

## DROP AND BLOCK WIRING— COAXIAL—PLACING

	CONTENTS	PAGE
1.	<b>GENERAL</b> . . . . .	1
2.	<b>PRECAUTIONS</b> . . . . .	1
3.	<b>LOCATING AND INSTALLING BUILDING ATTACHMENTS</b> . . . . .	2
4.	<b>PLACING F COAXIAL WIRE</b> . . . . .	2
5.	<b>ATTACHING F COAXIAL WIRE TO POLE</b>	7
6.	<b>ATTACHING F COAXIAL WIRE AT MIDSPAN</b> . . . . .	10
7.	<b>PLACING E AND G COAXIAL WIRE</b> . . .	10
8.	<b>PREPARING COAXIAL WIRE</b> . . . . .	14
9.	<b>INSTALLATION OF CONNECTOR</b> . . . . .	17
10.	<b>BUILDING RUN</b> . . . . .	19
11.	<b>TERMINATING DROP WIRE AT GROUNDING BLOCK</b> . . . . .	19
12.	<b>PLACING GROUND WIRE</b> . . . . .	19
13.	<b>REPAIRING E OR G COAXIAL WIRE</b> . . .	21

**1. GENERAL**

**1.01** This section covers the methods for placing E, F, and G coaxial wires used in closed circuit television systems. The E coaxial wire is used for building runs, short pole-to-building spans, and for buried service. The F coaxial wire is used for pole-to-pole or long pole-to-building spans. The G coaxial wire is for use in those areas, both aerial and buried, requiring a greater degree of RF shielding than that provided by E or F coaxial wire. G coaxial wire is also available with an olive gray PVC jacket for indoor use.

**1.02** This section is reissued to revise *precautions* and to update illustrations to show the addition of a handle on the C drop wire reel.

**1.03** Coaxial wire is first attached to the building and is then raised by means of a handline for attachment to the span clamp or pole attachment.

**1.04** The hardware required to attach the coaxial wire to pole and buildings is described in Section 462-030-140.

**2. PRECAUTIONS**

**2.01** Caution should be taken when placing coaxial wires. Any damage such as kinking or flattening may change the electrical characteristics of the wires.

**2.02** Obtain assistance before placing a coaxial wire over streets, highways, or elsewhere, if traffic, trees, or other conditions might prevent one man from doing the work safely.

**2.03** *Insulating gloves shall be worn by all employees wherever there is a possibility of a wet handline or a drop becoming energized.*

**2.04** *The handline used for raising a coaxial wire shall be free from metallic strands and should preferably be dry. However, if conditions are such that it is impractical to keep the handline dry, a wet handline may be used for placing a coaxial wire over secondary electric service operating at less than 300 volts. A wet handline must not be used in the vicinity of power circuits operating at 300 volts or more. In any case where in close proximity to power wires the craftsman must wear insulating gloves.*

**2.05** When it is necessary to carry a handline up a pole or ladder, secure one end of the handline to a B handline carrier attached to a body belt. The steel loop of the B handline carrier is designed to release the handline if it is placed under tension while the craftsman is climbing a pole or ladder. If no B handline carrier is available, double the end of the handline back on itself for a distance of approximately 1 foot and place this loop under the side or back of the body belt so that it will be readily released if placed under tension.

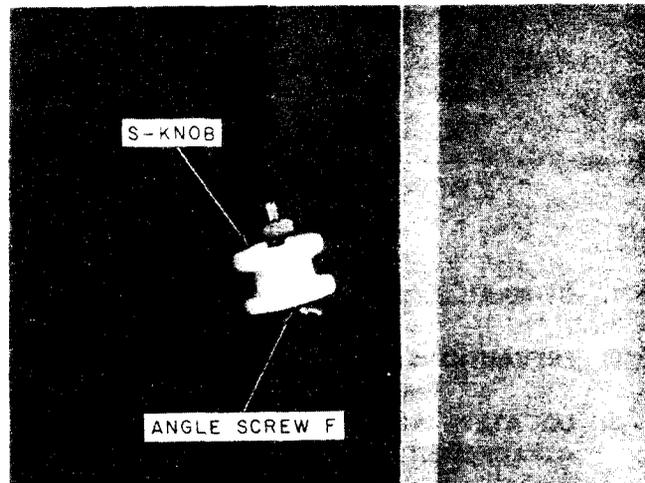
## SECTION 462-405-205

- 2.06** When using ladders, follow the safety precautions outlined in Section 081-740-105.
- 2.07** Before starting any work on buildings covered with metal siding, test the siding with a B voltage tester for possible foreign voltage that may be present.
- 2.08** *Under no condition shall a drop wire be placed over power wires or power cables operating at more than 750 volts.* Such cases shall be referred to the plant engineer.

### 3. LOCATING AND INSTALLING BUILDING ATTACHMENTS

- 3.01** In placing drop wire runs from building to pole it will be necessary to locate the first building attachment so that:
- The drop wire will have the required clearance from light and power wires, trolley wires, other foreign wires, and metallic objects.
  - Tree interference is avoided, making allowance for the future growth of existing trees. It is preferable to make a longer wire run on the building if the trees can be cleared by doing this.
  - The drop span can be placed with proper sag.
  - Where practical, the drop wire will make a vertical run to the last building attachment, if (1) the drop wire will have adequate clearance from trees, (2) will not be objectionable if it crosses adjacent property, or (3) will not cross portions of vacant lots on which buildings are likely to be erected.
  - Ice and snow falling from the roof will not strike the drop wire. If the drop wire in the span must pass under the sloping part of a roof, make the first attachment as near the eaves as possible.
- 3.02** Install an S knob and angle screw on the building as shown in Fig. 1.

**Note:** S knobs and angle screws are illustrated in this practice, however the first attachments described in Section 462-350-211 may be used.



**Fig. 1—First House Attachment Installed on Building**

- 3.03** Select a location on the building near a block in a horizontal position (Fig. 20).
- ### 4. PLACING F COAXIAL WIRE
- 4.01** Place the F coaxial wire along the proposed route from the first building attachment to the ground block, then mark the wire at the first building attachment.
- 4.02** Cut the support wire at the first house attachment. Cut the web for approximately 1 inch and separate the support wire and the coaxial wire from the building attachment to the grounding block. *Exercise care when separating the web to prevent damage to the PVC jacket of the cable.*
- 4.03** Slit the web between the support wire and coaxial wire for approximately 7 inches and remove the PVC jacket from the support wire (Fig. 2).
- 4.04** Wrap three turns of vinyl tape around the coaxial wire and support wire at the point of separation. The last turn of tape should not be left under tension. The tape prevents further splitting of the web.
- 4.05** Wrap one side of a Preformed deadend around the support wire, place around first house attachment as shown in Fig. 3, then wrap the other side of the Preformed deadend. The end of the support wire should not extend beyond the yellow mark on the Preformed deadend.

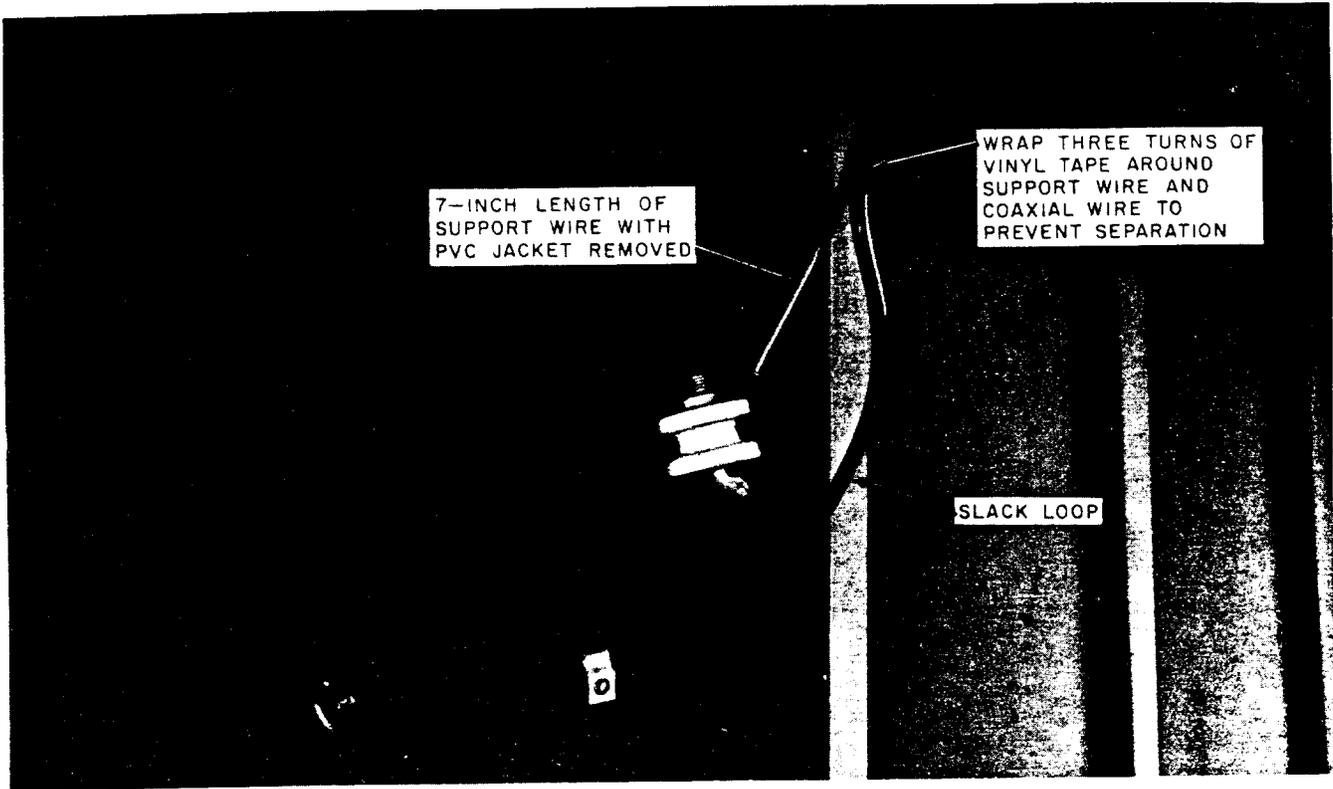


Fig. 2—Support Wire Separated From Coaxial Wire and PVC Jacket Removed



Fig. 3—Attaching F Coaxial Wire to First House Attachment With Preformed Deadend

*Note:* A Reliable Electric wire vise may be used for attaching the coaxial wire to the first house attachment (Fig. 4).



