

## BURIED PLANT—BURIED WIRE TERMINATIONS

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### 1. GENERAL

1.01 This section describes methods used for terminating service wires at junctions with other types of buried plant and at customer locations.

1.02 This section is reissued to add the following:

- Table of Contents
- New method of identification for buried wire

- Information on E armored service wire
- Information on C service wire (2- and 5-pair)
- Information on E buried wire
- Information on the following cable closures:
  - 13-Type (Fig. 5)
  - 14-Type (Fig. 6)
  - RC4/72 (Fig. 8)
  - PC6/48 (Fig. 10)
  - PC12/55 (Fig. 12)
  - J (Fig. 16)
  - K (Fig. 18)
  - LD (Fig. 20)
  - UP200 (Fig. 22)

Information formerly contained in Part 4 through Part 8 is now found in Part 6 through Part 10. Revision arrows used throughout this reissue will emphasize the most significant changes.

1.03 The metal tape or armor of service wires must *always* be grounded to the customer's protector when the protector is fed from aerial or buried plant. The grounding is needed at customer locations to protect against lightning damage and to minimize shock or fire hazards caused by sustained power contact. The metal tape or the armor of service wires should always be bonded to the terminal housing at the junction with buried cable.

1.04 At the older buried wire installations where a shield wire was used, the shield wire can be terminated in the same manner as recommended for metal tape or armor.

1.05 Those stations which use fuseless protectors and which are served from buried distribution cable of 19- or 22-gauge that is exposed to possible contact with power of over 300 volts, such as in random separation construction or aerial plant,

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require a fusible link in the circuit between the exposed cable and the station. This fusible link can be provided at junctions of buried cable and buried service wire by terminating the buried service wire on the following terminal blocks:

- 3A3-6 (MD) terminal block installed in a buried cable pedestal
- 6A2-3 (A&M) terminal block installed in K-, E-, J-, and PC-type closures.
- ♦9A1-5, 9A1A-5, 9A1B-5 terminal blocks installed in a PC-type closure.♦

The 24-gauge wire leads which are connected to the cable pair provide the fusible link. The 3A3-6 (MD) terminal blocks can be used only in B and E cable closures. The 6A2-3 terminal blocks can be used only in K-, E-, J-, and PC-type cable closures. The 3A3-3 terminal block is used with the 49-type aerial terminal. ♦The 9A1-5, 9A1A-5, and 9A1B-5 terminal blocks are intended for use in the PC-type closures.♦

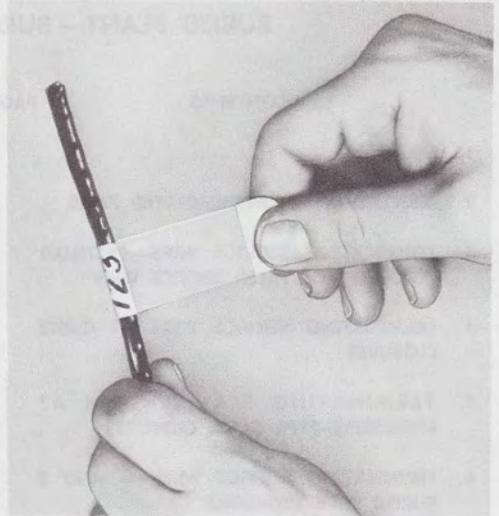
**1.06** ♦After the service wires have been placed, the type of identification required is dependent only on the length of time required to retain the wire identity. Steps (a) and (b) outline procedures for identifying service wires when identity must be retained for less than three months. Step (c) outlines procedures for identifying service wires when identity must be retained for more than three months.

(a) Using a pen or felt marker, write the identity of the service wire on a self-laminating label (obtain from T&B Company, W. H. Brady Company, or other companies with equivalent labels).

(b) Remove the label from pad and place on service wire by wrapping it on itself so that the transparent adhesive covers the written identity (Fig. 1).♦

(c) ♦Install TY-RAP ties and markers (obtain from T&B Company or other companies with equivalent ties and markers) on service wire as follows:

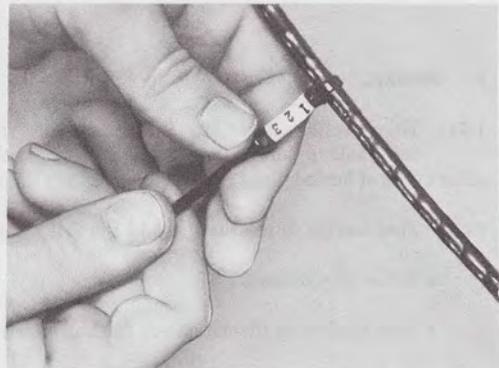
(1) Twist off and retain locking head from nylon tie.



**Fig. 1**—♦Placing Self-Laminating Label♦

(2) Wrap the tie around the service wire and slip the tail through the eye of the grommet end and pull taut.

(3) Slide the desired preprinted tubular markers on the tail of the tie, then slide the locking head on the tie and push snug against the markers (Fig. 2).♦



**Fig. 2**—♦Placing Tie and Marker♦

1.07 The B and D cable closures are rated MD. Sections 631-604-203, 631-600-205, and 631-601-201 cover the description and installation of the K and J cable closures used for buried wire terminations. The 9-type closures described in Section 631-600-215 can also be used, in addition to the 13- and 14-type closures described in Section 631-600-217.

2. DISPOSITION OF UNTERMINATED PAIRS

2.01 Buried wire not in use may include new installations when some time may elapse before the buried wire is placed in service or where existing service is being disconnected. To avoid differences in potential between conductors and the metallic shield or armor, buried wire which is not in use should be protected as follows:

(a) **New installations** where the wire is not being terminated on a station protector at time of placing —

(1) At station end, twist the bare conductors and metallic shield together and wrap with vinyl tape.

(2) At end toward central office, bridge metallic shield or armor and conductors to a common ground post or, if not available, follow instructions in (1) above.

(b) **Service disconnections** where the wire has been terminated and existing service is being disconnected —

(1) At station end, leave all terminations as they are, but where the station protector is being removed, twist the metallic shield or armor and bare conductors together and wrap with vinyl tape.

(2) At end toward central office, when the wire terminates on a protector, leave the terminations as they are. Under "Dedicated Plant" conditions, leave the terminations as they are. Under all other conditions, follow the instructions in (a)(2).

3. TERMINATING SERVICE WIRE—PREFILLED CLOSURES FOR FILLED SERVICE WIRE

3.01 Prepare service wire as shown in Fig. 3.

**Note:** Preparation of 2-pair and 5-pair C service wire is identical.

3.02 Install the metallic shield of the filled service wire in the AT-7796X (Fig. 4) and tighten the screw.

3.03 Splice the service wire to the cable pairs using 700-type connectors **only**, as shown in Fig. 5 or 6.

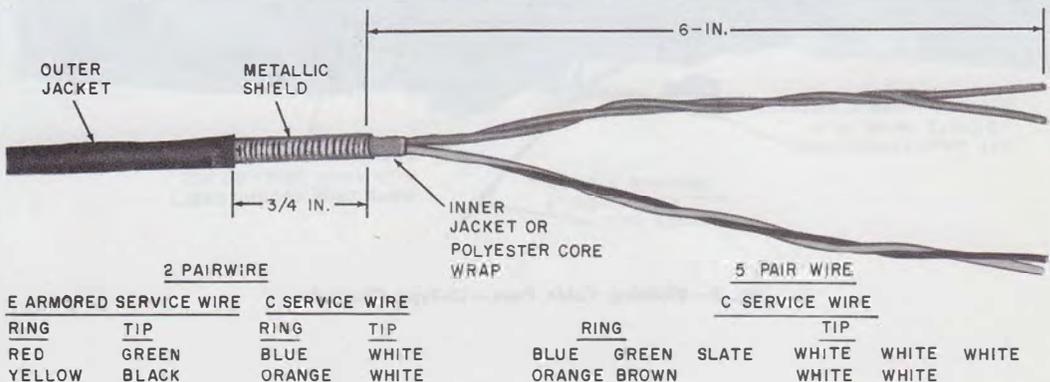


Fig. 3—Prepared Service Wire—13- or 14-Type Closure

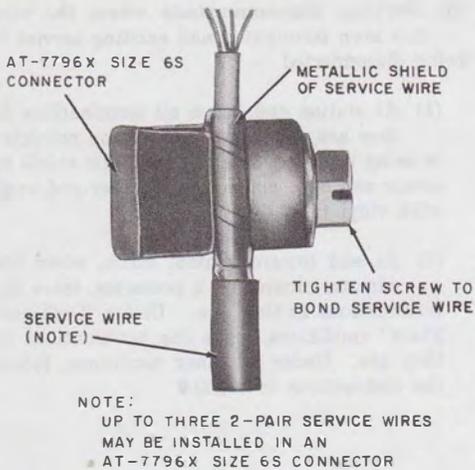


Fig. 4—Service Wire Installed in AT-7796X Connector

4. TERMINATING SERVICE WIRE AT CABLE CLOSURES

PC4/72 Cable Closures

4.01 Prepare service wire as shown in Fig. 7 and install the metallic shield in the AT-7796X connector as shown in Fig. 4.

