

BELL SYSTEM PRACTICES
Outside Plant Construction
and Maintenance

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CABLE TERMINATING

ORDERING AND INSTALLING CABLE FORMS

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1. GENERAL

1.01 This Section contains instructions for ordering cable forms used to terminate paper-insulated lead-covered exchange cables and covers the method of installing them on main distributing and protector type frames.

1.02 A cable form usually consists of a length of textile insulated cable, one end of which has a portion of the sheath removed and the exposed conductors sewn together. The wires are brought out at regular intervals along all or part of the unsheathed portion. The wires brought out of the form between stitches are called skimmers.

1.03 The principal changes made in this Section are: It covers (1) the method of terminating cable forms on frames equipped with jacks, (2) the installation of forms on frames where flood water is a potential hazard, and (3) the closing of the slot under the frame.

2. INSTRUCTIONS FOR ORDERING CABLE FORMS

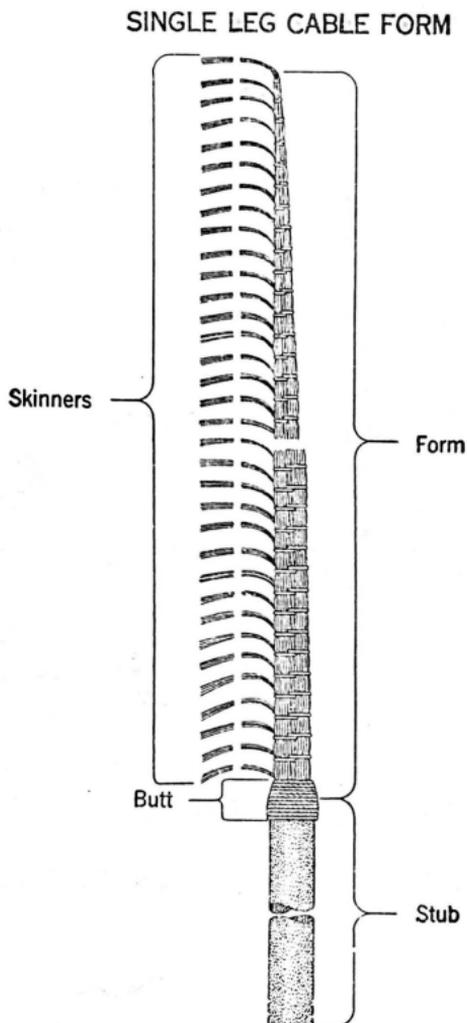
2.01 These instructions are intended to apply primarily to orders for cable forms placed on Telephone Company form shops. It is necessary to give complete details with respect to the dimensions of the cable form and its make-up. It is advisable to prepare a sketch for this purpose. The items to be given are:

- (a) The code or drawing number and size of the textile cable.
- (b) When color-code cable is ordered, indicate whether the pair count should begin at the butt or the tip of the form and in the case of multi-leg cable forms, indicate the pair count of each leg.
- (c) The position and length of the legs on multi-leg cable forms.
- (d) The spacing of the skimmers.
- (e) When skimmers over eight inches long are required, indicate their length.
- (f) The length of the stub, i. e., of the sheathed portion of the cable form.
- (g) The order or estimate number.

2.02 The cable forms for terminating exchange cables are generally made of 22-gauge textile-insulated cable. However, 24-gauge textile cable may be used on paper-insulated cables which are entirely underground and also on exposed cables which are adequately protected by fuses. The forms for terminating quadded paper-insulated cable should be made of 19-gauge quadded textile cable.