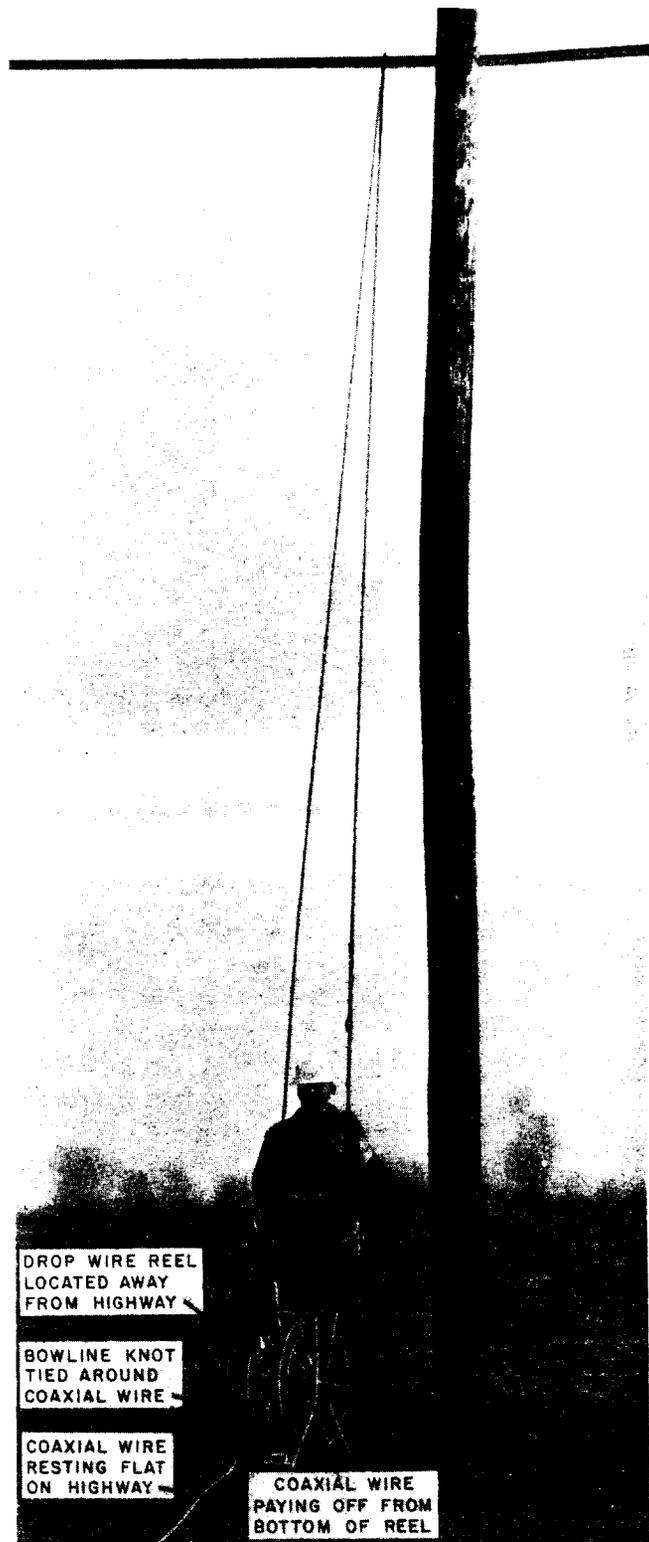
**Fig. 4—F Coaxial Wire Attached to First House Attachment With a Reliable Steel Wire Vise**

**4.06** Place a handline over the strand, guard arm, drive hook, or crossarm (similar to Fig. 5) so that both ends reach the ground with no excess length in that portion of handline toward the building. If practical, the handline may be formed into a coil at one end and thrown over the strand. After the handline has been placed, tie it to the base of the pole or the lower rungs of the ladder to avoid interference with pedestrians or vehicles. If it is necessary to climb the pole or ladder to place the handline, install any drop wire support that is needed while aloft.

**4.07** Roll or carry the drop wire coil or reel to the pole, paying out the wire along the way.

**4.08** Release the handline from the base of the pole, tie a bowline knot around the coaxial wire, and raise as shown in Fig. 6. When the loop in the handline has reached the required height, secure the handline to the base of the pole (Fig. 7).