4.02 Where *fixed count* or *preferred count* termination is desired, run the service wire to the assigned binding post of the terminal block as shown in Fig. 8.

PC6/48 and PC12/55 Cable Closures

4.03 Prepare the service wire as shown in Fig. 9 and install the metallic shield in the AT-7796X connector as shown in Fig. 4.

4.04 Run the conductor of the service wire up through the wire rings, back down through the center ring, then up or down to the assigned

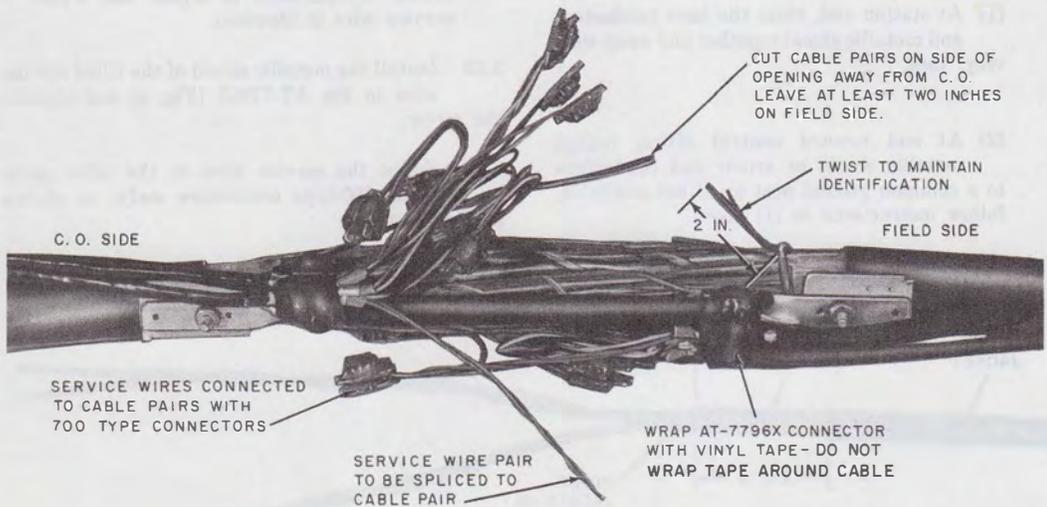


Fig. 5—Splicing Cable Pairs—13-Type Closure

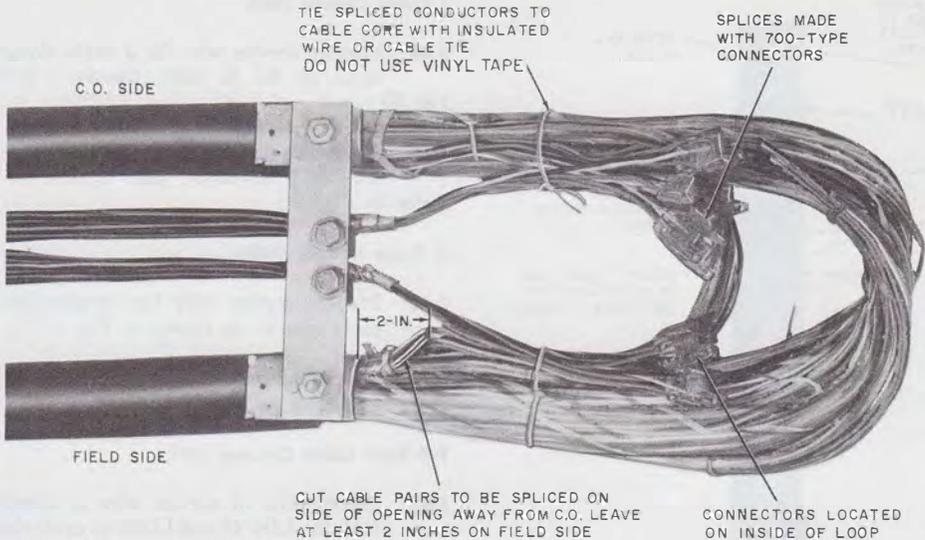


Fig. 6—Wire Work Completed—14-Type Closure

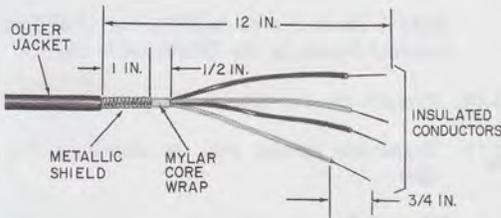


Fig. 7—Prepared Service Wire—RC4/72 Cable Closure

binding post on the terminal block as shown in Fig. 10, 11, and 12.

5. **TERMINATING SERVICE WIRE AT SUPERSEDED-TYPE CABLE CLOSURES**

5.01 The B, C, D, E, G, H, J, K, LD, and UP200 cable closures have been rated MD.

**B Cable Closure (MD)**

5.02 Prepare the service wire as illustrated in Fig. 13.

**D Cable Closure (MD)**

5.03 Route service wire in D cable closure and secure in place with ground connector.

5.04 Prepare service wire as illustrated in Fig. 14.

**E Cable Closure (MD)**

5.05 Route service wire in E cable closure and secure in place with AT-7796X connector as shown in Fig. 4.

5.06 Prepare service wire as illustrated in Fig. 15.

**G and H Cable Closures (MD)**

5.07 The G and H cable closures have been replaced by the LD6/42 and LD10/42, respectively. The termination of service wire in the G and H cable closures is the same as the LD-type cable closures (refer to 5.12 and 5.13).

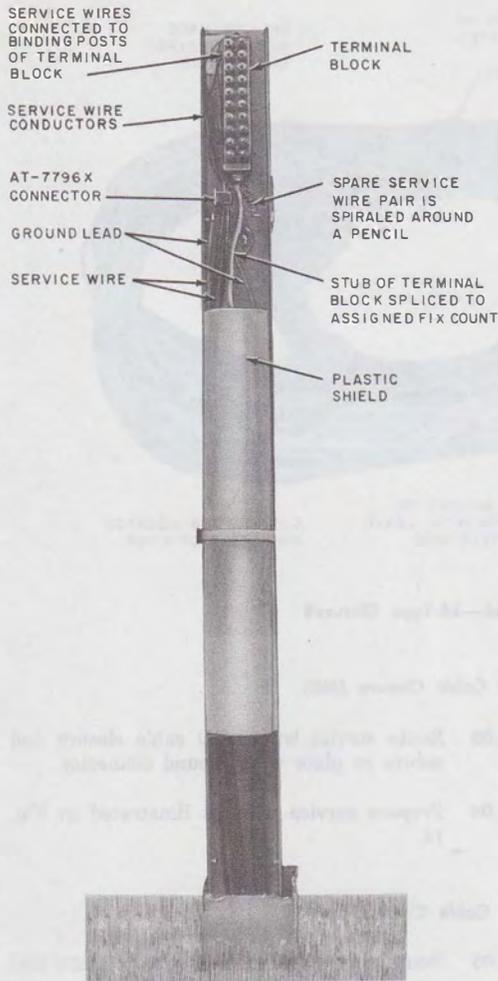


Fig. 8—Service Wires Terminated in RC4/72 Cable Closure

### J Cable Closure (MD)

5.08 Prepare service wire for J cable closure the same as for E cable closure. Refer to Fig. 15.

5.09 Insert metal shield of service wire into AT-7796X connector and tighten securely. Refer to Fig. 16.

### K Cable Closure (MD)

5.10 Prepare service wire for termination in K cable closure as shown in Fig. 17.

5.11 Terminate service wire in K cable closure as shown in Fig. 18.

### LD-Type Cable Closures (MD)

5.12 Termination of service wire is identical in both the LD6/42 and LD10/42 cable closures.

5.13 Prepare the service wire as shown in Fig. 19 and terminate as shown in Fig. 20.

### UP200 Cable Closure (MD)

**Note:** There are no facilities for installing terminal blocks in the UP200 cable closure.

5.14 Prepare service wire as shown in Fig. 21.

5.15 Terminate service wire as shown in Fig. 22.

### 6. TERMINATING SERVICE WIRE—D AND E BURIED WIRE TERMINALS

6.01 At junctions of buried wire, place a D or E buried wire terminal as described in Section 629-720-215. Bridge the branch buried wires in the terminal as required. Each wire can be identified with a suitable designation by placing a self-laminating label as covered in 1.06. The metal tape or armor wire of buried service wire must be connected to the ground post of each terminal.