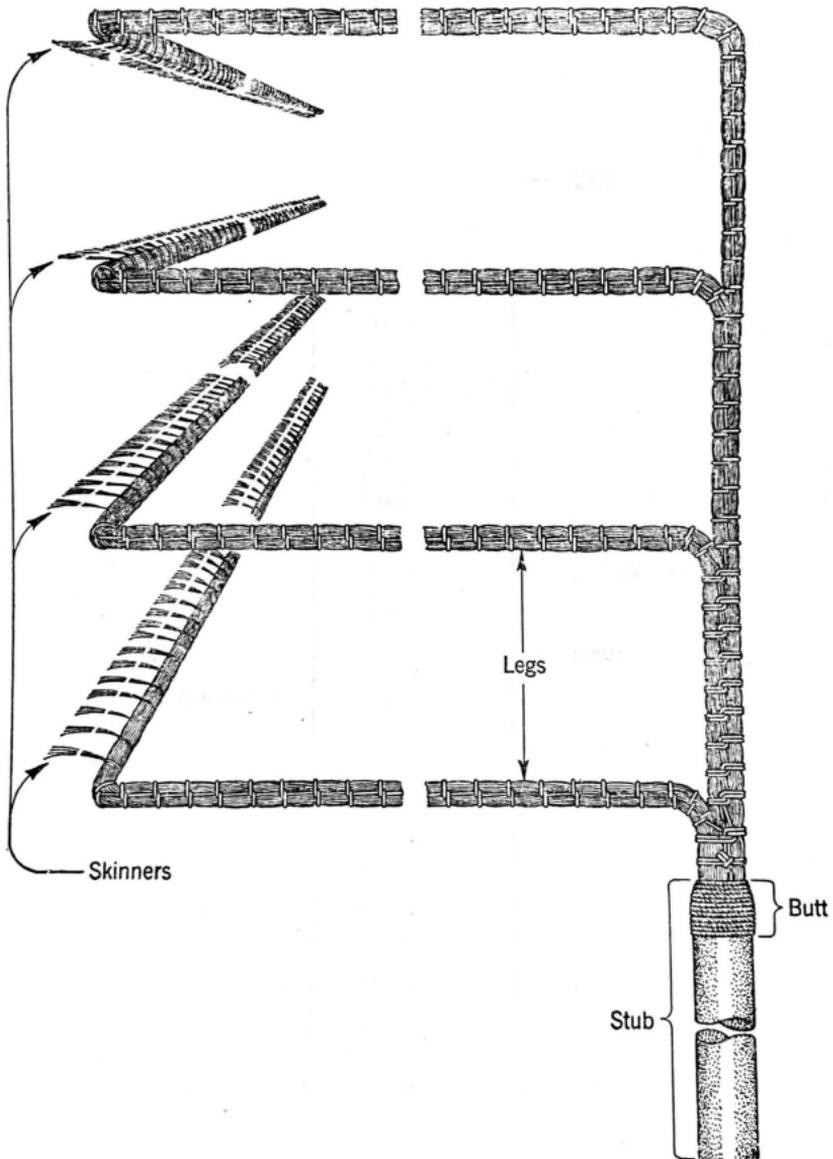
3. DETAIL PARTS OF CABLE FORMS

3.01 The various parts of a single leg cable form are shown in the following sketch.



3.02 The following illustration shows the detail parts of a multi-leg cable form.

MULTI-LEG CABLE FORM



4. MATERIALS

4.01 The names of the materials used to install forms on frames are given below.

Boards, Asbestos: 1/4" x 8" x 16" (For closing slots beneath main distributing frames.)

1/4" x 4" x 11" (For closing slots beneath double-sided frames where the FA-202 Slot Covers cannot be used.)

FA-202 Slot Covers (For closing slots beneath double-sided frames where two 202-pair cables are terminated on a vertical.)

Clip, Flex-Wire (F-12): For attaching stubs of cable forms to transverse arms.

Covers, Slot: (See Asbestos Boards)

Houseline: (Available in 1-pound balls and 10-pound coils) For temporarily attaching forms to frames.

Insulator: P-420678 For insulating 1" x 3/8" channels.

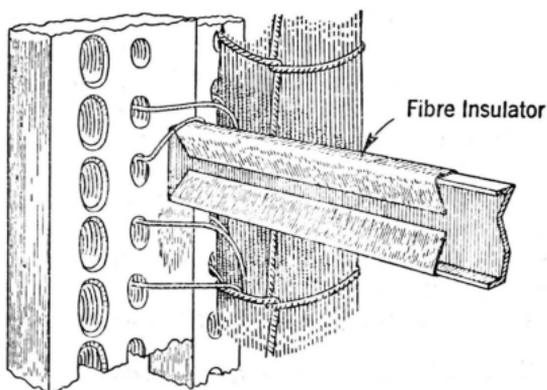
Insulator: P-420679 For insulating 1" x 1/2" channels.

Tape, Friction: (Black or Gray) (3/4" or 2") (Both sizes of black tape and the 3/4" gray tape are available in 36-foot and 75-foot rolls. The 2" gray tape is available in only 75-foot rolls.) For insulating frames when it is impracticable to install insulators.

Thread, Waxed Cotton: (6-ply or 12-ply) (Available in 1/4-pound and 1/2-pound tubes.) For attaching stubs to frames.