**4.09** Pull the excess slack from the coaxial wire and wind on the reel.



**Fig. 5—♦Handline Placed Over Strand♦**

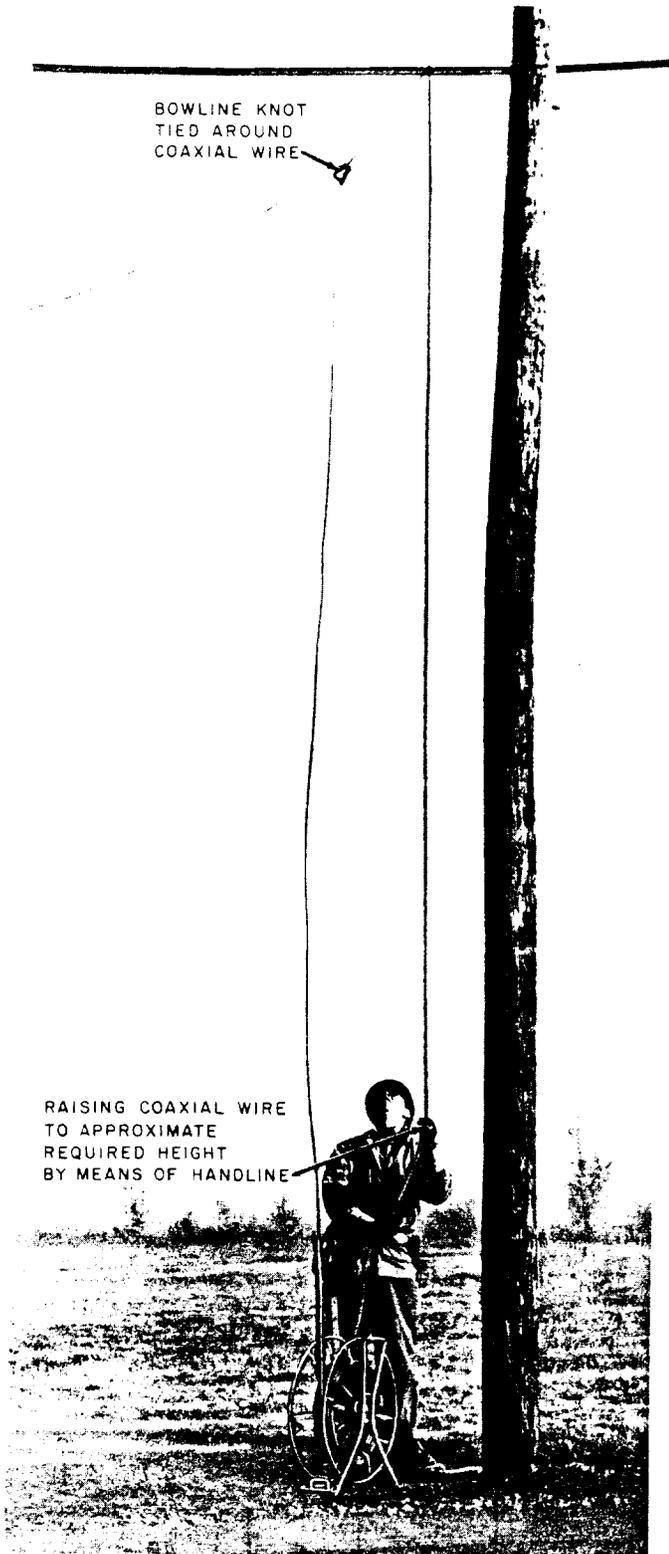


Fig. 6—Raising Coaxial Wire

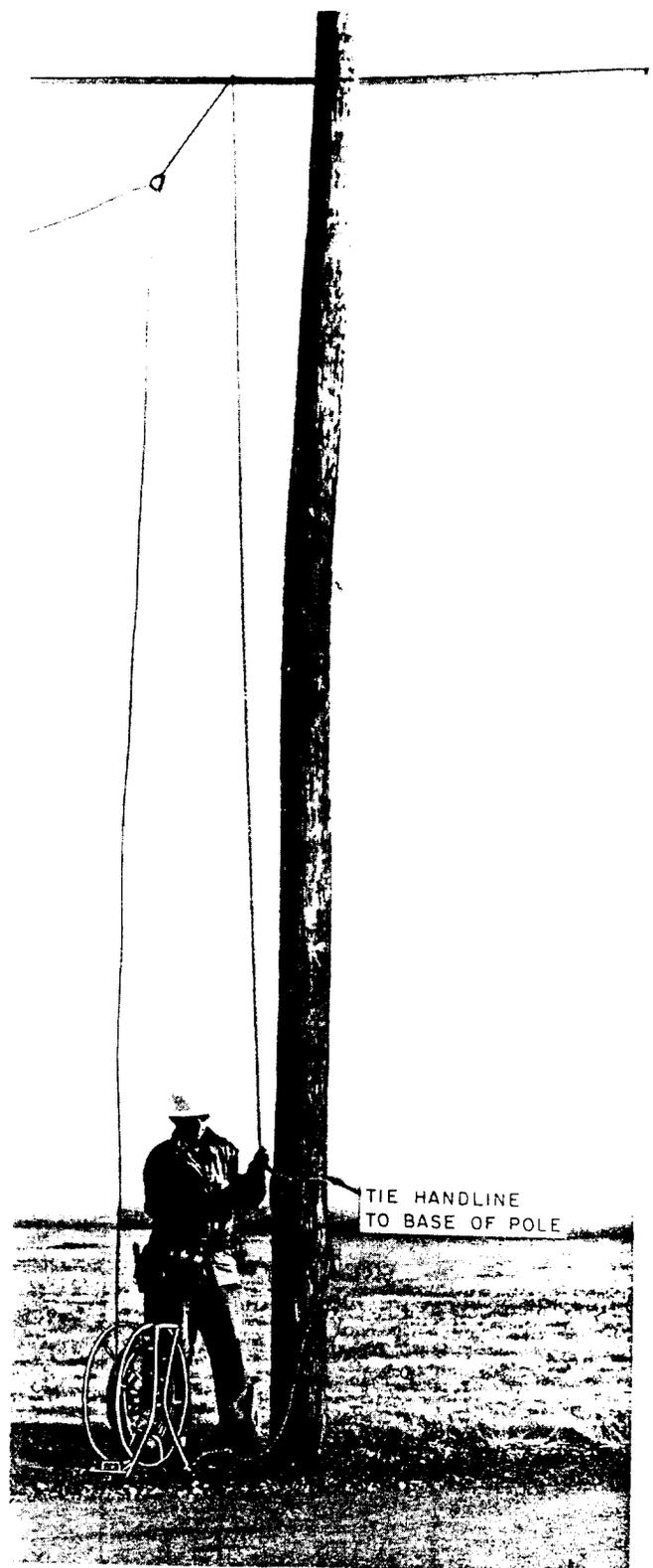


Fig. 7—Coaxial Wire Raised to Required Height

**SECTION 462-405-205**

- 4.10** Set the hand brake on the drop wire reel to restore the coaxial wire under tension.
- 4.11** Climb the pole and, if required, install a drive hook on the pole.
- 4.12** If the span is less than 90 feet, pull the drop wire hand-tight until the required stringing sag listed in Table A is obtained. The sag may be estimated by sighting between wire attachments.
- 4.13** For spans over 90 feet install a drop wire puller or slack block on the F coaxial wire as follows (Fig. 8):
- (a) Suspend the hook of the wire puller on the drive hook installed on the pole.
- (b) Pull the drop wire hand-tight with handline and then reach out and place the wire grip of the puller on the support wire. ***The jaws of the drop wire puller or slack block must engage only the support wire.***
- 4.14** Take up on the pulling strap or rope until the required stringing sag listed in Table A is obtained. The sag may be estimated by sighting between wire attachments.
- 4.15** The maximum span lengths and minimum stringing sags for the F coaxial wire in each of the three loading areas are listed in Table A.

**TABLE A**  
**MINIMUM STRINGING SAGS AND MAXIMUM SPAN LENGTHS FOR F COAXIAL WIRE**

LOADING AREA	SPAN LENGTH (FT) (MAX)	COLD (BELOW FREEZING)			WARM (ABOVE FREEZING)		
		STRINGING SAG		TENSION	STRINGING SAG		TENSION
		FT	IN.	LB (APPROX)	FT	IN.	LB (APPROX)
Heavy	50	0	4	51	0	5	45
	75	0	9	51	1	0	45
	100	1	7	51	1	9	45
	125	2	7	51	2	10	45
	150	3	10	51	4	1	45
Medium	50	0	4	51	0	5	45
	75	0	9	51	1	0	45
	100	1	7	51	1	9	45
	125	2	7	51	2	10	45
	150	3	10	51	4	1	45
	175	5	3	51	5	6	45
	200	6	11	51	7	2	45
Light	50	0	4	51	0	5	45
	75	0	9	51	1	0	45
	100	1	7	51	1	9	45
	125	2	7	51	2	10	45
	150	3	10	51	4	1	45
	175	5	3	51	5	6	45
	200	6	11	51	7	2	45
	225	8	10	51	9	1	45
	250	11	0	51	11	3	45

## 5. ATTACHING F COAXIAL WIRE TO POLE

5.01 Measure the coaxial wire to go down the pole to the terminating point allowing for approximately a 6-inch drip loop, then cut the

coaxial wire. Attach the handline and remaining coaxial wire to the B handline carrier or under the body belt as previously mentioned and carry them down the pole in this manner. *Do not drop them to the ground.*



Fig. 8—Installed Drop Wire Puller

5.02 Slit the web and separate the support wire and coaxial wire for a distance of approximately

8 inches from the drive hook (Fig. 9) and remove the PVC jacket from the support wire.

