the conductors.

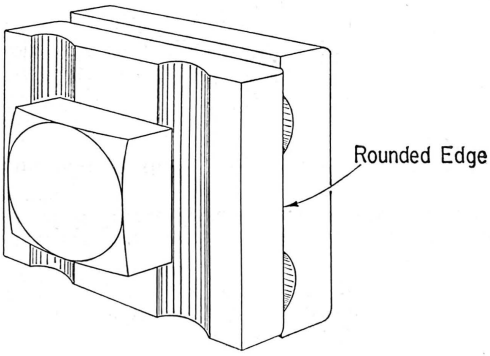
(d) Leave the rope blocks or chain hoist and temporary guy in place until the wire sagging operations have been completed beyond that point.

(e) After the wire has been sagged in any one section, group of sections or along the entire lead and dead-ended, permanent attachments should be made as described in Part 6.

6. ATTACHING 109E STEEL SUPPORT WIRE AT POLES AND CROSSARMS

6.01 The 109E steel support wire may be dead-ended by the wrap method, on a thimble eye nut, or on a B dead-end bracket.

6.02 The Wirevise, the offset dead-end sleeve, or the one-bolt clamp may be used for dead ending the 109E steel support wire. When the one-bolt clamp is used, it should be assembled as shown to provide a secure clamping arrangement. The polyethylene insulation should be removed from the support wire so that the clamp is placed on the bare steel wire to prevent any possible slippage of the wire through the clamp.



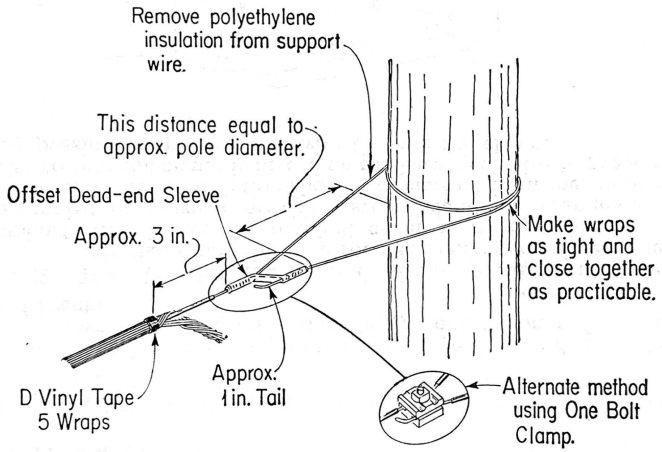
One half of the clamp should be reversed and clamp reassembled so that grooves on each half are at right angle to each other.

6.03 A one-inch tail should be left beyond the edge of the offset dead-end sleeve or the one-bolt clamp and bent toward the main wire as shown in the illustrations.

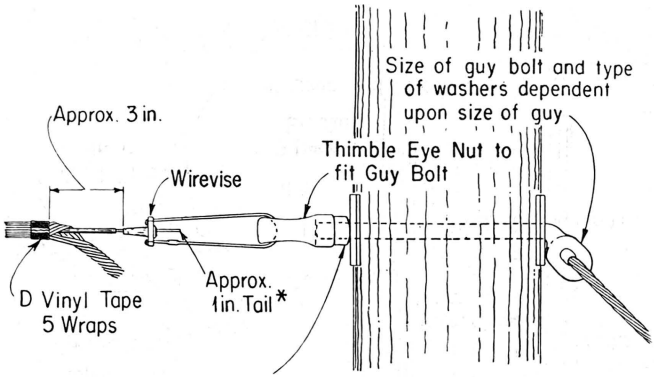
6.04 The offset dead-end sleeve or the 109E S Steel Sleeve should be applied with the 51 JE Nicopress Tool as covered in the section of practices relating to pressed sleeve joints in open wire (G31 Division).

6.05 The 109E steel support wire may be joined when splicing two lengths of B Rural Wire by use of the Wirelink or 109E S Steel Sleeve.