5. INSULATING FORMS FROM IRONWORK

5.01 The unsheathed portion of cable forms should be insulated from the ironwork of the frame. On "B" type frames the formed fibre insulators which are 4-3/4 inches long should be placed on the bars or channels and clamped under the fanning strip as follows: Loosen the screws in the fanning strip, place about 1/4" of the insulator under the strip and tighten the screws. When this is not feasible, the insulators should be butted firmly against the fanning strip, as shown below. On "A" type frames where it is impracticable to install insulators, cover the ironwork where the unsheathed portion of the form will be attached to the frame with two layers of friction tape.

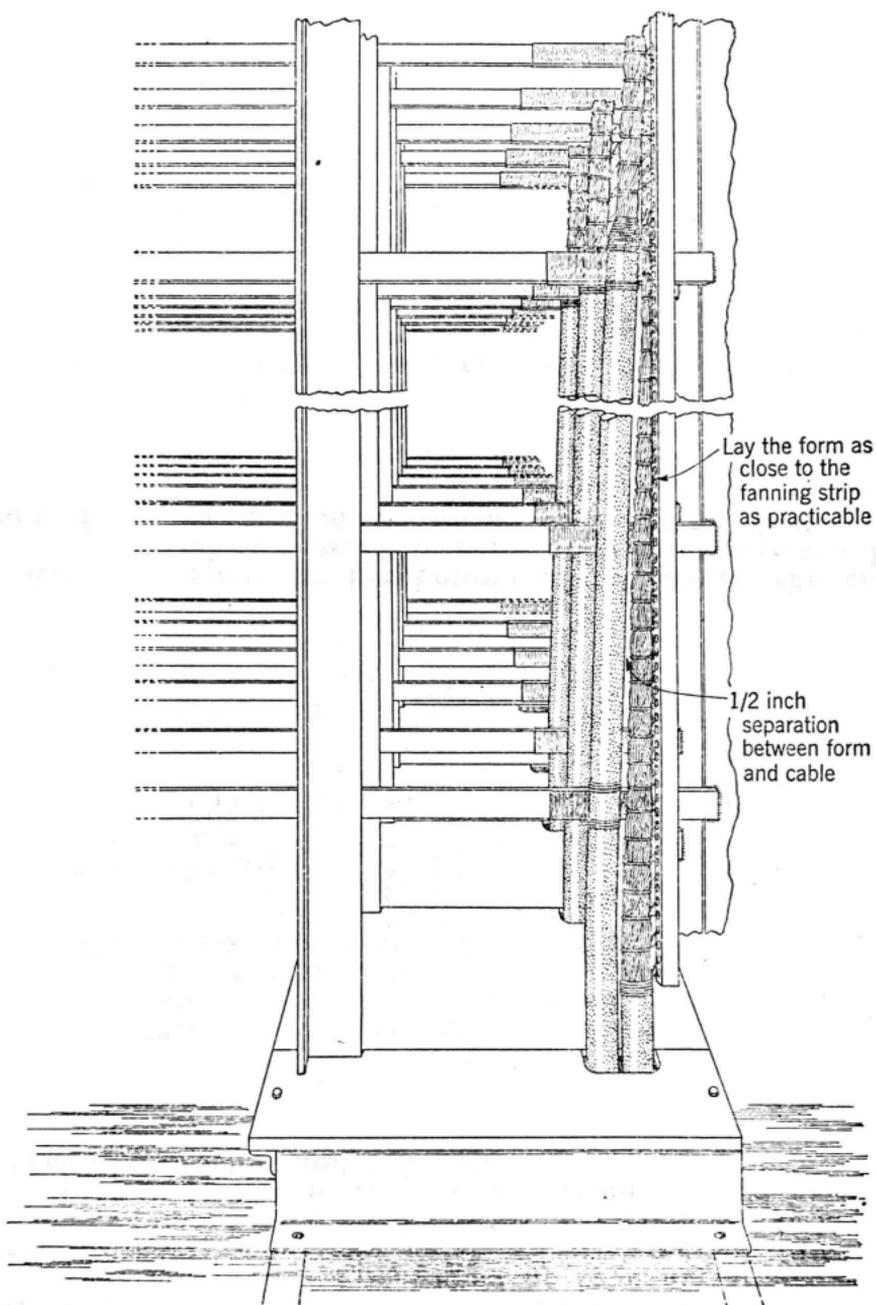


6. INSTALLING FORMS ON "B" TYPE FRAMES

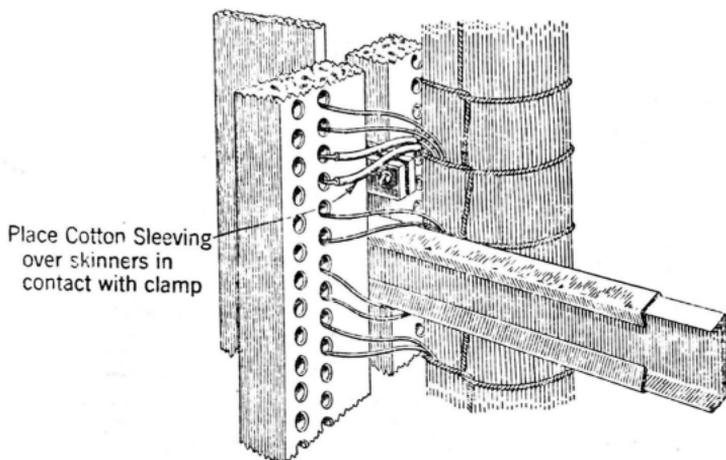
6.01 The method of installing cable forms on "B" type frames applies also to forms terminated on double-sided protector frames. The "B" type frame has protector or jack mountings on one side of the frame, whereas the protector frame has protector mountings on both sides.