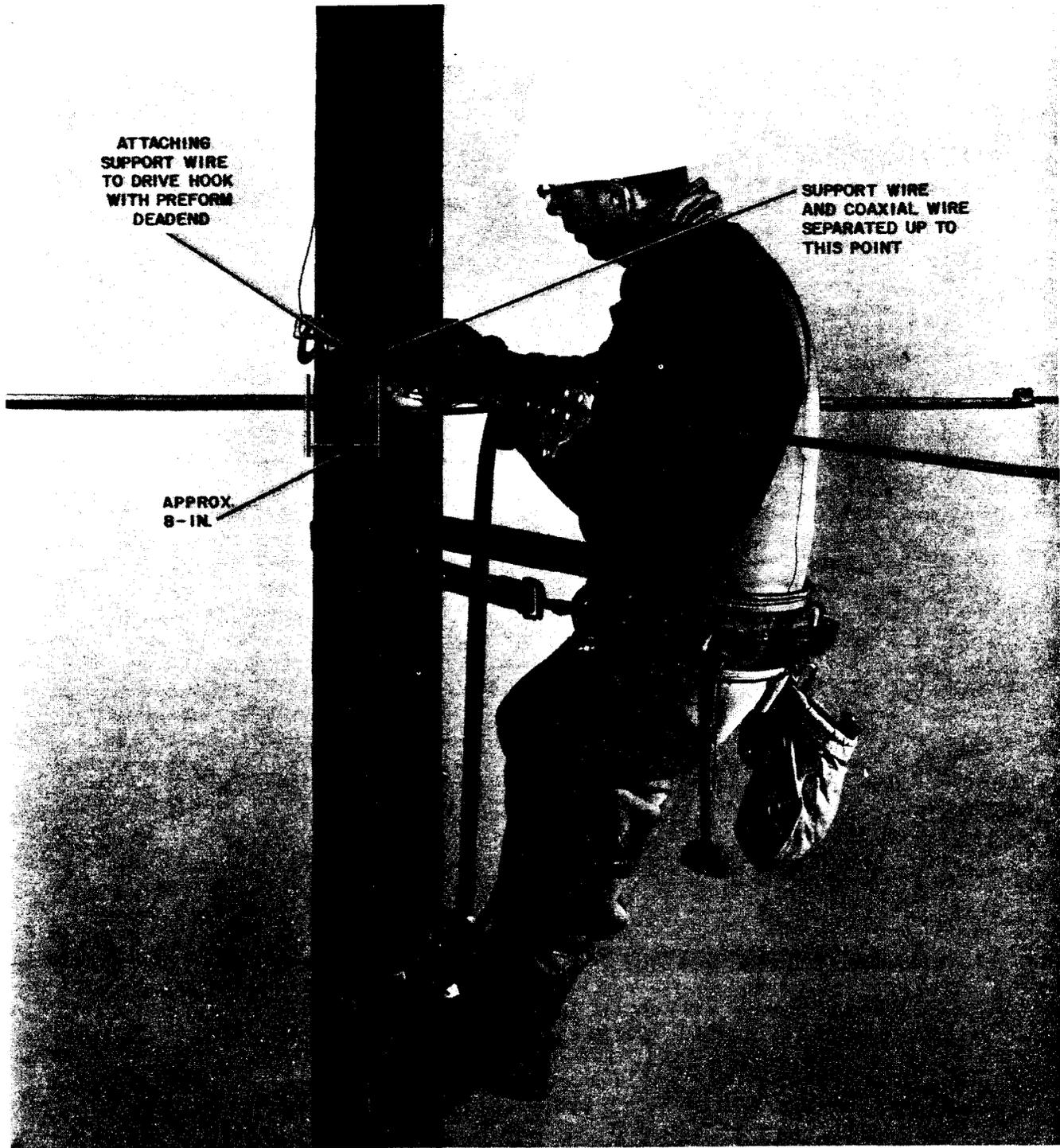
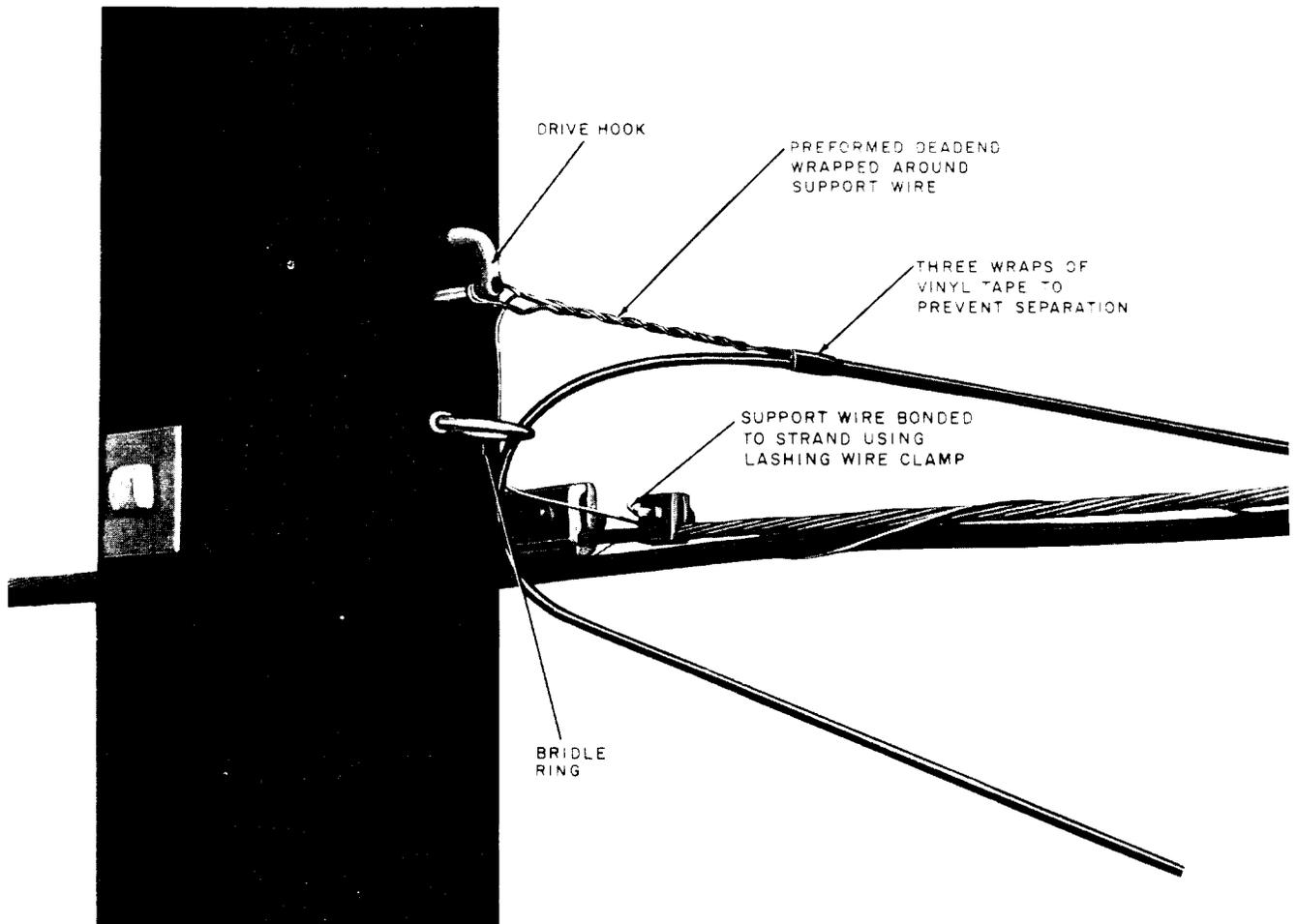


Fig. 9—Attaching F Coaxial Wire to Pole

**5.03** Attach the support wire to the drive hook with a Preformed deadend or a Reliable Electric wire vise as shown in Fig. 10.

**5.05** Route the support wire through the bridle ring and bond to the strand using a D lashing wire clamp as shown in Fig. 10.

**5.04** Remove the drop wire puller or slack blocks and handline from the drop wire.



**Fig. 10—F Coaxial Wire Attached to Pole**

**6. INSTALLING F COAXIAL WIRE AT MIDSPAN**

**6.01** Install a span clamp and attach the F coaxial wire as shown in Fig. 11.

**7. PLACING E AND G COAXIAL WIRE**

**AERIAL**

**7.01** Wrap the E coaxial wire around a Preformed coaxial deadend and attach to the first house attachment as shown in Fig. 12 or use an S wire grip for dead ending the coaxial wire as follows:

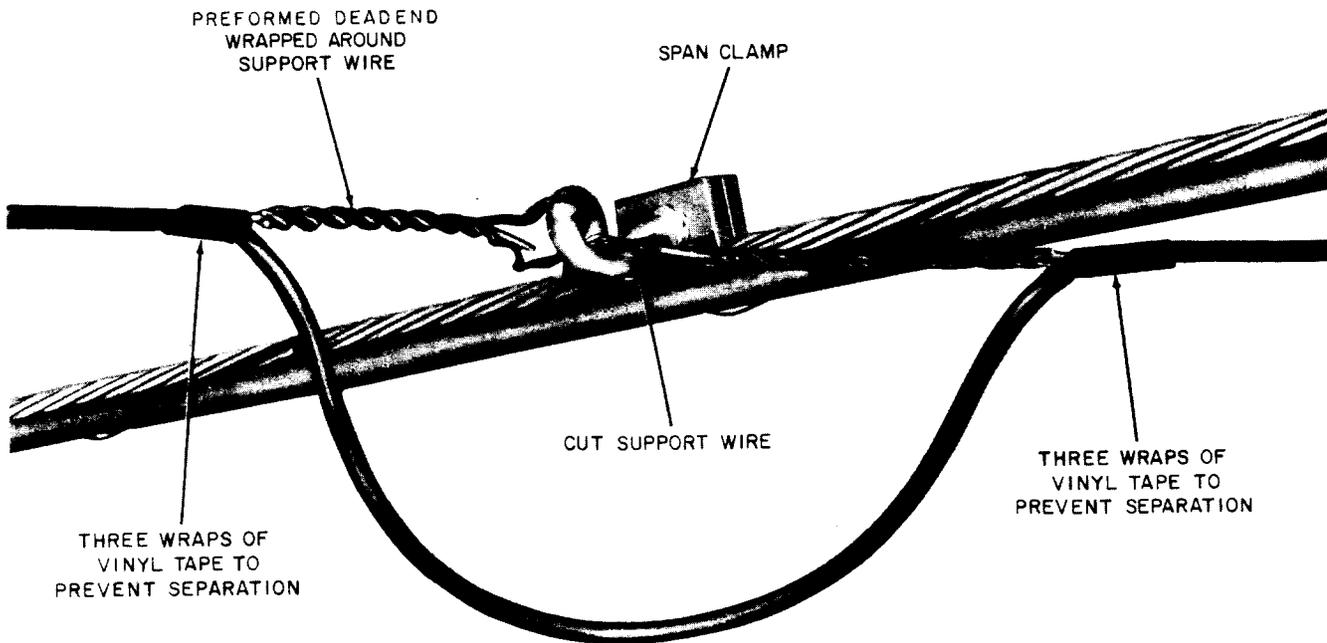
- (a) Bend the keeper wire up.
- (b) Lay the coaxial wire in first spiral under keeper wire and bend keeper wire down.
- (c) Place the coaxial wire in each spiral of the S wire grip.

(d) Place the ball (Fig. 13) of the S wire grip on the house or pole attachment.

**7.02** Place Preformed deadend DE-2507 on the G coaxial wire shown in Fig. 14 as follows:

- (a) Wrap first leg of deadend around wire starting with spiral between orange and black marks.
- (b) Wrap second leg of deadend around wire with black mark adjacent to the black mark on the first leg.
- (c) Place the loop of the Preformed deadend on the house or pole attachment.

**7.03** The procedures for raising the E and G coaxial wire are the same as for the F coaxial wire covered in 4.06 through 4.10.