6.06 The wrap method, as illustrated, should in general, be used on nonjoint poles.

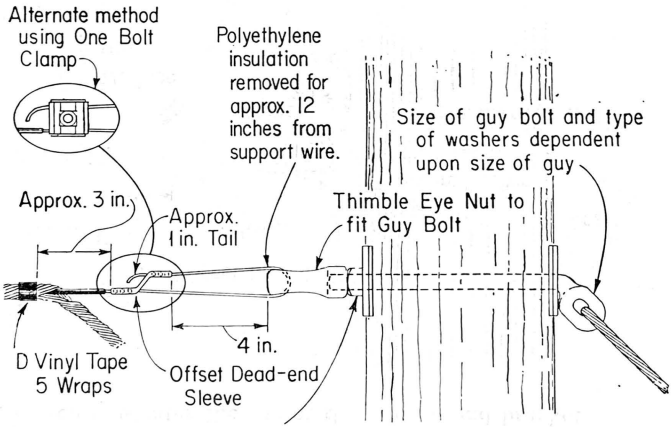


6.07 The thimble eye method of dead ending the 109E steel support wire should be used when a new or existing guy bolt is suitably located. The following illustrations show the thimble eye method of dead ending.



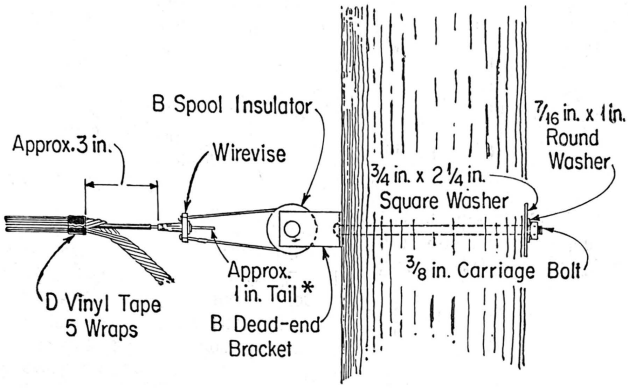
Square nut under eye nut may be omitted when length of bolt thread extending beyond pole is short enough to permit turning eye nut down to curved washer without interfering with placing of 109E Steel Support Wire.

* If support wire is to be bonded leave approx. 6 in. tail.

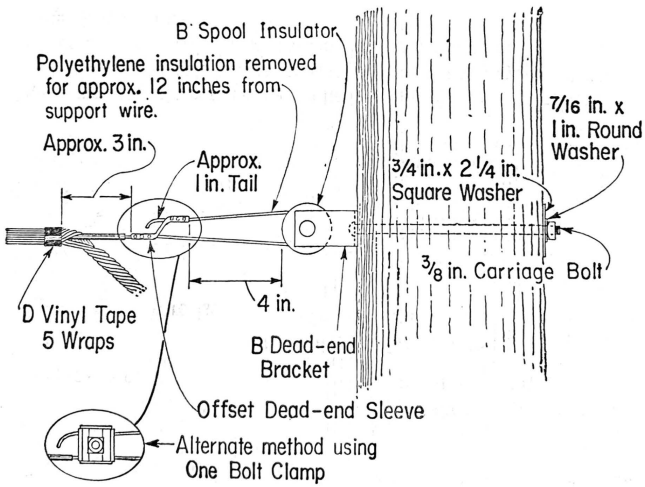


Square nut under eye nut may be omitted when length of bolt thread extending beyond pole is short enough to permit turning eye nut down to curved washer without interfering with placing of 109E Steel Support Wire.

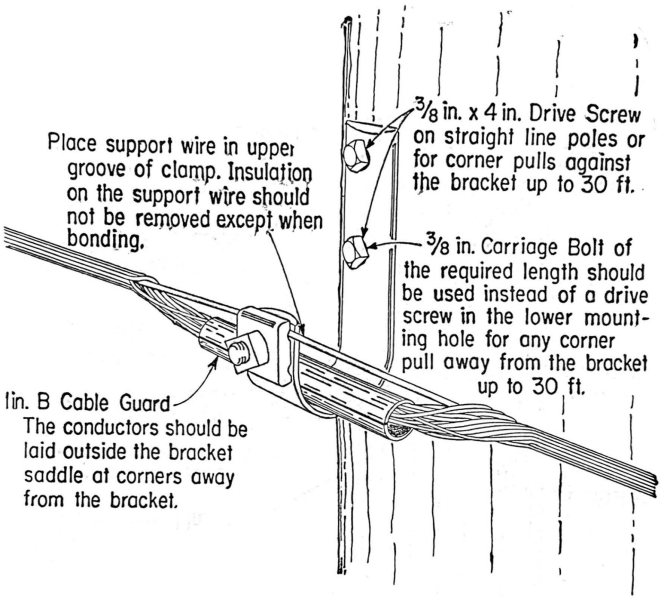
6.08 The B dead-end bracket should be used to dead-end the 109E steel support wire at any location where the wrap method or thimble eye method is not suitable. The following sketch illustrates the use of the B dead-end bracket.