6.02 In installing a cable form, feed the stub into the cable vault or splicing pit through the slot or hole under the frame and support it temporarily with ties made of house-line or waxed thread. Lay the fanned portion as close to the back of the fanning strip as practicable with the skimmers extending through the holes in the fanning strip in line with the lugs to which the skimmers are to be connected.

6.03 When a second form is terminated on a vertical, as is the case where a frame is provided with a mezzanine, place the stub back of the form connected to the lower protectors, as shown below. In this case also the fanned portion should be placed along the back of the fanning strip with the skimmers in line with the lugs to which they are to be connected.

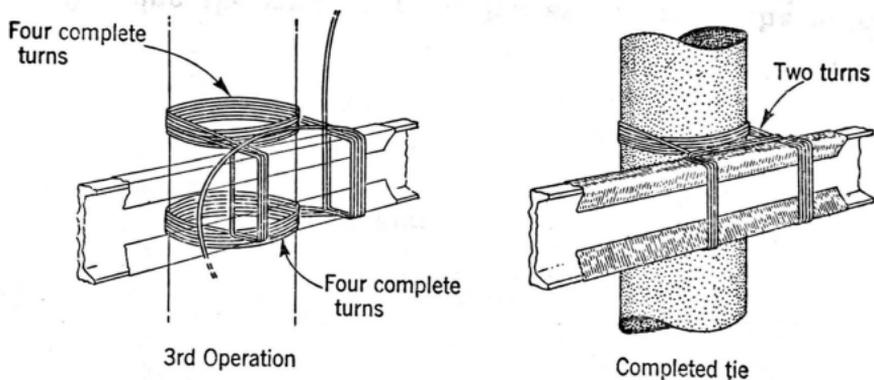
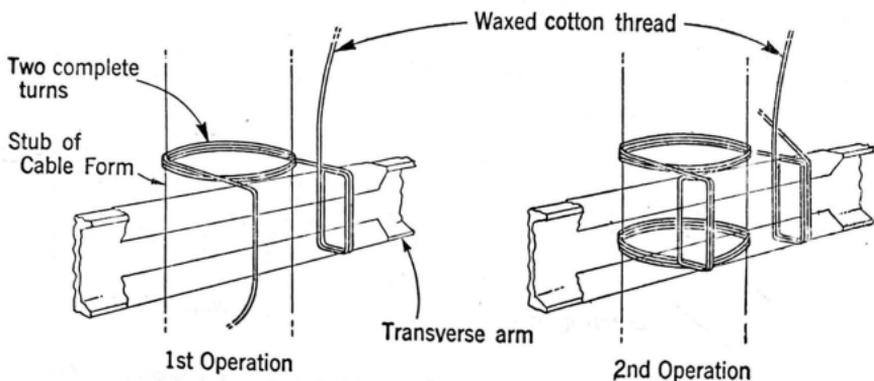


6.04 On frames equipped with protectors, the skimmers should be brought through the holes in the fanning strip as shown in Paragraph 5.01. On frames equipped with 444 type jacks, two pairs should be brought through each hole in the fanning strip, as shown in Paragraph 6.07. On frames equipped with fanning strips of the type shown below, skimmers that come in contact with clamps should be insulated with $3/32$ " cotton sleeving.