**Fig. 11—F Coaxial Wire Attached at Midspan**

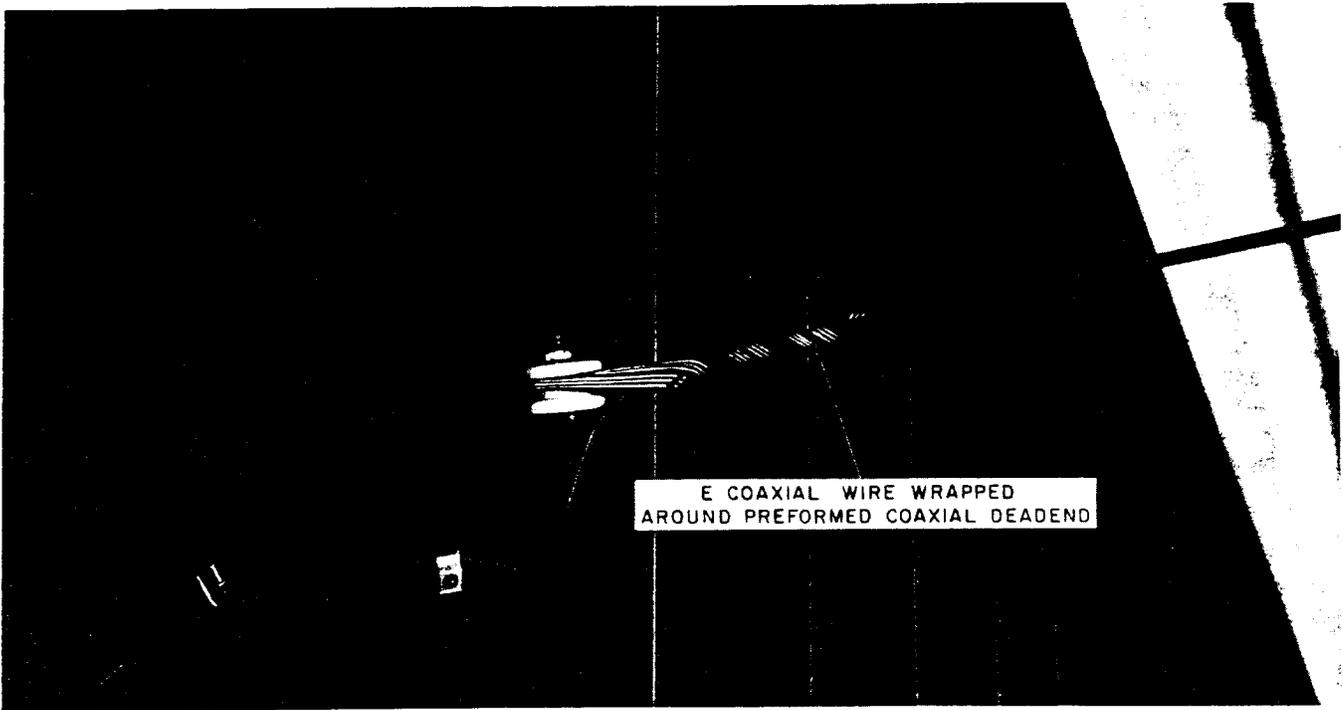


Fig. 12—E Coaxial Wire Attached to First House Attachment

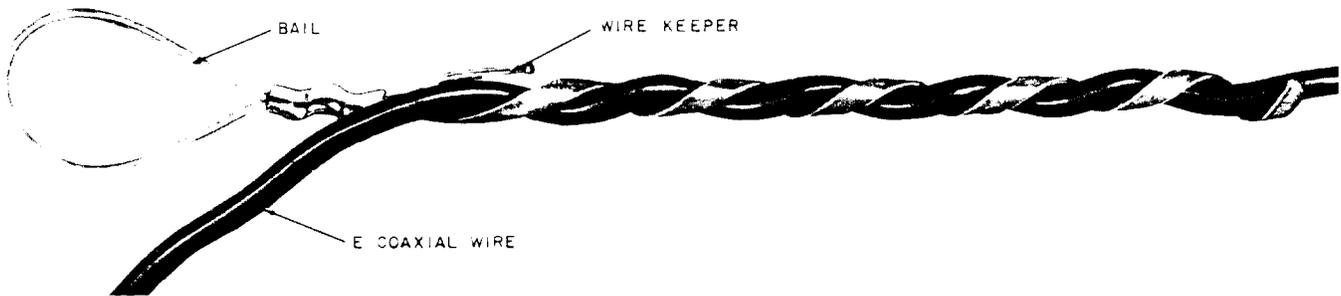


Fig. 13—Dead Ending E Coaxial Wire With 5 Wire Grip

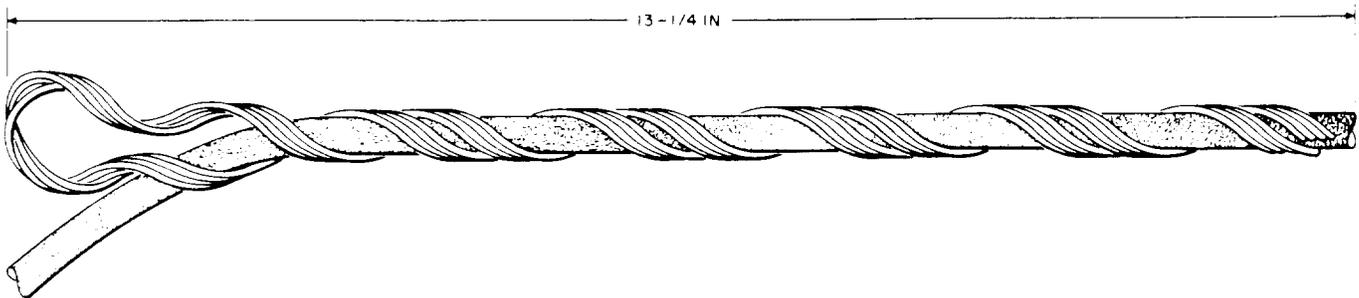


Fig. 14—Dead Ending G Coaxial Wire With Preformed Deadend DE-2507

**SECTION 462-405-205**

**7.04** Pull the E coaxial wire by hand until the required sag listed in Table B is obtained, wrap around a Prefomed coaxial deadend or S wire grip, and attach to a drive hook on the pole

(Fig. 14). When attaching E coaxial wire at midspan install a span clamp on the strand and attach the E coaxial wire with a Prefomed coaxial deadend.

**TABLE B  
MINIMUM STRINGING SAGS AND MAXIMUM SPAN LENGTHS  
FOR E COAXIAL WIRE**

LOADING AREA	SPAN LENGTH (FT) (MAX)	STRINGING SAG		TENSION LB (APPROX)
		FT	IN.	
Heavy	20	0	1	20
	30	0	3	20
	40	0	5	20
	50	0	7	20
Medium	20	0	1	20
	30	0	3	20
	40	0	5	20
	50	0	7	20
	60	0	10	20
	70	1	2	20
	80	1	6	20
	90	1	11	20
	100	2	4	20
	Light	20	0	1
30		0	2	30
40		0	3	30
50		0	5	30
60		0	7	30
70		0	9	30
80		1	0	30
90		1	3	30
100		1	7	30
110		1	11	30
120		2	3	30
130		2	8	30
140		3	1	30
150		3	6	30

*Note:* No temperature information is provided for the E Coaxial Wire due to the limited length of the span.

7.05 Pull the G coaxial wire by hand until the required sag listed in Table C is obtained. Place a Preformed deadend DE-2507 and attach to

drive hook on pole or to span clamp in midspan in manner shown for E or F coaxial wire in Fig. 11 and 15.

TABLE C  
NORMAL STRINGING SAGS AND TENSIONS FOR G COAXIAL WIRE

STORM LOADING AREA	SPAN LENGTH (FT)	STRINGING TENSION (LBS)	STRINGING SAG		STORM LOADED SAG		SUBSEQUENT SAG	
			(FT)	(IN.)	(FT)	(IN.)	(FT)	(IN.)
Heavy	50	30	0	5	1	10	0	5
	75		0	11	3	2	1	0
	100		1	8	4	10	1	10
	125		2	7	6	9	3	0
	150		3	8	8	10	4	4
	175		5	1	11	1	5	10
	200		6	7	13	6	7	8
Medium	50	30	0	5	1	5	0	5
	75		0	11	2	7	0	11
	100		1	8	3	11	1	8
	125		2	7	5	6	2	7
	150		3	8	7	3	3	10
	175		5	1	9	1	5	2
	200		6	7	11	2	6	10
Light	50	30	0	5	1	0	0	5
	75		0	11	1	11	0	11
	100		1	8	3	0	1	8
	125		2	7	4	3	2	7
	150		3	8	5	8	3	8
	175		5	1	7	4	5	1
	200		6	7	9	1	6	7