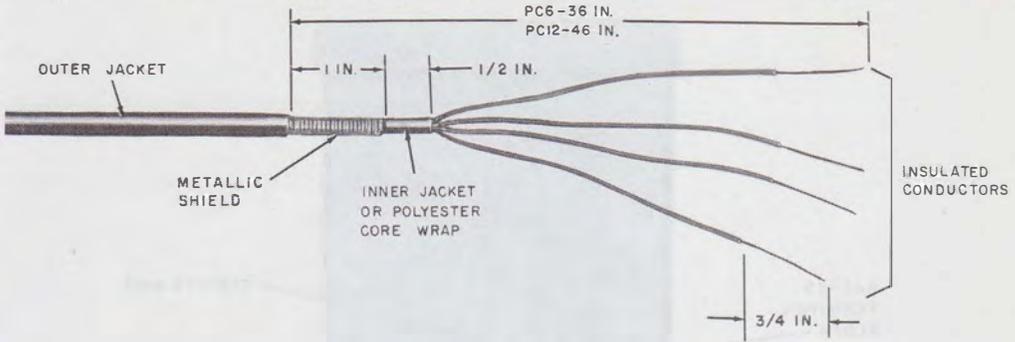


Fig. 9—Prepared Service Wire—PC6/48 or PC12/55 Cable Closure

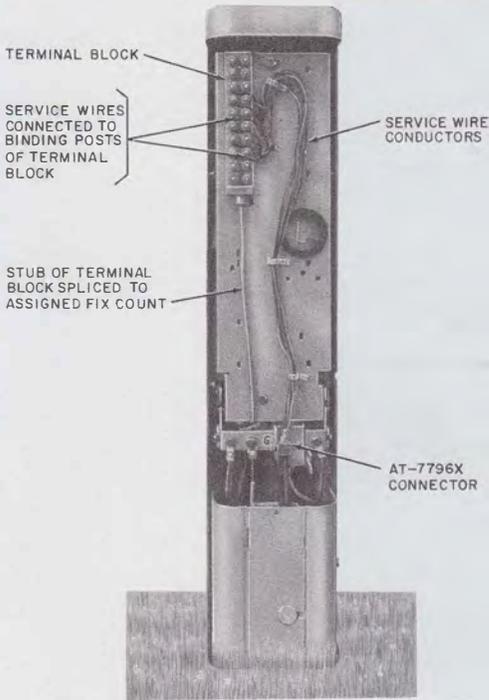


Fig. 10—Service Wires Terminated in PC6/48 Cable Closure—Fixed Count Mode

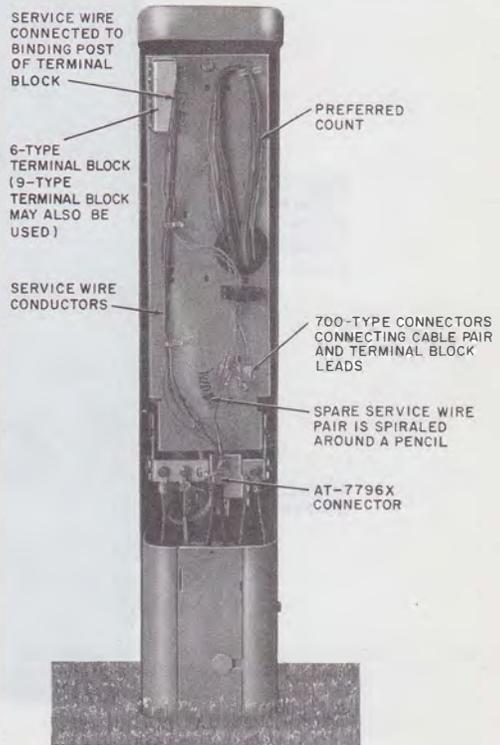


Fig. 11—Service Wires Terminated in PC6/48 Cable Closure—Preferred Count Mode

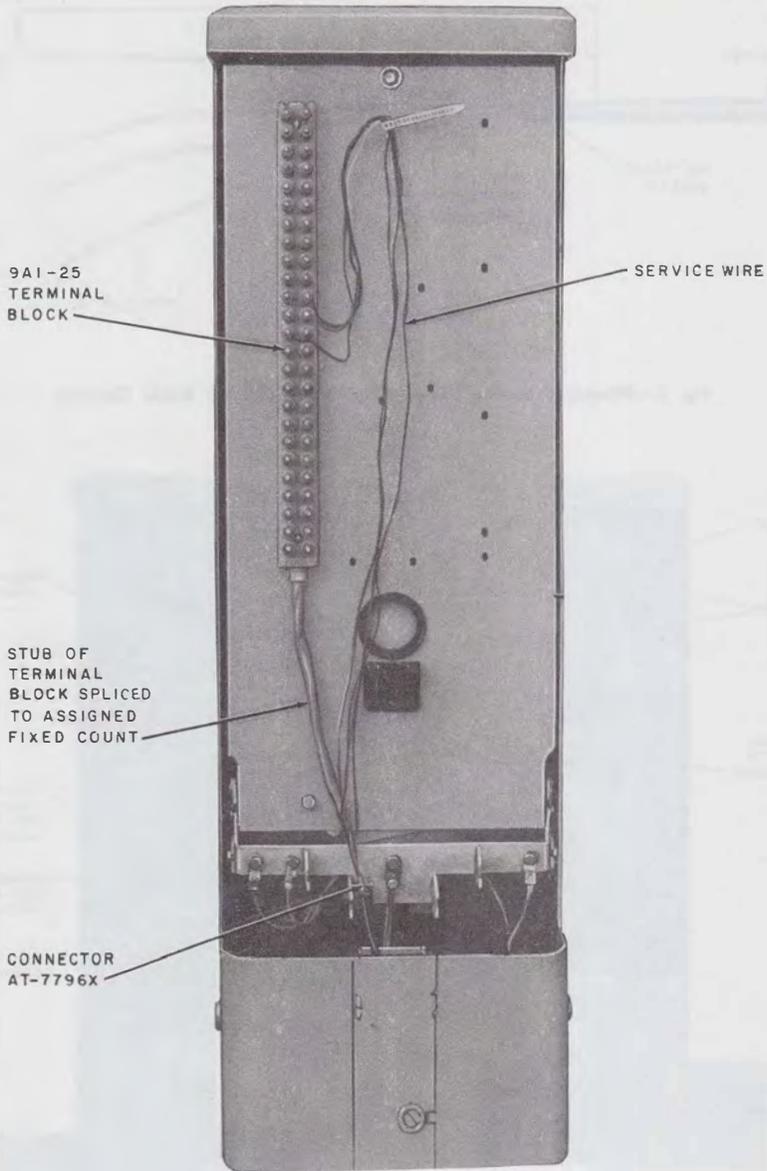


Fig. 12—Service Wire Terminated in PC12/55 Cable Closure—Fixed Count Mode

6.02 The termination of service wire in either the D or E buried wire terminal is identical. Prepare the service wire as shown in Fig. 23 and terminate as shown in Fig. 24.

## 7. TERMINATING SERVICE WIRE—JUNCTION WITH AERIAL CABLE

7.01 At the cable terminal or closure where buried service wire feeds from aerial cable and where the length of the buried service wire is:

- (a) **700 feet or less**, do not bond the metallic shield of service wire to the strand or terminal housing. This will **protect the subscriber location from possible fire** caused by excessive power fault, should the circuit come in contact with power line of any voltage.

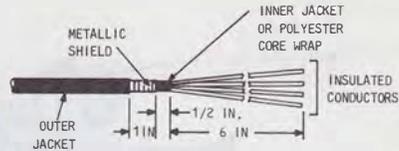


Fig. 13—Prepared Service Wire—B Cable Closure

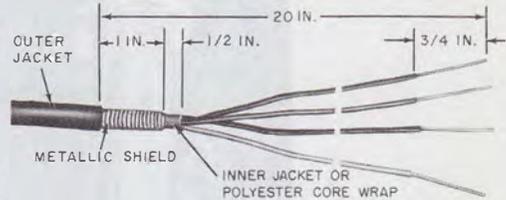


Fig. 14—Prepared Service Wire—D Cable Closure

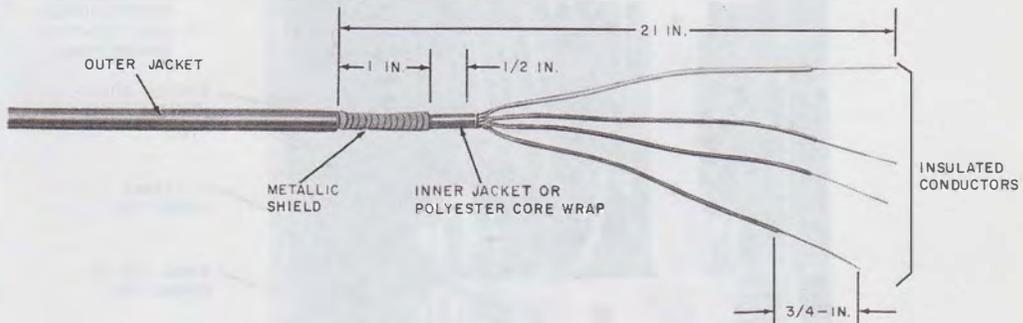


Fig. 15—Prepared Service Wire—E Cable Closure

- (b) **More than 700 feet**, use E buried wire and bond the metallic shield to the strand or terminal housing. When the length of buried wire is greater than 700 feet, the resistance of E buried wire, because of its length, will limit the fault current to safe values. **C service wire and E armored service wire are not to be used for distances of more than 700 feet.**

7.02 No carbon block protection is required between the cable conductors and the buried

service wire conductors unless severe lightning exposure exists (see 7.07).