* If support wire is to be bonded leave approx. 6 in. tail.

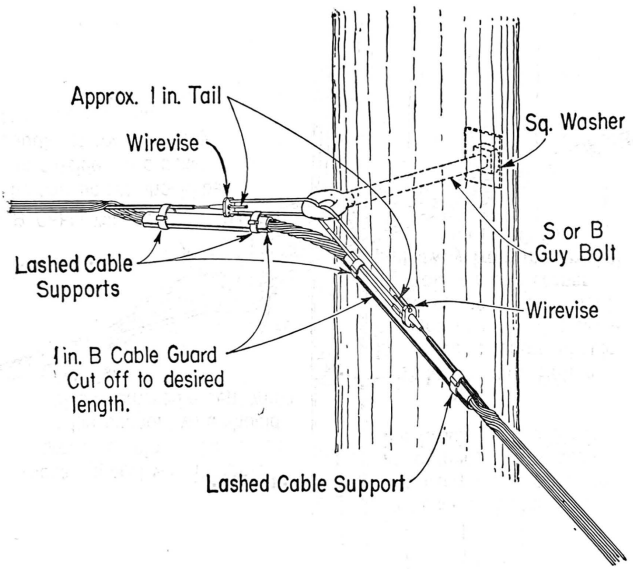


6.09 The B Wire Bracket should be used as a pole attachment to support B Rural Wire on straight sections of the line and at corner poles having 30-foot pull or less. The bracket should be attached to the pole as shown in the following sketch.

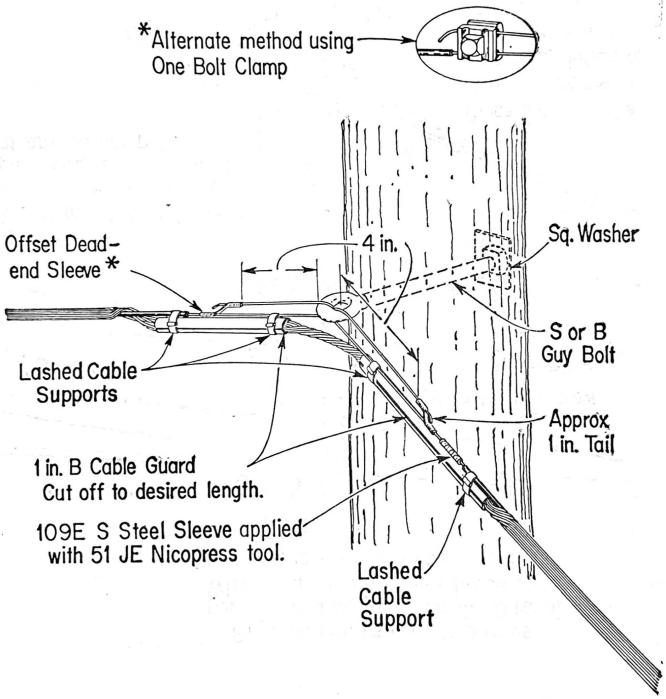


6.10 At corner poles with pull exceeding 30 feet, the 109E steel support wire should be dead-ended on a guy bolt. Two methods of making this type of attachments are described below:

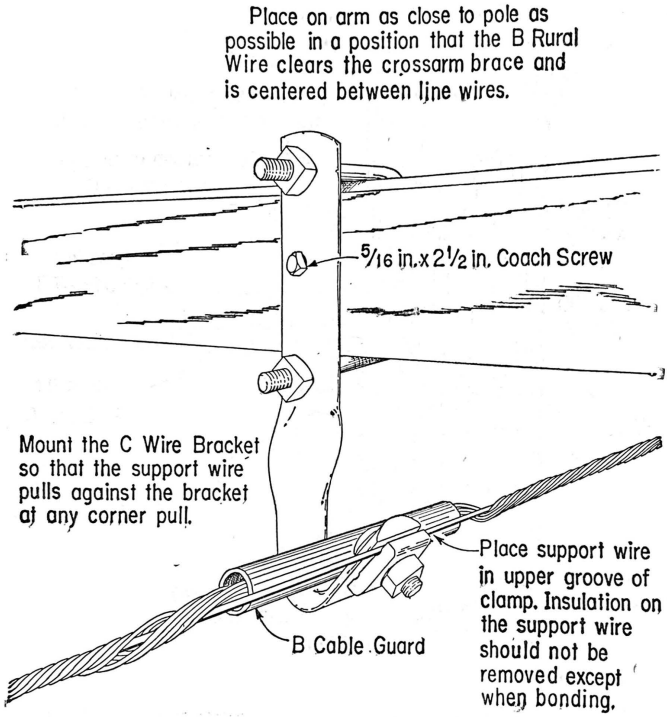
(a) In this method the wire is pulled up to the desired sag from one direction and the steel support wire cut at a location which will allow it to be dead-ended in a Wirevise as shown below. When the dead end in this direction is complete, a length of steel support wire is cut out which will allow it to be dead-ended in a Wirevise from the other direction so as to form the conductors around the corner as shown.



(b) In the sketch below, the wire in the span to the left is pulled up to the desired sag and the steel support wire is cut about 7 inches beyond the eye of the guy bolt and dead-ended as shown. A piece of 109E wire about 18 inches long is joined by means of a 109E S Steel Sleeve applied with a 51 JE Nicopress Tool, to the steel support wire in the span to the right. This 109E wire is then dead-ended in the eye of the guy bolt in a location such that the slack in the conductors is taken up sufficiently to permit the conductors to lie along the support wire as shown.

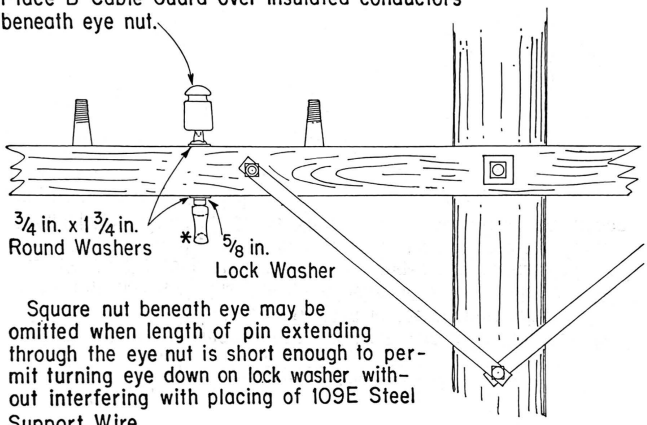


6.11 The C Wire Bracket may be used as a crossarm attachment to support the B Rural Wire along straight sections of the line and at corner poles having 30-foot pull or less. Attach the bracket as shown in the following sketch.



6.12 A steel insulator pin and thimble eye nut should be used as a crossarm attachment for B Rural Wire at corner poles with a pull exceeding 30 feet. The attachment should be made as shown in the following sketch.

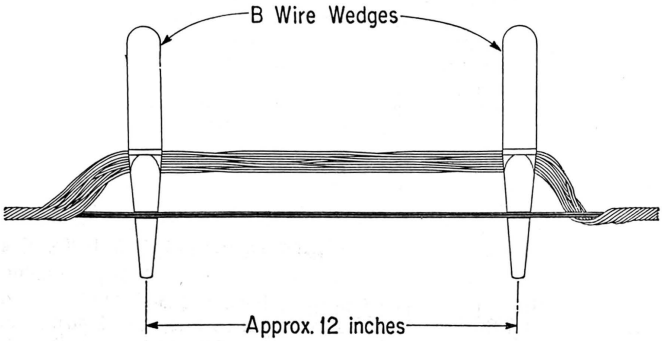
If crossarm is equipped with wood pins, replace a wood pin with B Wood Bushing and a B or CS Steel Insulator Pin. Place Thimble Eye Nut on pin and dead-end the 109E Steel Support Wire as shown in Par. 6.07. Place B Cable Guard over insulated conductors beneath eye nut.



Square nut beneath eye may be omitted when length of pin extending through the eye nut is short enough to permit turning eye down on lock washer without interfering with placing of 109E Steel Support Wire.