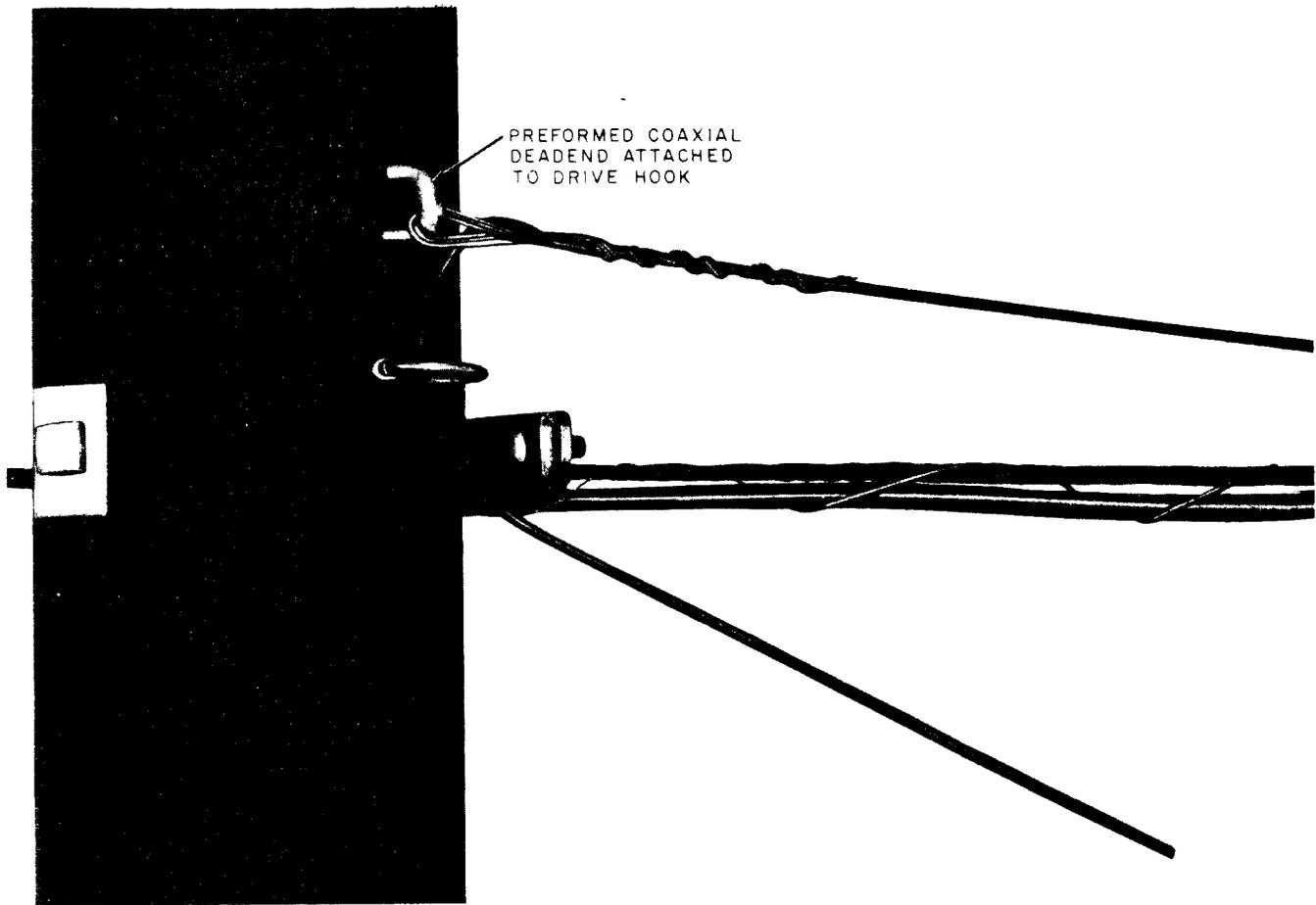


Fig. 15—E Coaxial Wire Attached to Pole

**7.06** If minimum sag shown in Table D is required for clearance it will be necessary to pull the G coaxial wire with a drop wire puller, (Fig. 8). (See Section 462-400-200.)

**BURIED**

**7.07** Using a static plow, bury the E or G coaxial wire using the approved method for burying telephone service wire observing the precautions outlined in Section 629-100-010.

**8. PREPARING COAXIAL WIRE**

**8.01** The procedure for preparing the coaxial wire for installation of the F-59 connector is as follows using the dimensions as indicated in Table E.

- (a) Remove the PVC jacket from the wire. It is not necessary to cut through the braid of E and F coaxial wire for this operation. However, the braid and jacket of G coaxial wire must be removed in one operation.

**TABLE D**  
**MINIMUM STRINGING SAGS AND MAXIMUM STRINGING**  
**TENSIONS FOR G COAXIAL WIRE**

STORM LOADING AREA	SPAN LENGTH (FT)	STRINGING TENSION (LBS)	STRINGING SAG		STORM LOADED SAG		SUBSEQUENT SAG	
			(FT)	(IN.)	(FT)	(IN.)	(FT)	(IN.)
Heavy	50	50	0	3	1	8	0	3
	75		0	7	3	1	0	7
	100		1	0	4	8	1	2
	125		1	7	6	5	2	0
	150		2	3	8	4	3	0
	175		3	0	10	5	4	2
	200		3	11	12	9	5	7
Medium	50	50	0	3	1	4	0	3
	75		0	7	2	5	0	7
	100		1	0	3	8	1	0
	125		1	7	5	1	1	7
	150		2	3	6	7	2	5
	175		3	0	8	4	3	4
	200		3	11	10	1	4	5
Light	50	50	0	3	0	11	0	3
	75		0	7	1	10	0	7
	100		1	0	2	8	1	0
	125		1	7	3	8	1	7
	150		2	3	4	11	2	3
	175		3	0	6	2	3	0
	200		3	11	7	7	3	11

**TABLE E**  
**DIMENSIONS FOR WIRE PREPARATION**

TYPE OF FITTING	PVC SHEATH REMOVED (IN.)	EXPOSED CONDUCTOR (IN.)	EXPOSED INSULATION (IN.)
F-59	1/2	5/16	3/16

(b) Fold the braid back over the PVC jacket of the E and F coaxial wire (Fig. 16). This operation is not required for the G coaxial wire. Additional operations are required when preparing G coaxial wire: Rotate the insulated inner conductor to spread the longitudinal copper strip outer conductor. Trim off the copper strip outer conductor near the braid over the PVC jacket.

(c) Remove the required polyethylene insulation from the conductor by cutting three-fourths through the insulation, then twist the piece of insulation to be removed between the thumb and forefinger while pulling toward the end of the wire. Exercise care not to bend or touch the exposed conductor with fingers. This may cause the conductor to corrode.

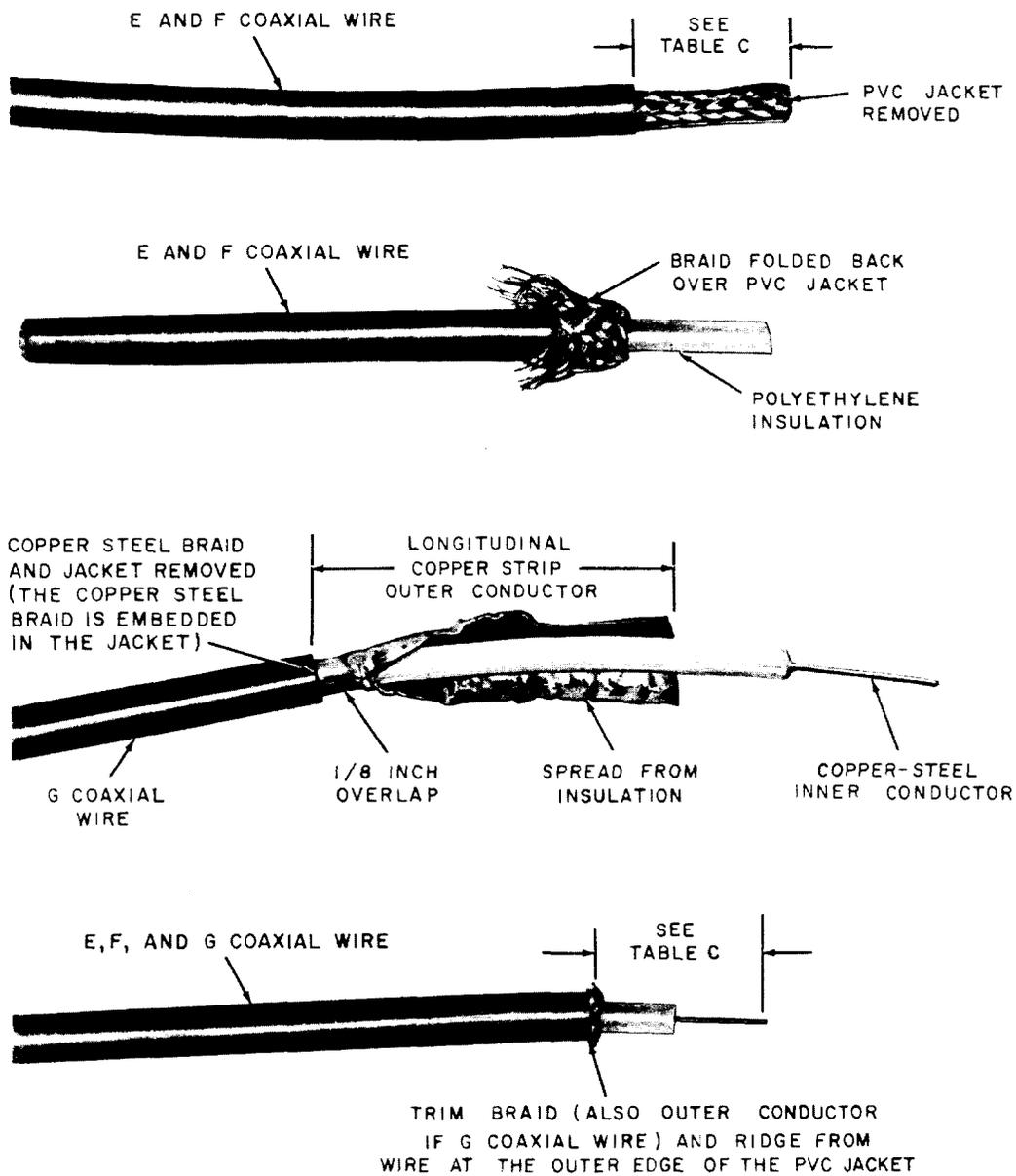
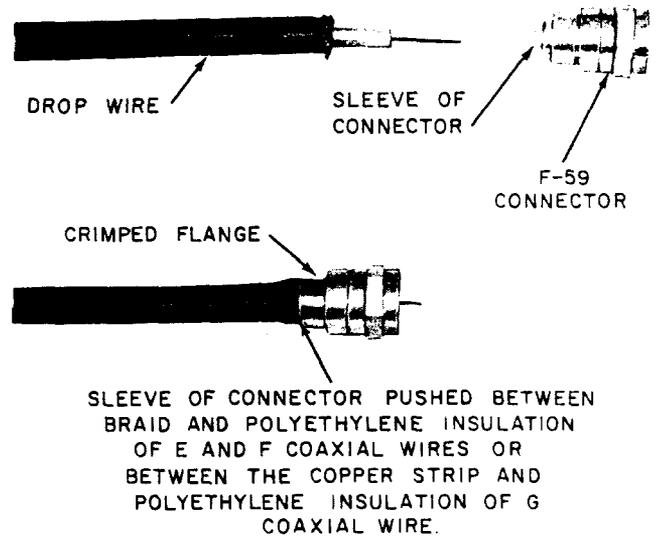