7.03 Buried service wire can be brought up a pole and terminated directly in a pole- or strand-mounted cable terminal or cable closure if the cable conductor is 24- or 26-gauge. Where fuseless protectors are used at the station and the cable conductor is 22- or 19-gauge and exposed to power contact, a fusible link is required between the cable pair and the service wire. As stated in 1.05, the 24-gauge conductors in a cable stub or

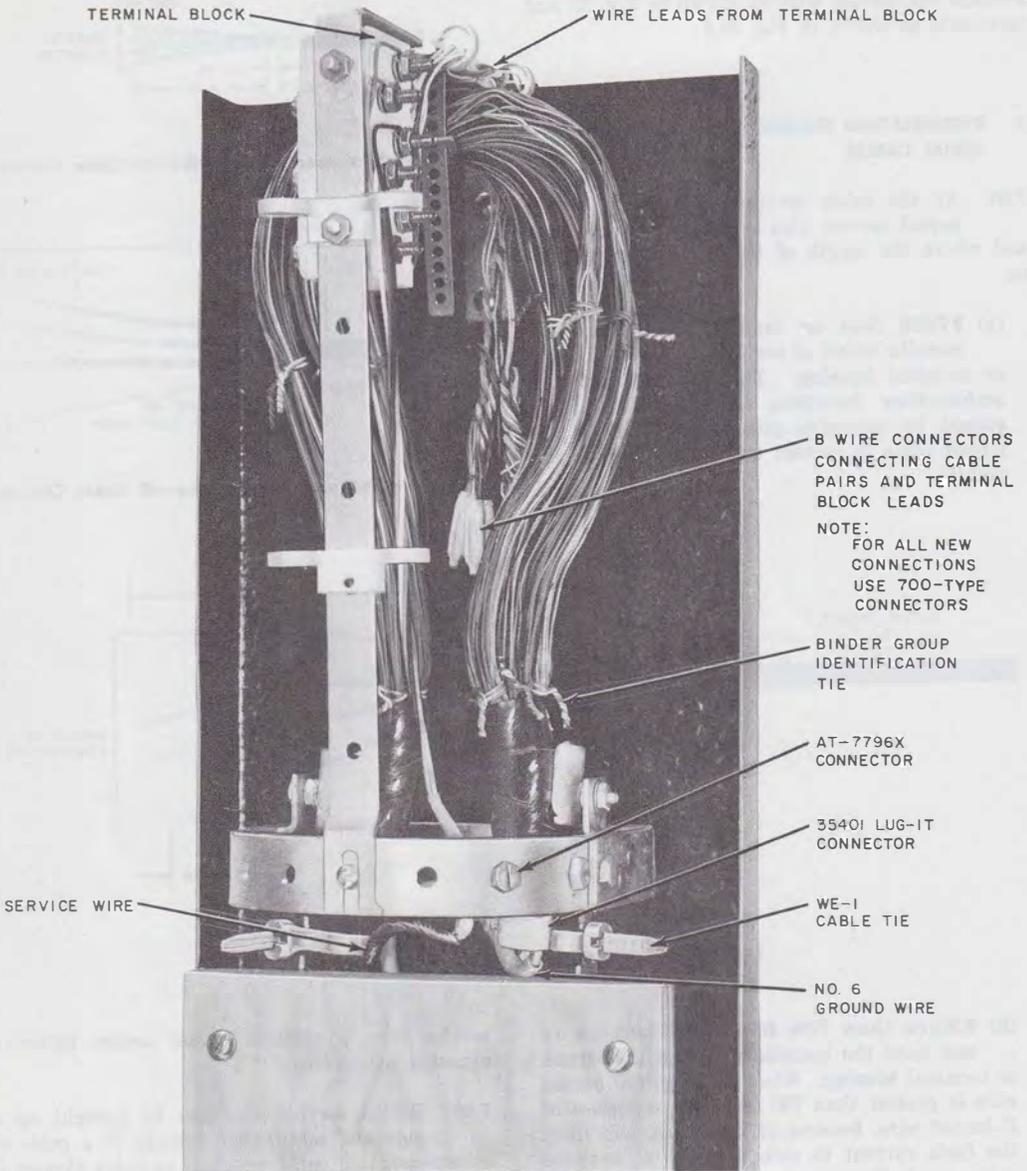


Fig. 16—Service Wire Installed—J Cable Closure (Protected)

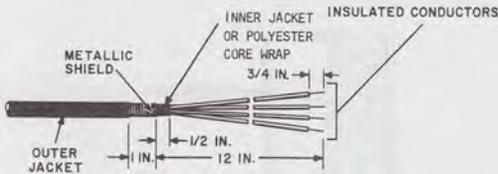


Fig. 17—Prepared Service Wire—K Type Cable Closure

the connecting block of a 49-type cable terminal are satisfactory fusible links. At the groundline, the wire should be protected with an 8-foot length of No. 0 U cable guard. A typical installation terminating in a 49-type cable terminal is shown in Fig. 25.

#### Inside a Cable Terminal

7.04 Where the buried wire is 700 feet or less in length, grounding of the metallic shield at the cable terminal is omitted, unless special lightning protection is required (see 7.07). Cut off the metallic shield at the terminal location and wrap with two turns of vinyl tape to protect against sharp edges (Fig. 26).

7.05 Where the buried wire is over 700 feet in length, the metallic shield of the E buried wire must be bonded to the cable terminal. A B bond clip and B appliance wire may be installed on the metallic shield in a solderless connector as shown in Fig. 27.

7.06 Inside a cable terminal, the conductors of service wire should be terminated on the binding post in the usual manner. The stub cable conductors of the terminal provide the fusible link.

#### Special Lightning Protection

7.07 In lightning areas where the subscriber's station is exposed to lightning, it may be desirable to furnish additional lightning protection to buried service wires which are 700 feet or less in length. Under these conditions, detailed plans or other special instructions will authorize bonding the metallic shield at the aerial cable terminal. Such installations require the use of a 123- or 128-type protector (equipped with 2B2E protector units) and bonding the metallic shield to

the ground post of the protector. A bond is also required between the protector ground post and the cable strand. For the latter purpose, block wire is required as a fusible link to prevent the metallic shield from overheating. A typical installation is shown in Fig. 28.

#### 8. TERMINATING SERVICE WIRE—JUNCTION WITH MULTIPLE WIRE

8.01 Where multiple wire is exposed to power contact and a fuseless protector is used at the station, C service wire or E armored service wire must not be used with or fed from multiple wire of current manufacture, because of the relatively small size and low fusing level of the conductors of the service wires. A satisfactory fusible link is not available for use between the multiple wire conductors and the service wire conductors.

**Note:** Earlier manufactured multiple wire with 24-gauge conductors may be satisfactorily used with C service wire or E armored service wire.

8.02 E buried wire can be used with or fed from multiple wire where the multiple wire is exposed to power contact and fuseless station protection is used. E buried wire should be brought up a pole and terminated in a 101B2 wire terminal. The metallic shield should be cut back and taped as shown in Fig. 26. Connect the conductors of E buried wire to the conductors of the multiple wire with block wire. At the groundline the wire should be covered with an 8-foot length of No. 0 U cable guard. Fig. 29 shows a typical example of E buried wire being connected to a 105-type wire terminal.

8.03 The block wire serving as a fusible link between the E buried wire conductors and the multiple wire conductors can be terminated in a 105A wire terminal, a 104-type wire terminal, a 116-type protector, a 108-type wire terminal, or in similar wire terminals used with multiple wire.

#### 9. TERMINATING SERVICE WIRE—JUNCTION WITH C RURAL WIRE

9.01 Do not connect C service wire or E armored service wire to C rural wire because of the small size of the conductors of the service wire and because no satisfactory fuse link is available.