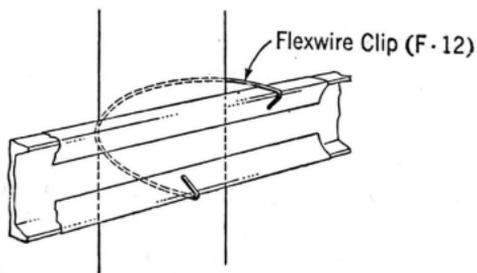


6.05 Beginning at the bottom of the frame, the stub should be fastened to every other transverse arm by one of the two methods shown in the following sketch.

TIE METHOD



CLIP METHOD

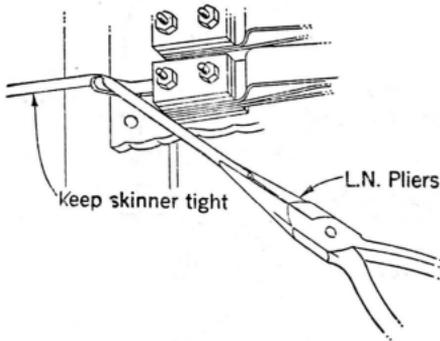


The clip should be cut to length and clamped to the transverse arm with a pair of 8-inch pliers.

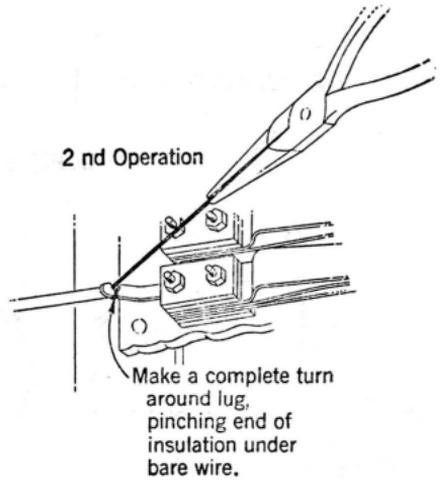
6.06 The method of terminating skimmers on protectors is outlined and illustrated in the following:

- (1) Keeping the skimmer tight, bend the wire over the lug to mark the point where the removal of the insulation is to be started. Remove the textile servings from the end of the skimmer, being careful not to nick the wire. Enamel coating on conductors may be removed with a pair of long nose pliers.

1 st Operation

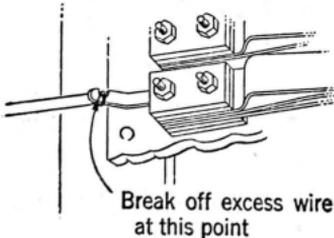


2 nd Operation

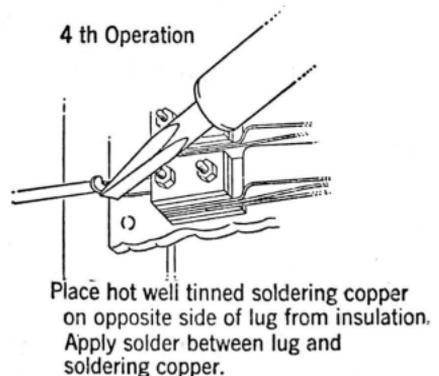


- (2) Bring the wire over the lug and through the notch, pinching the end of the insulation between the wire and the notch. Make one complete turn around the lug.
- (3) Break off the excess wire at the point indicated.