Fig. 16—Coaxial Wire Preparation

- (d) Remove any burrs from the end of the conductor using a small file with *smooth light* strokes.
- (e) Trim the braid of the E and F coaxial wire at the outer edge of the PVC jacket.
- (f) Trim the ridge from the F coaxial wire at the outer edge of the PVC jacket.

## 9. INSTALLATION OF CONNECTOR

- 9.01** Insert the conductor and polyethylene insulation into the sleeve of the F-59 connector (Fig. 17).
- 9.02** Push the sleeve between the braid and insulation of the E or F wire or between the copper strip and insulation of G wire. The edge of the PVC jacket, the braid and the copper strip must be concealed under the flange of the connector and the polyethylene insulation fitted flush with the bottom of the swivel portion of the connector.



**Fig. 17—Installation of F-59 Connector**

SECTION 462-405-205

9.03 Crimp the flange of the connector using a PL-602 Jerrold or CT-598 Entron crimping tool.

9.04 Connect the F-59 connector to the pressure tap (Fig. 18) or multiple tap (Fig. 19). The wire from the connector must be formed into a slack loop which extends at least 6 inches below the strand.

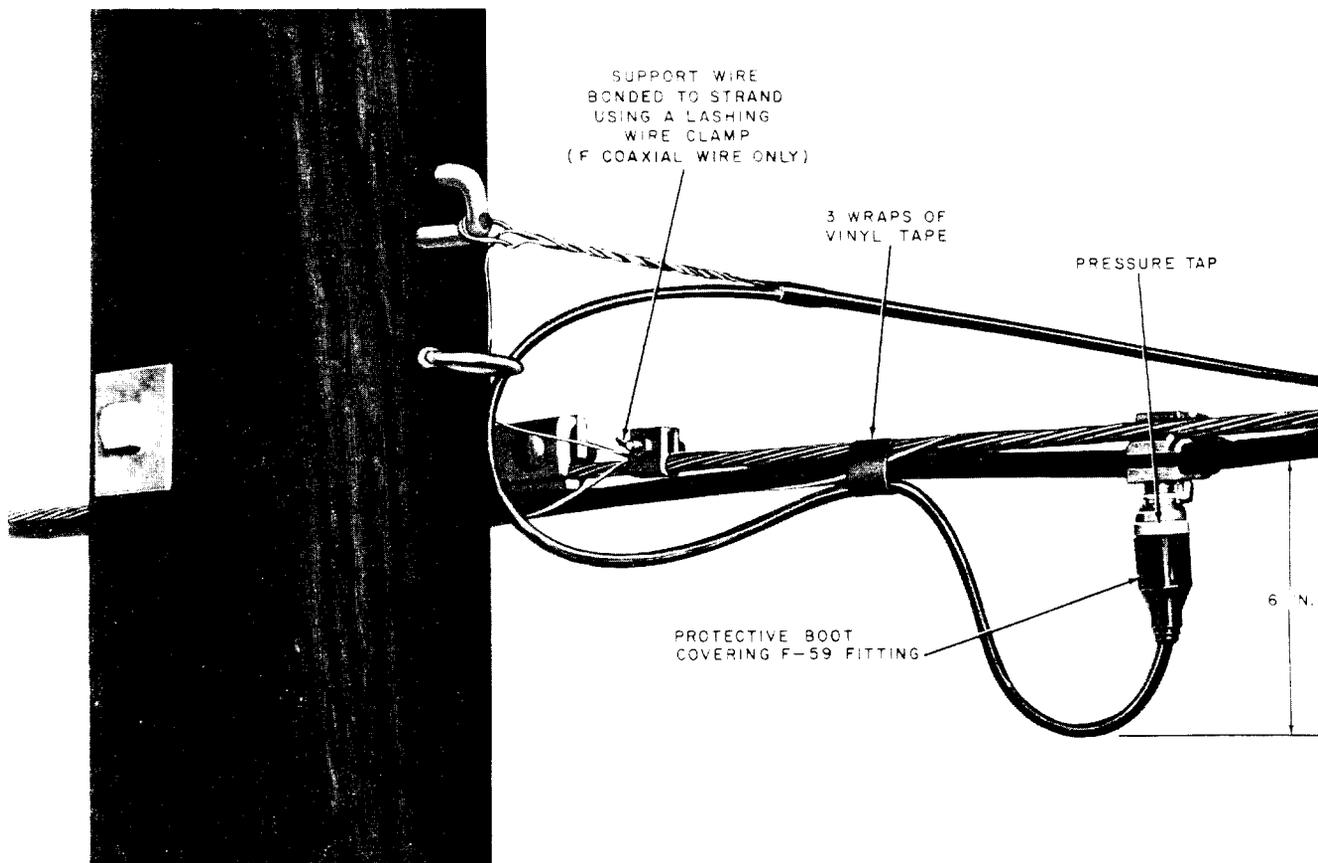


Fig. 18—Completed Connection at Pressure Tap

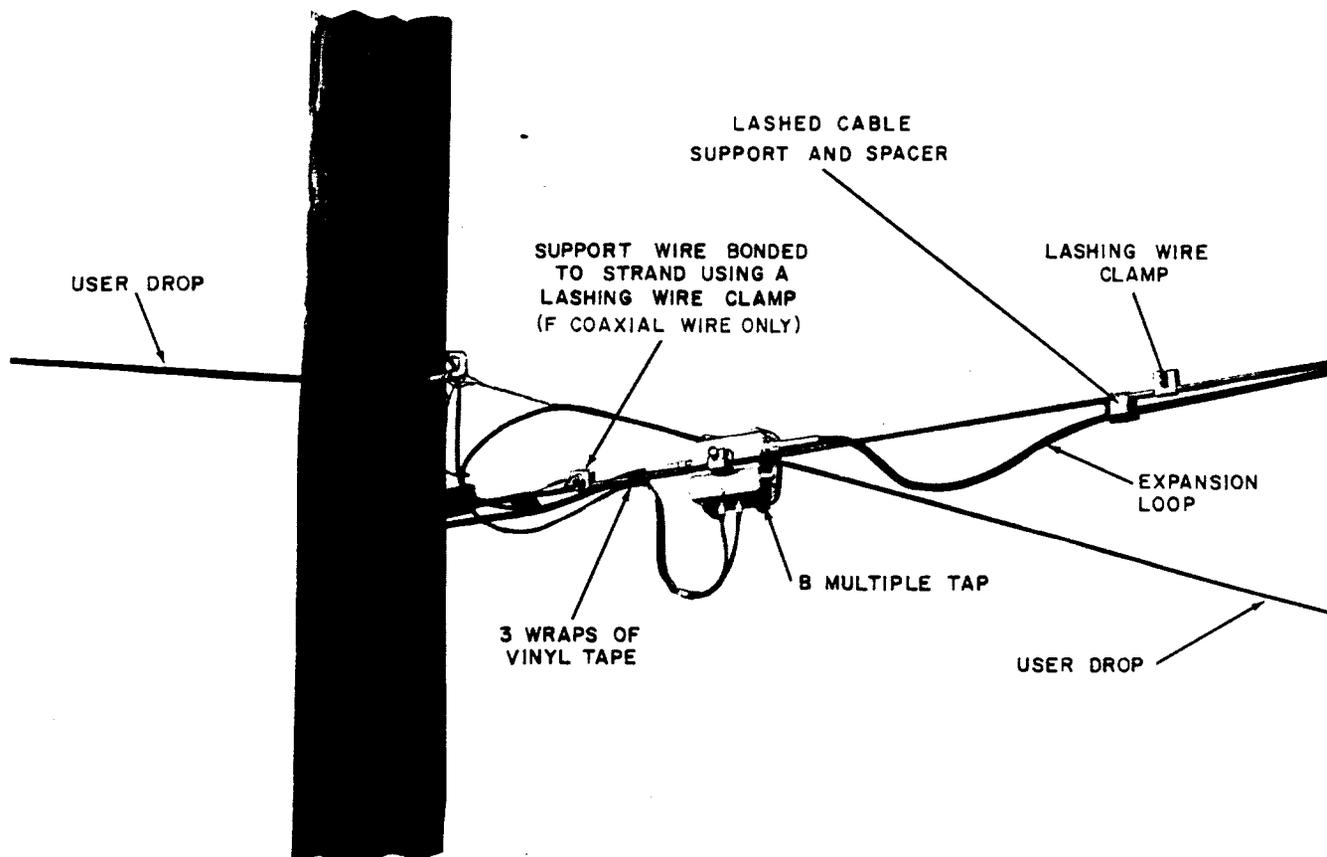


Fig. 19—Completed Connection at B Multiple Tap

## 10. BUILDING RUN

**10.01** Run the coaxial wire from the first house attachment to the grounding block (Fig. 20) in a standard manner observing the following:

- (a) When making a turn, maintain a minimum radius of 4 inches.
- (b) Avoid pulling the coaxial wire tight around sharp corners; use No. 4 galvanized cable clamps on each side and make a slack corner.

**10.02** Use a No. 4 galvanized cable clamp for making the first and last clamping attachments. **Do not use drop wire clamps or clips for any attachment.** On intermediate attachments conventional rings may be used.

## 11. TERMINATING DROP WIRE AT GROUNDING BLOCK

**11.01** Prepare the coaxial wire and install an F-59 type connector as outlined in Parts 8 and 9.

**11.02** Connect the F-59 connector to the grounding block. Figure 20 illustrates the coaxial wire installed on the grounding block.

## 12. PLACING GROUNDING WIRE

**12.01** For grounding purposes consider the grounding block as being equivalent to two fuseless station protectors. Install a 12-gauge ground wire for each ground block. In the case of multiple installations refer to the 638 Division of the Bell System Practices.

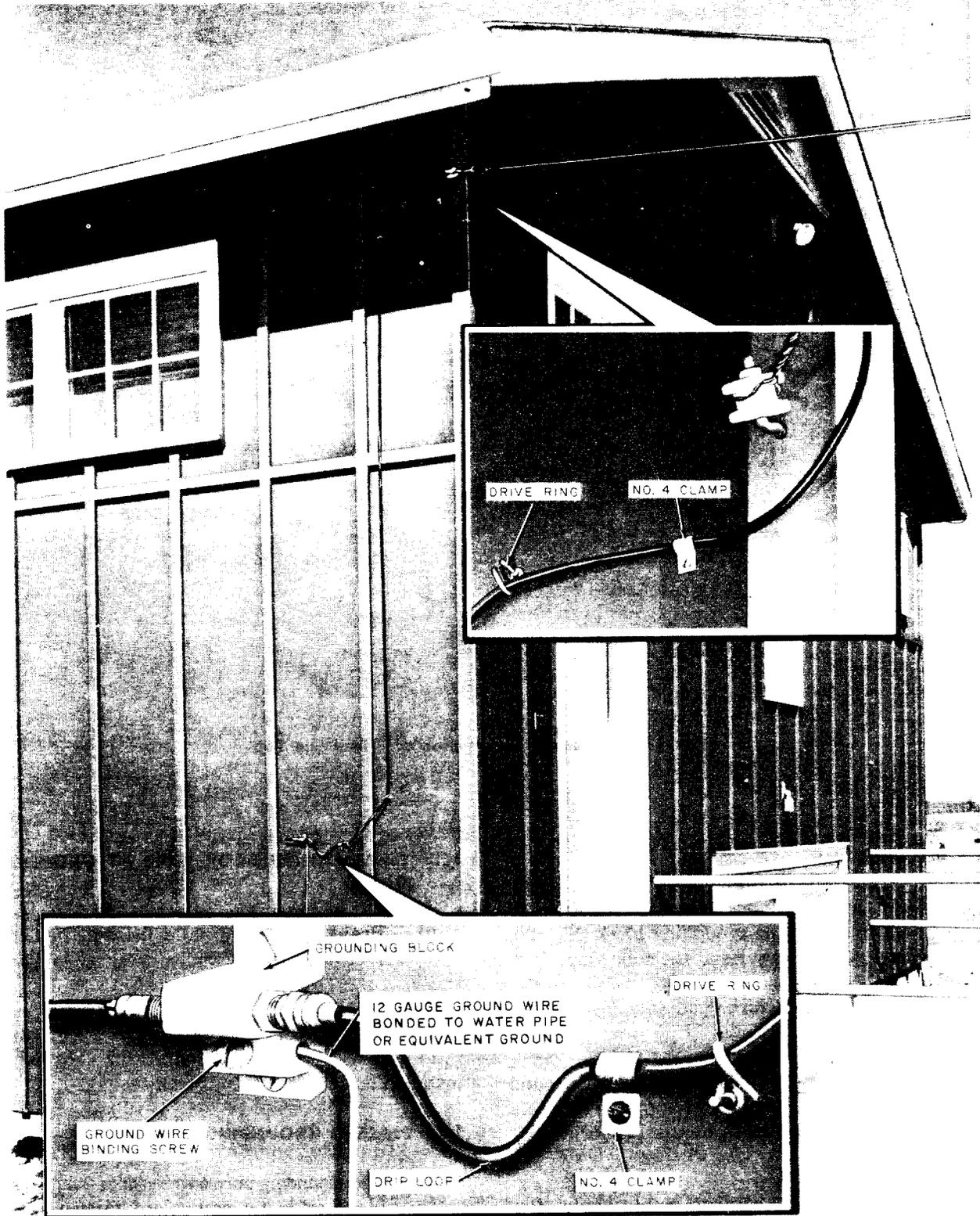


Fig. 20—Building Run

- 12.02 Tighten the ground wire binding screw.
- 12.03 Bond the ground wire to a water pipe or equivalent ground as outlined in Section 460-100-201.

**13. REPAIRING E OR G COAXIAL WIRE**

13.01 The following hardware is required for repairing a damaged *buried* E or G coaxial wire. Repairing *aerial* E, F, or G coaxial wire is not recommended as the splice will not withstand the stress involved, therefore damaged aerial installation of coaxial wire should be replaced rather than repaired.

(a) Coaxial coupling connector C-F-81A (Fig. 21) is a coupling device with a male thread on each end that will fit a standard F-59 connector.

(b) Cable connector F-59 (Fig. 22) is placed on the ends of the E or G coaxial wire for connecting the E or G coaxial wire to the coupling.

13.02 Prepare the E or G coaxial wire and install F-59 cable connector on each of the wire ends to be spliced as outlined in Parts 8 and 9.

13.03 Secure the F-59 cable connectors to the coaxial coupling connector. (Fig. 22.)

13.04 Cover the entire splice with B sealing tape, then apply two half-lapped layers of DR tape over the B sealing tape. Cover the DR tape with two half-lapped layers of D or F vinyl tape.

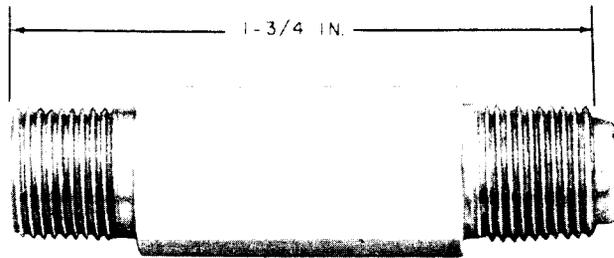


Fig. 21—C-F-81A Coaxial Coupling Connector

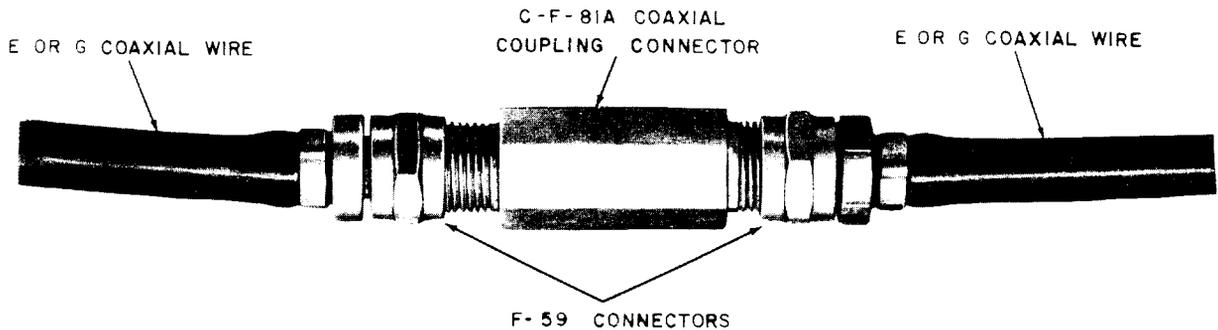


Fig. 22—F-59 Connector Secured to Coaxial Coupling