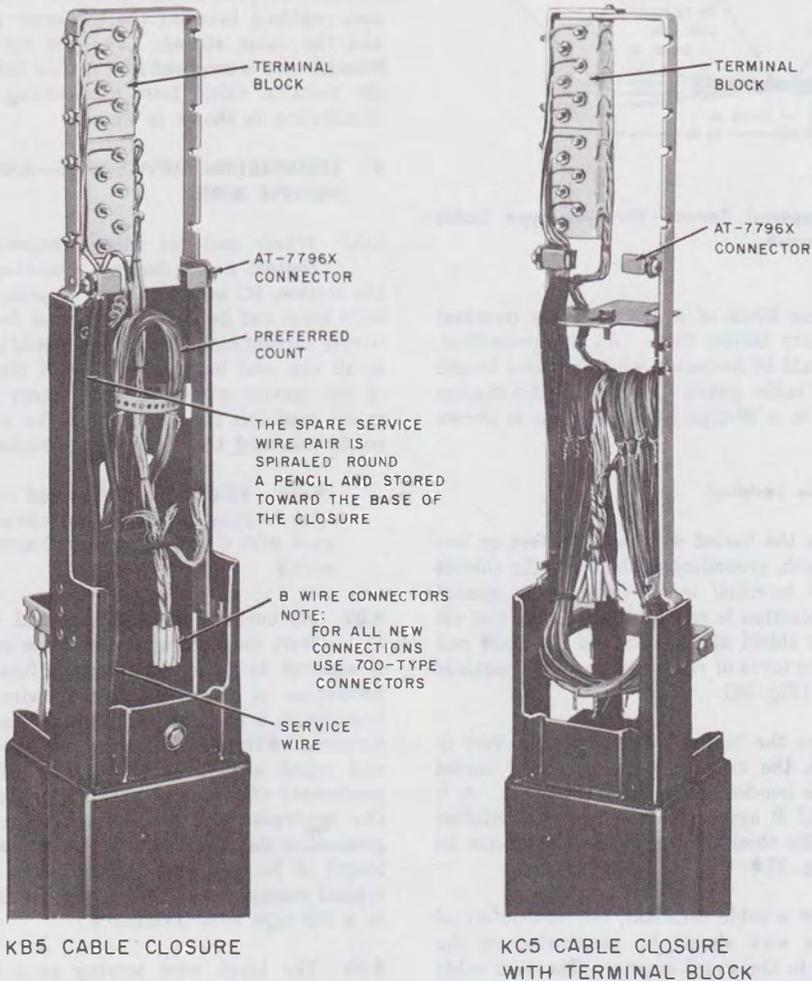


Fig. 18—Service Wire Installed—K Type Cable Closure (Protected)

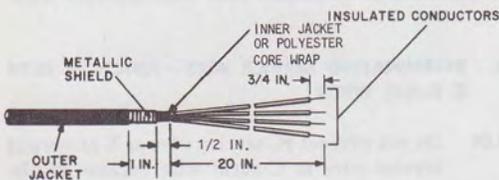


Fig. 19—Prepared Service Wire—LD Type Cable Closure

9.02 At the junction with C rural wire, E buried wire can be brought up a pole and terminated in a 101B2 wire terminal. The metallic shield should be cut off and taped as shown in Fig. 26. Block wire should be used to bridle between the 101B2 wire terminal and the 107-type wire terminal on the C rural wire. At the groundline, the E buried wire should be covered with an 8-foot length of No. 0 U cable guard. A typical installation is shown in Fig. 30.