3 rd Operation

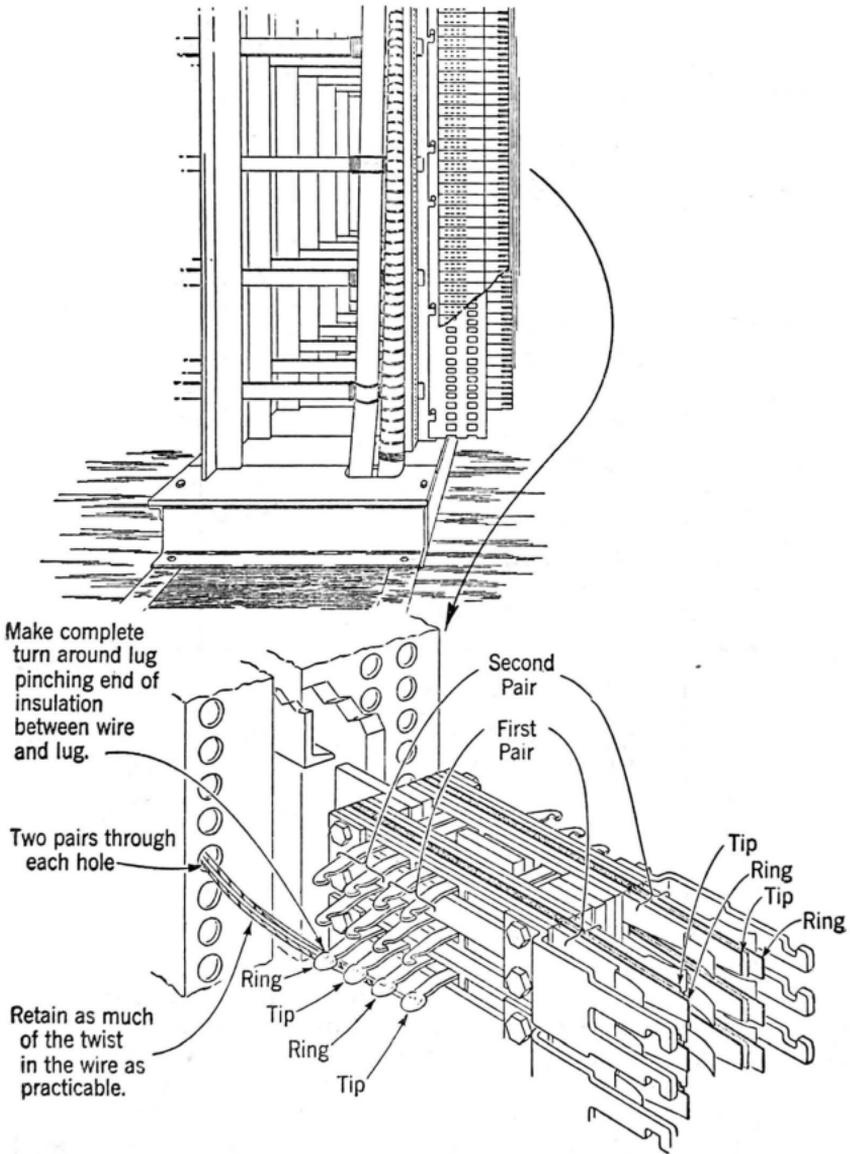


4 th Operation

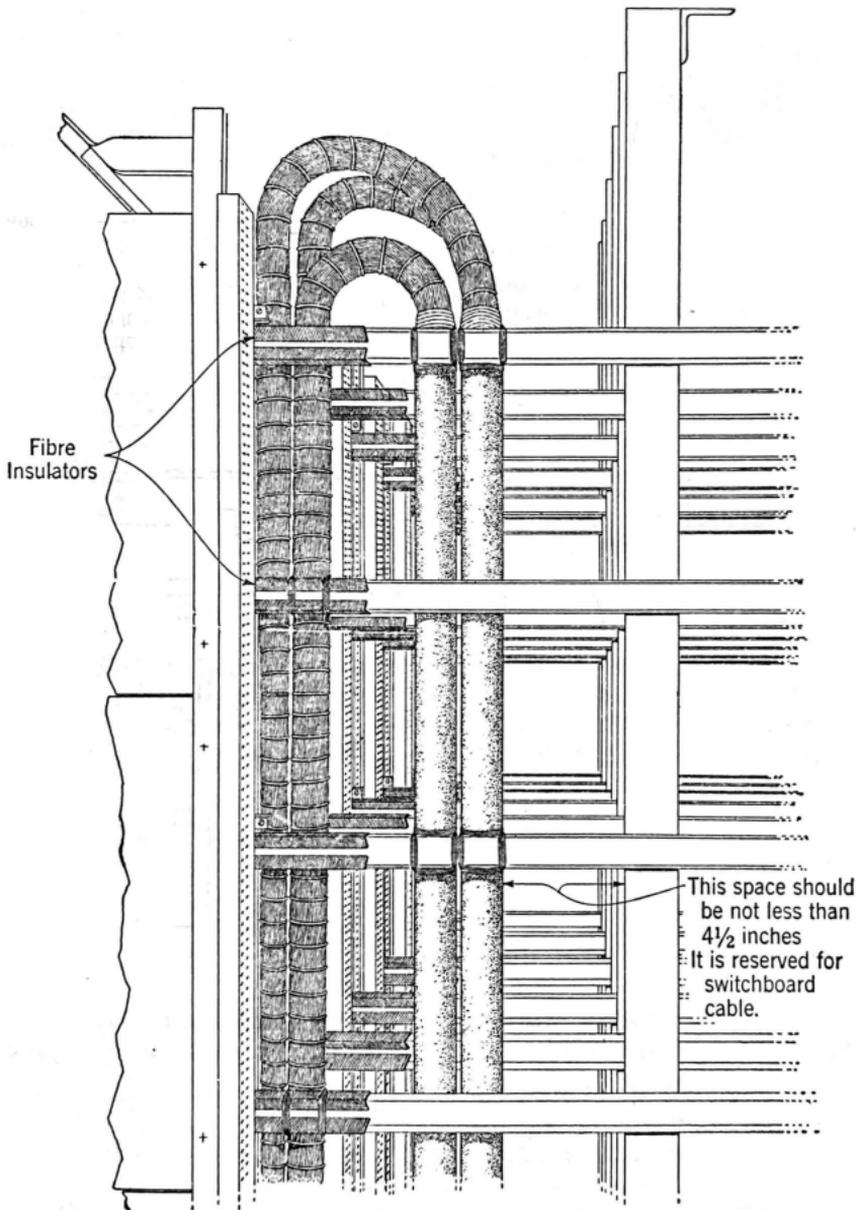


(4) Solder the connection with rosin core solder, using a hot and well tinned copper. Care should be taken to prevent small pieces of solder dropping on terminal lugs below. Equipment should be protected by means of a piece of canvas while soldering is in progress.

6.07 The method of connecting skinners to 444 type jacks is illustrated in the following sketch.



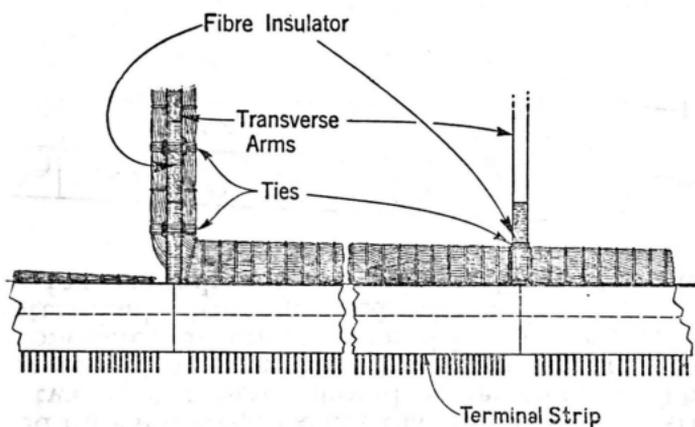
6.08 Installing Forms Where Flood Water Is a Potential Hazard: Where flood water is a potential hazard, the lead sheath of the cable form should be carried to the top of the