* B Rural Wire omitted for clarity.

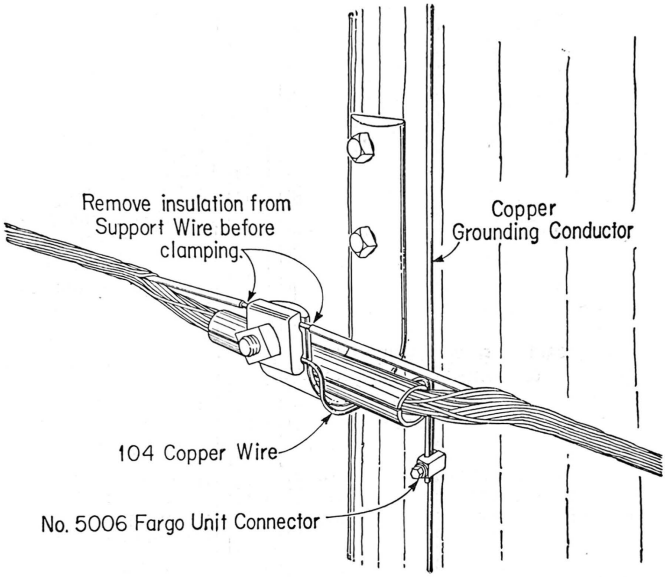
6.13 B Wire Wedges shall be used to separate the conductors from the support wire preparatory to attaching the support wire to the bracket. Wedges should be inserted in the following manner.

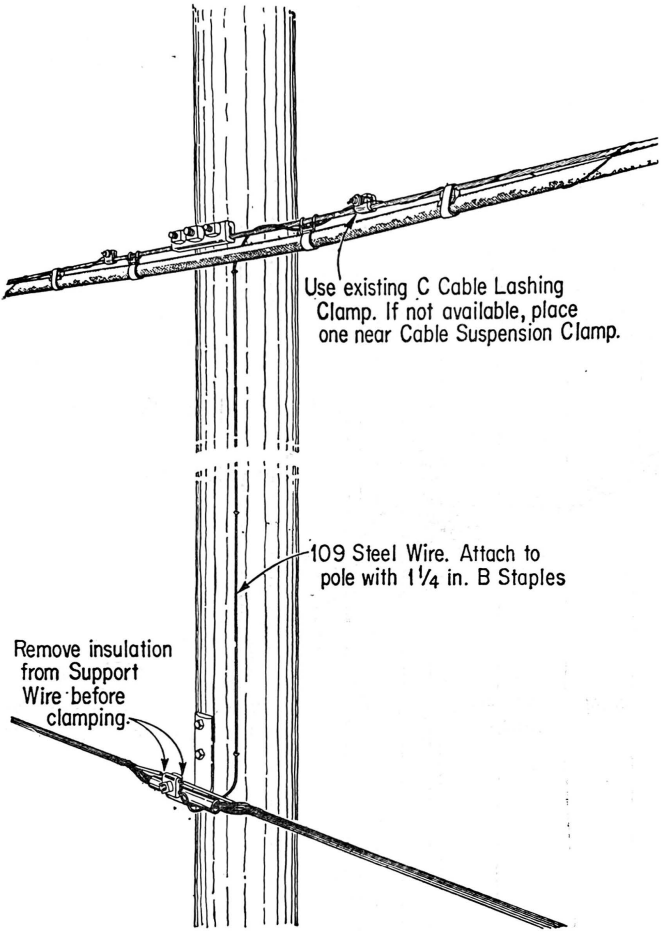


Before inserting wedges, grip the wire with both hands at the point where clamp is to be attached to the support wire. Twist with both hands against the lay of wire until the conductors are parallel to the support wire and the wedges can be inserted. Continue twisting until wedges can be spaced approximately 12 inches apart. Place 1-Inch B Cable Guard over conductors and attach support wire to bracket.

7. BONDING 109E STEEL SUPPORT WIRE

7.01 Bonding the 109E Steel Support Wire, when it is not dead-ended, to a multigrounded neutral or to a cable is illustrated below.




Use existing C Cable Lashing Clamp. If not available, place one near Cable Suspension Clamp.
109 Steel Wire. Attach to pole with 1¼ in. B Staples
Remove insulation from Support Wire before clamping.