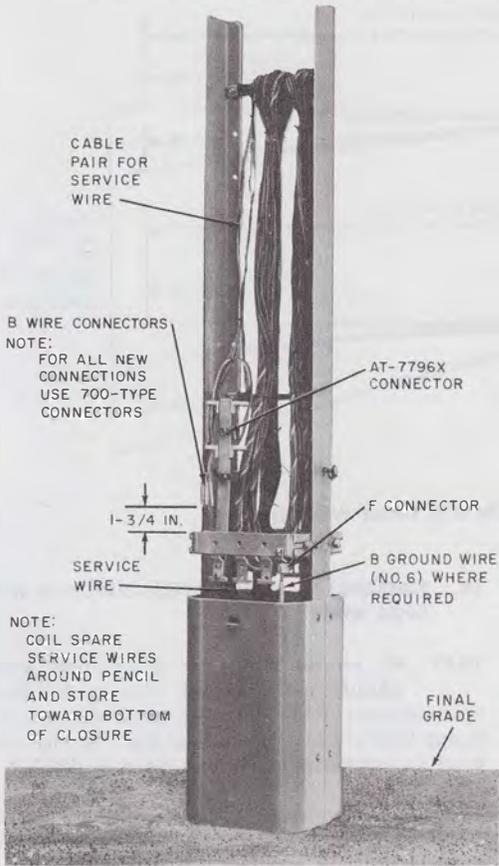


Fig. 20—Service Wire Installed—LD Type Cable Closure

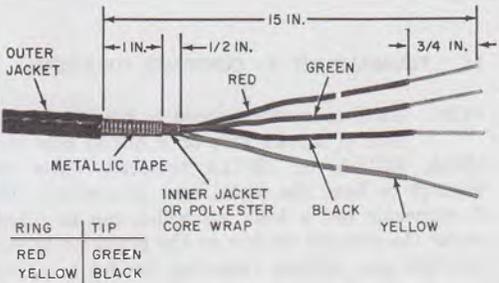


Fig. 21—Prepared Service Wire—UP200 Cable Closure

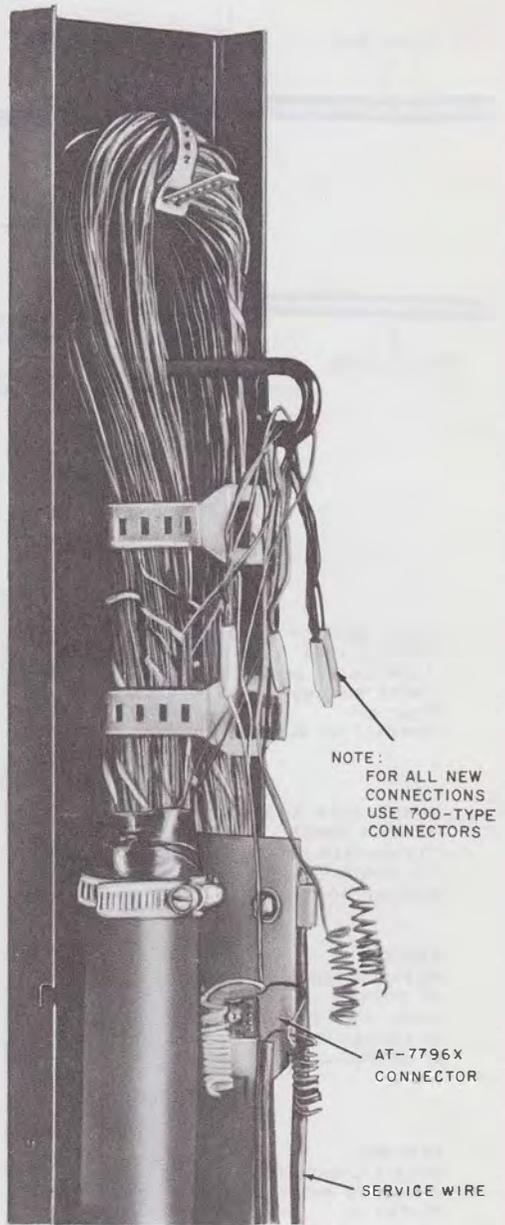


Fig. 22—Service Wire Installed—UP200 Cable Closure

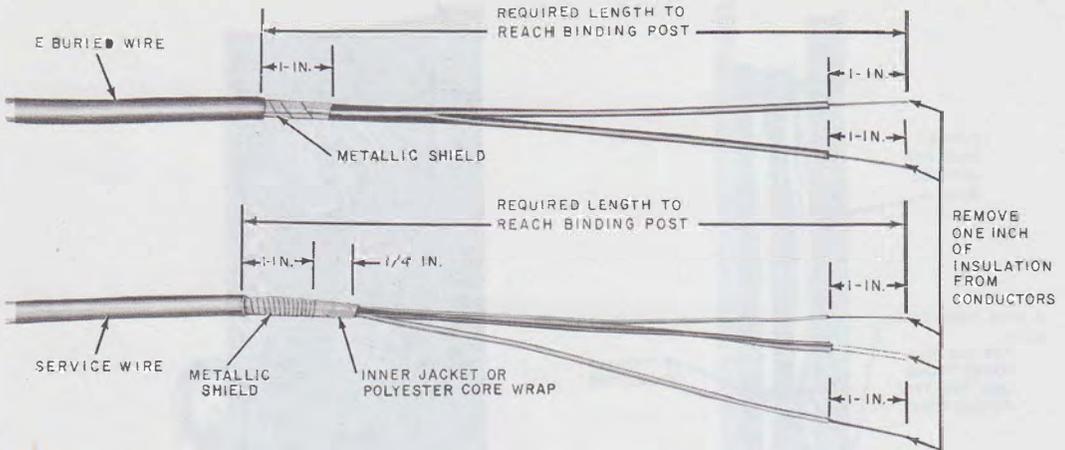


Fig. 23—Prepared Service Wire—D or E Buried Wire Terminal

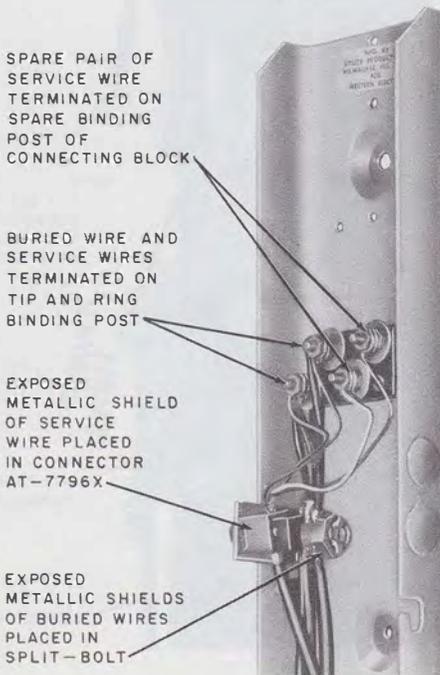


Fig. 24—Service Wire Terminated—D or E Buried Wire Terminal

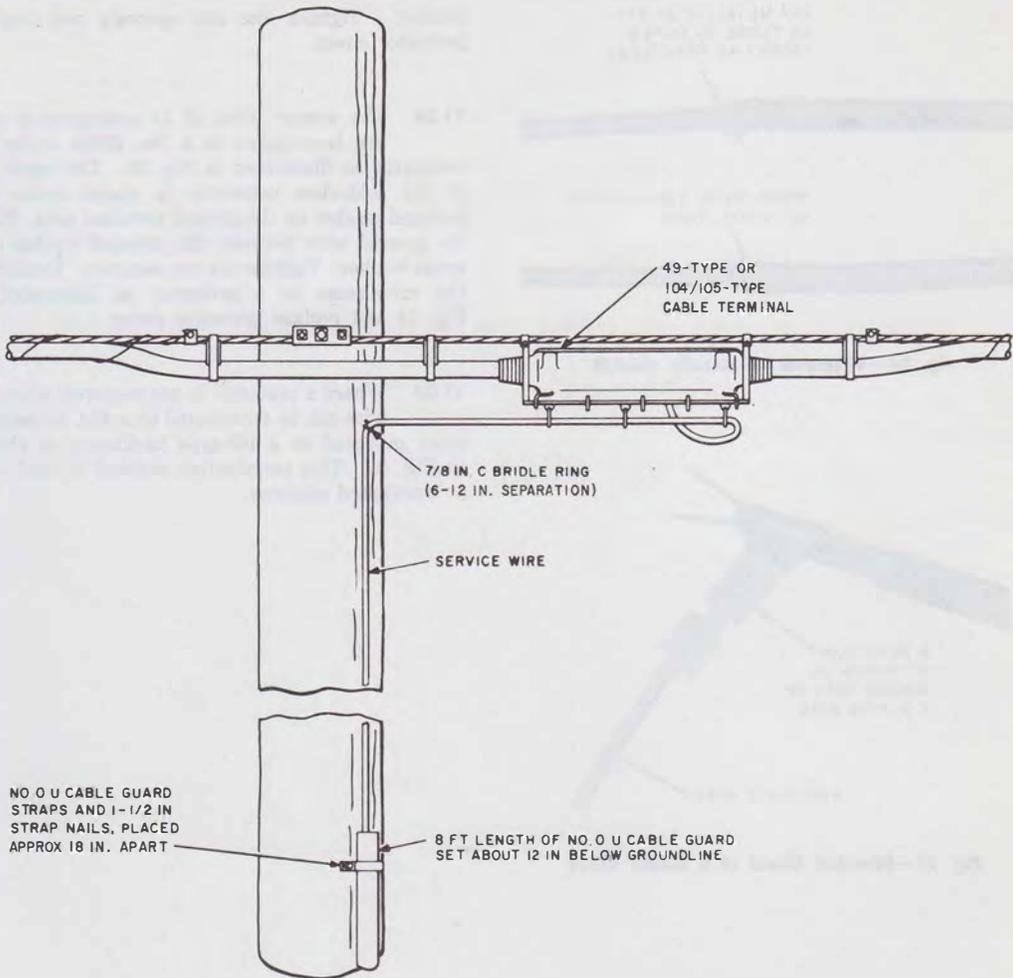
10. TERMINATING SERVICE WIRE—JUNCTION WITH OPEN WIRE

10.01 C service wire and E armored wire should not be used with or fed from open wire due to the relatively small size and low fusing level of the conductors of the C service wire and no satisfactory fuse link being available.

10.02 At the junction with open wire, E buried wire can be brought up a pole and terminated in a 101B2 wire terminal. The metallic shield should be cut off and taped as shown in Fig. 26. Block wire must be used between the protector and the open wire. At the groundline, the wire should be covered with an 8-foot length of No. 0 U cable guard. A typical installation is shown in Fig. 31.

11. TERMINATIONS AT CUSTOMER LOCATIONS

11.01 An F connector is used to bond the metal tape of service wire or E buried wire to a 1231A, 123B1A, or 128A1A protector. (Do not attempt to bond the metal tape otherwise.) The F connector has a hook tip which can be placed under the pronged washer on the protector ground terminal post without removing the nut. A spade tip solderless connector is used with D underground wire (see 11.06).



**Fig. 25—Buried Plant Run Up a Pole**

**11.02** Mount the 123- or 128-type protector on the wall and mark the location of the F connector on the service or buried wire. Cut off the wire about 5 inches beyond this point. Remove the outer jacket.

**11.03** Remove the metal tape as shown in Fig. 32.

**11.04** Remove the inner jacket of the service wire or E buried wire up to the metal tape.

Position the F connector on the service wire or buried wire as shown in Fig. 33 and tighten firmly with a C, D, or 4-inch E screwdriver. Do not crush the insulation by too great a pressure.

**11.05** Terminate the service or buried wire on a protector as illustrated in Fig. 34. Place the hook tip of the F connector under the pronged washer on the ground terminal post. Place the ground wire between the pronged washer and brass

CUT METALLIC SHIELD AS CLOSE TO OUTER JACKET AS PRACTICAL



WRAP WITH TWO LAYERS OF VINYL TAPE

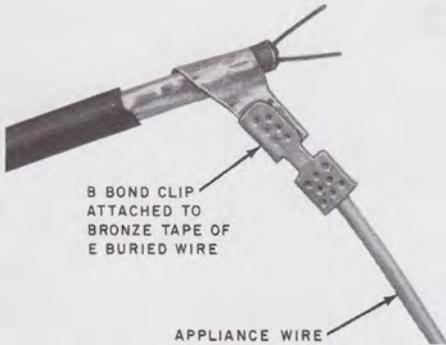


Fig. 26—Removal of Metallic Shield

washer. Tighten the nut securely and replace protector cover.

11.06 The armor wires of D underground wire are terminated in a No. 31589 solderless connector as illustrated in Fig. 35. The spade tip of the solderless connector is placed under the pronged washer on the ground terminal post. Place the ground wire between the pronged washer and brass washer. Tighten the nut securely. Terminate the conductors on a protector as illustrated in Fig. 34 and replace protector cover.

11.07 Where a protector is not required, a service wire can be terminated on a 42A connecting block mounted on a 168-type backboard as shown in Fig. 36. This termination method is used only at unexposed stations.