frame and the formed portion then turned downward. The following sketch shows the method of making forms and terminating them on a frame.



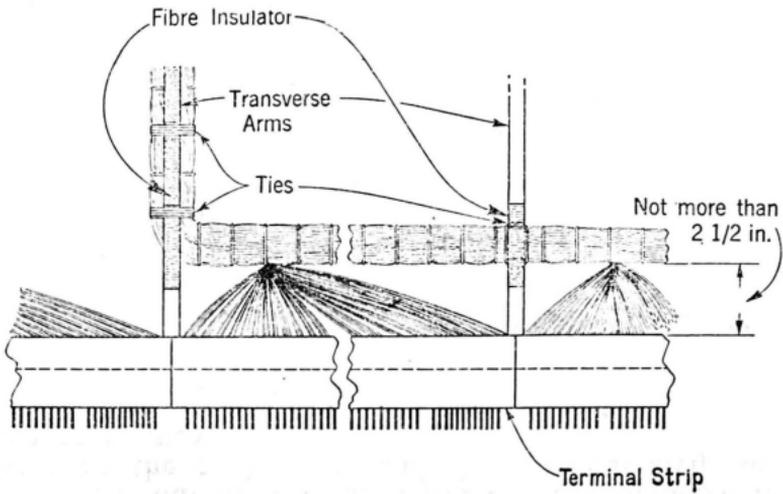
7. INSTALLING FORMS ON "A" TYPE FRAMES

7.01 Feed the stub of the cable form into the cable vault or splicing chamber through the slot or hole under the frame. Bring the form up the vertical and place the legs on the shelves below the transverse arms to which they are to be fastened and support them temporarily by means of house-line ties. Lay the legs back of the terminal strips and extend the skimmers through the holes in the strip. The method of tying forms to the transverse arms is illustrated in Paragraph 6.04.