B BOND CLIP ATTACHED TO BRONZE TAPE OF E BURIED WIRE

APPLIANCE WIRE

Fig. 27—Bonded Shield of E Buried Wire

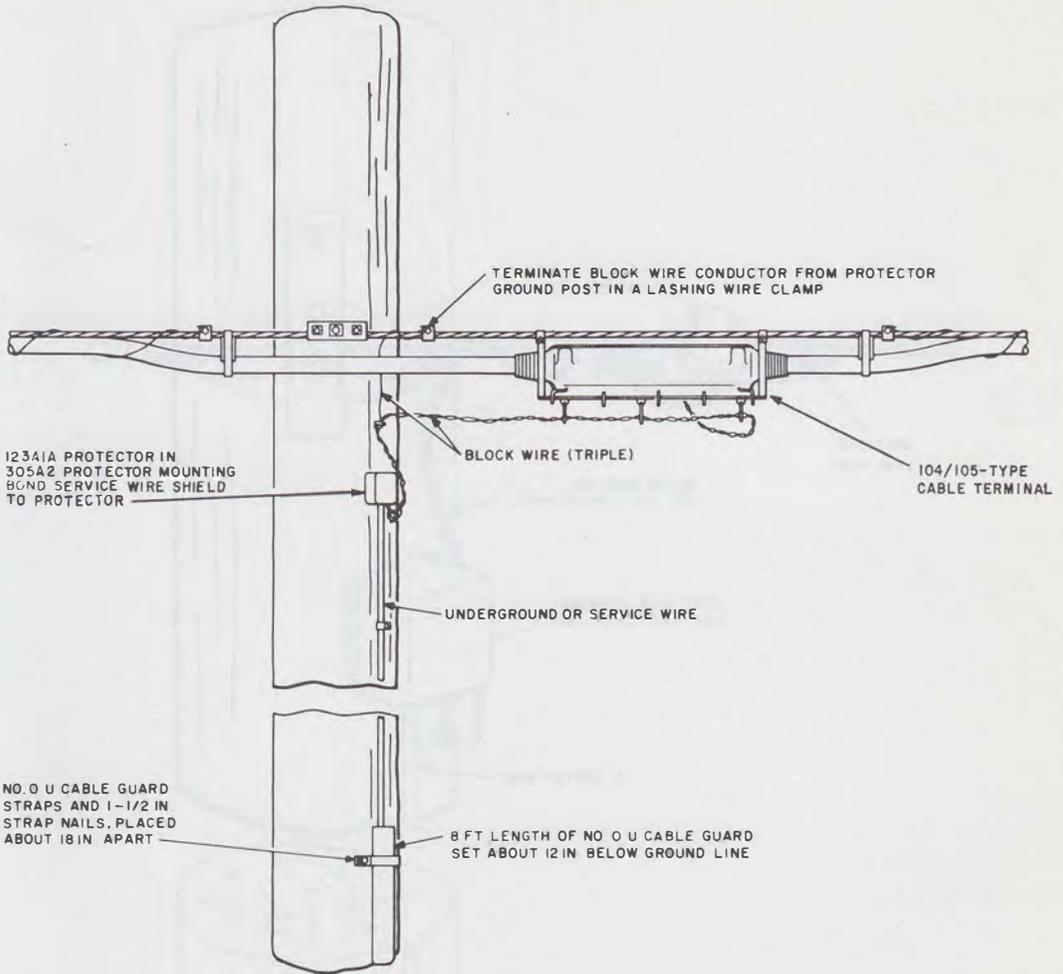


Fig. 28—Termination for Special Lightning Protection

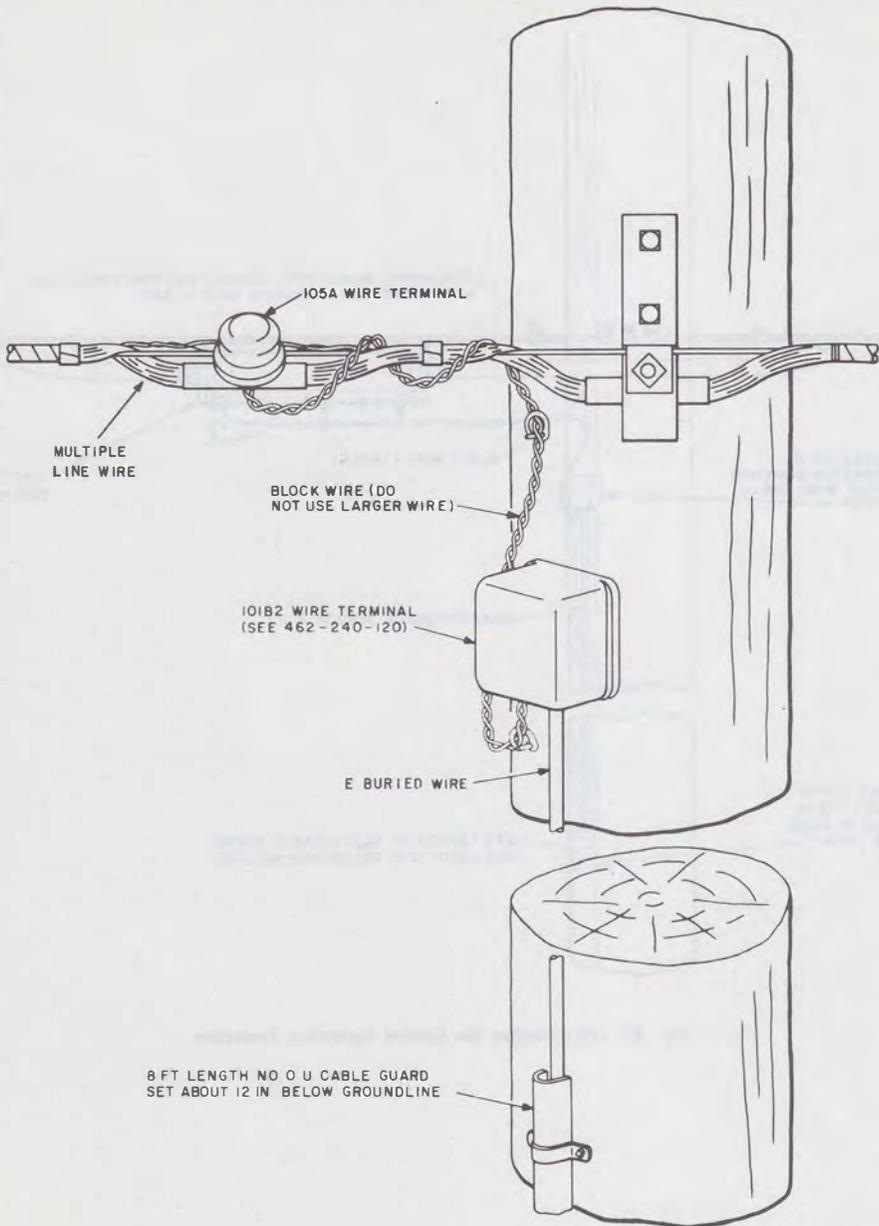


Fig. 29—E Buried Wire Terminated to Multiple Line Wire

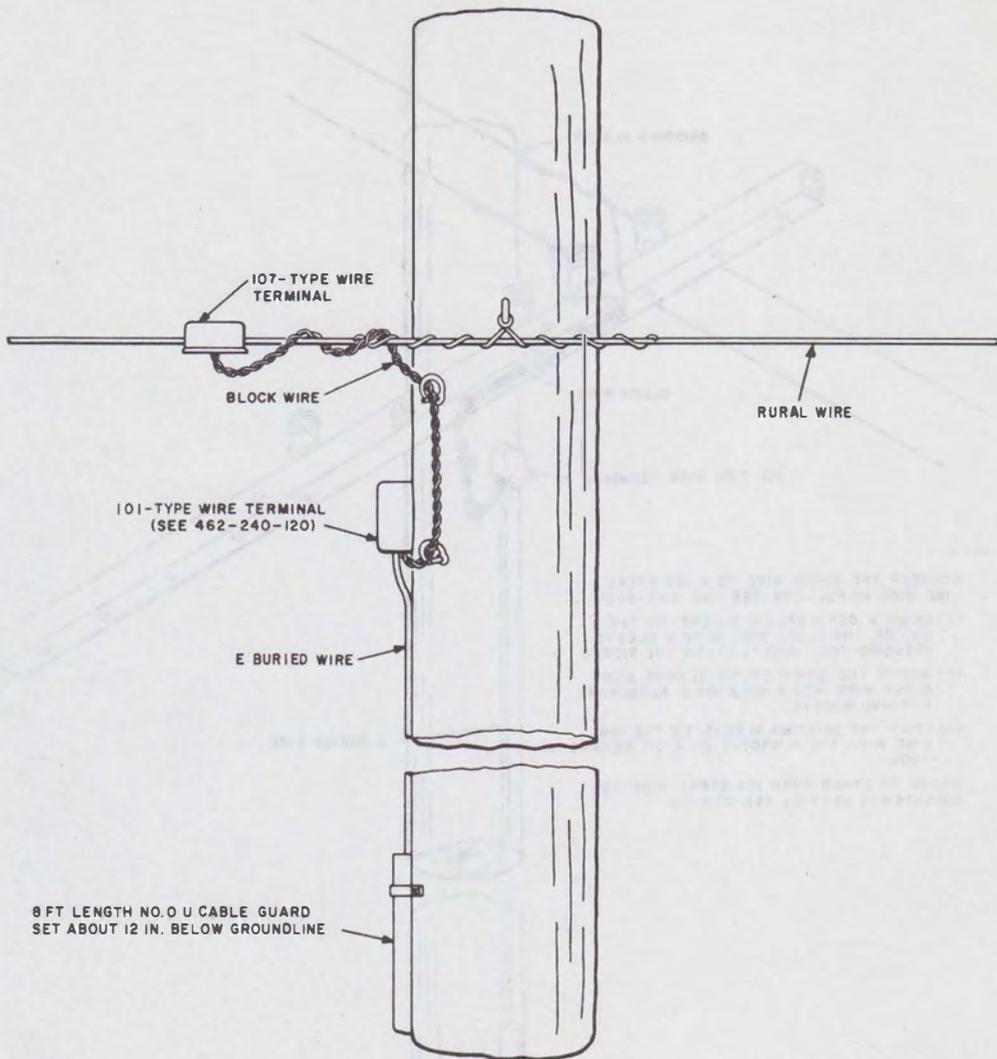


Fig. 30—Termination of E Buried Wire and Rural Wire

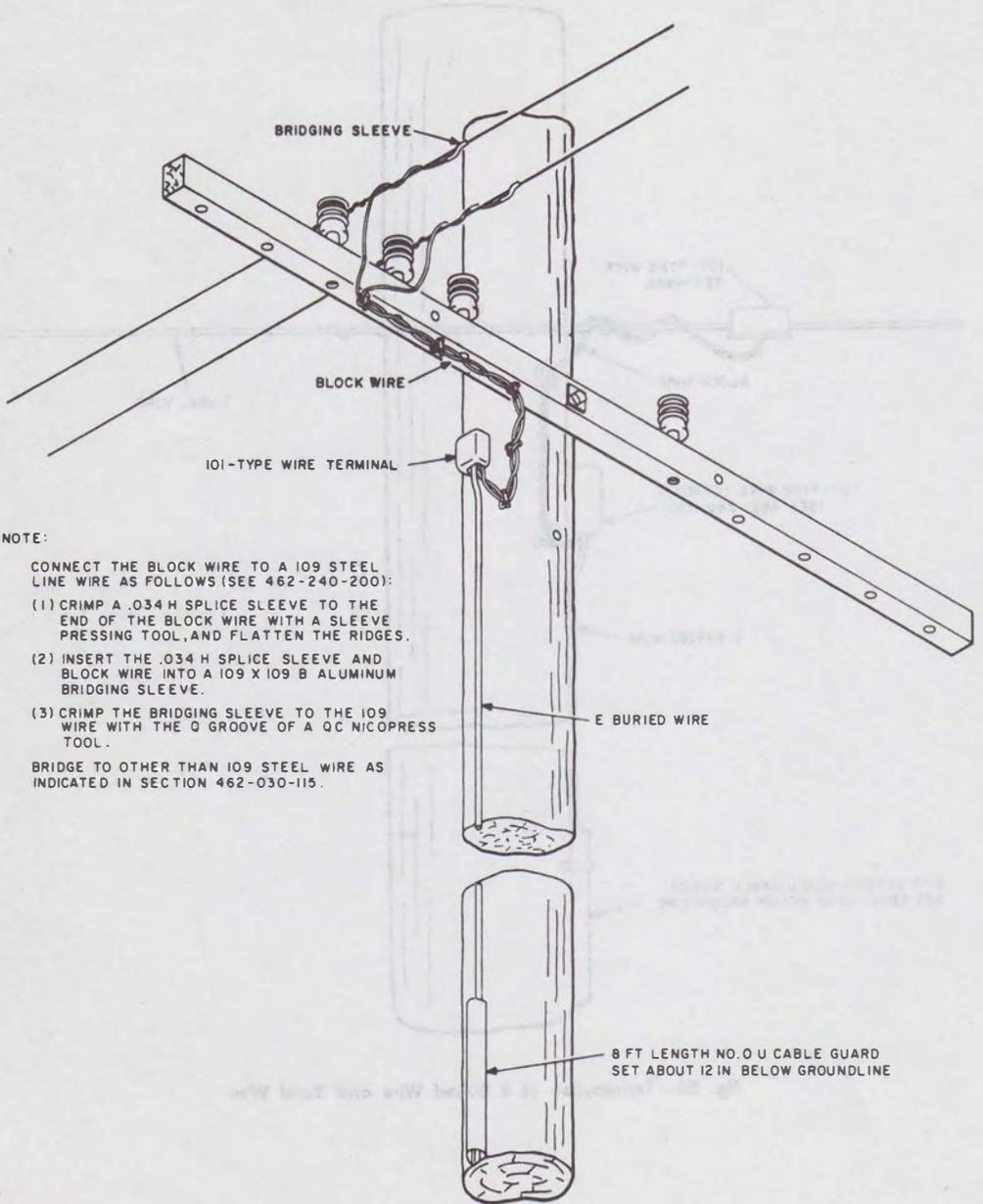


Fig. 31—Termination of E Buried Wire and Open Wire

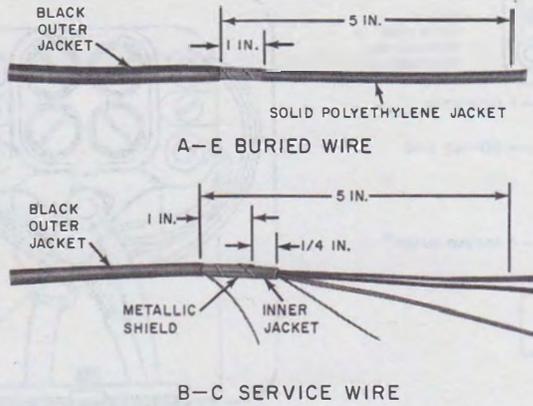


Fig. 32—Sheath Preparation for Placing F Connector

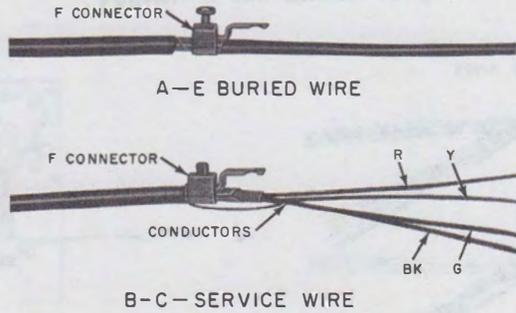


Fig. 33—F Connector on Service Wire

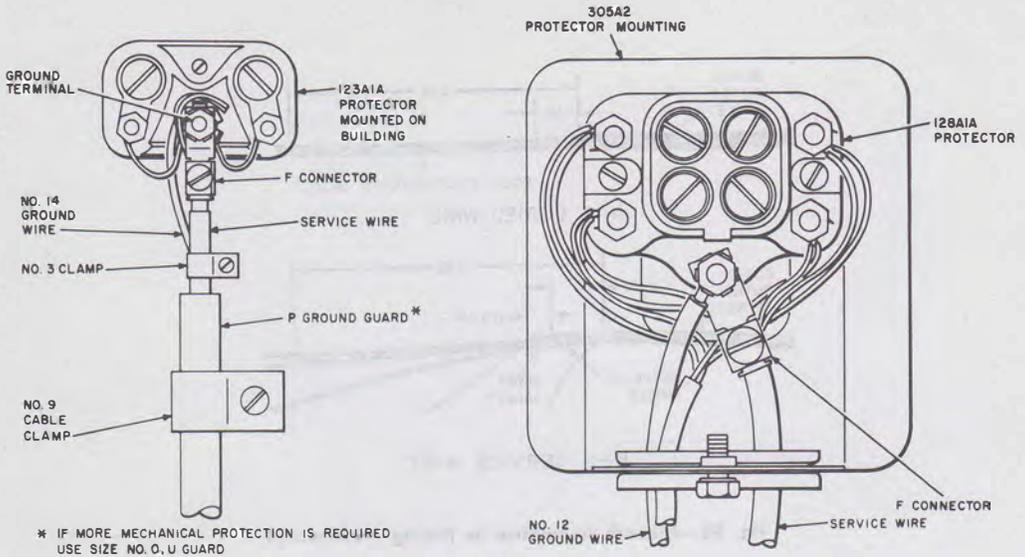


Fig. 34—Service Wire on Protector

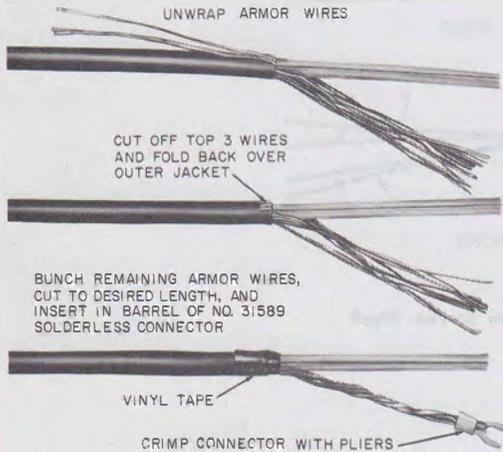


Fig. 35—Preparation of D Underground Wire (MD) for Protection or Cable Terminal Where Grounding is Required

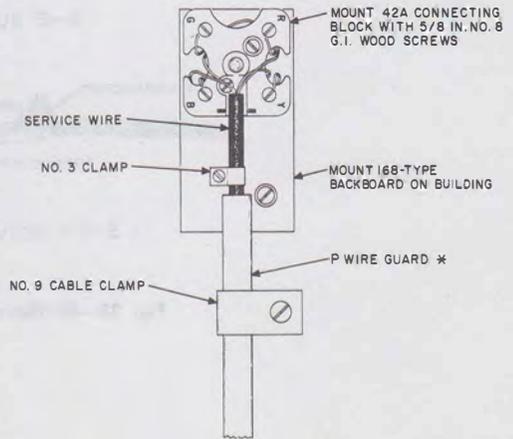


Fig. 36—Service Wire on 42A Connecting Block (Prepared for Unexposed Stations)