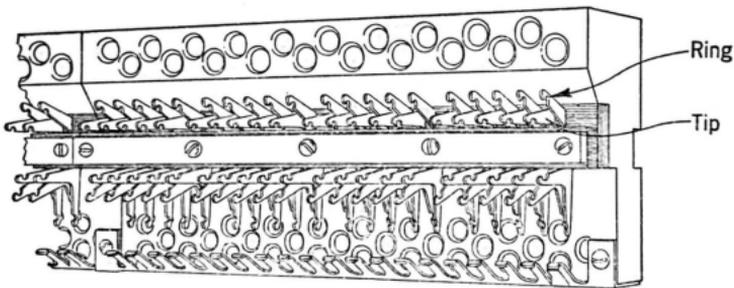
- (a) When only two or three skimmers have been brought out between stitches, tie the legs close to the back of the terminal strip as shown below:



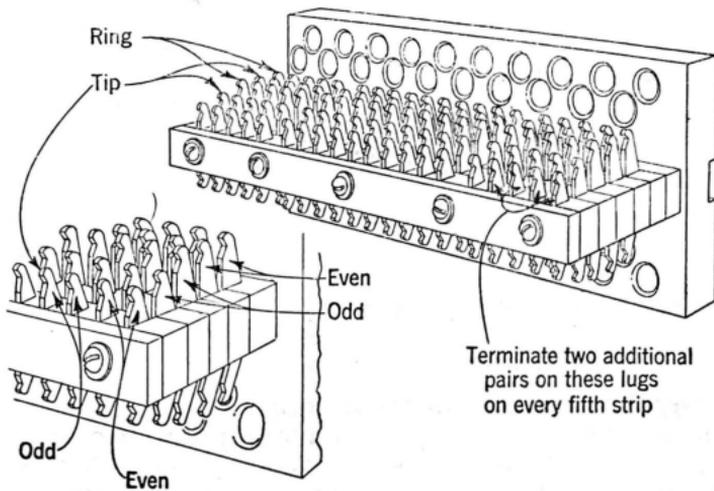
- (b) Where approximately 10 or 20 skimmers have been taken out at a stitch, leave a space of 2-1/2 inches between the cable form and the terminal strip so that the pairs may be fanned.



7.02 On frames equipped with No. 65 (20 pairs) or similar type terminal strips, twenty cable pairs should be terminated on each strip, except that on every fifth strip (No. 82 type) twenty-one pairs should be terminated. The white conductor should be terminated on the left-hand lug and the colored conductor on the right-hand lug of each pair. A No. 65 type terminal strip equipped with a No. 30-A terminal punching for grounding spare pairs is illustrated below:

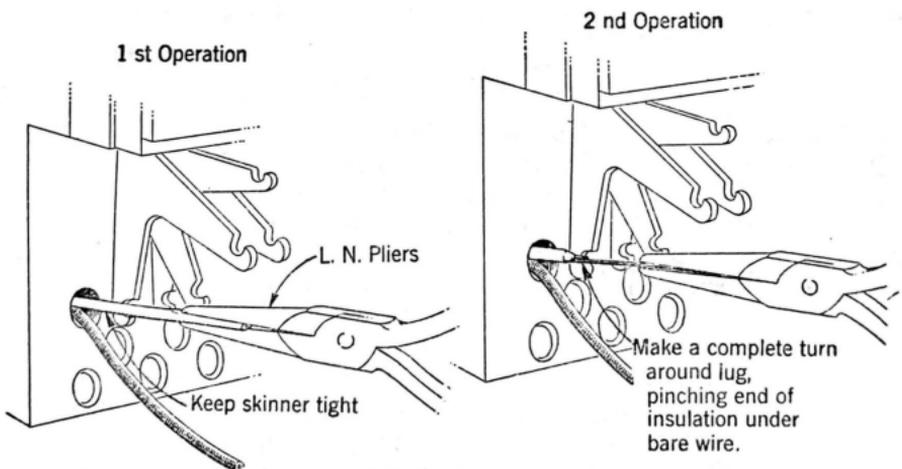


7.03 On frames equipped with No. 91 or similar type terminal strips, forty cable pairs should be terminated on each strip except that two additional pairs should be terminated on every fifth strip. The white conductor of a pair should be terminated on the second and fourth lugs of a row and the colored conductor on the third or fifth lug. A No. 91 strip is illustrated below. The first (front) row of lugs is used for grounding spare pairs.

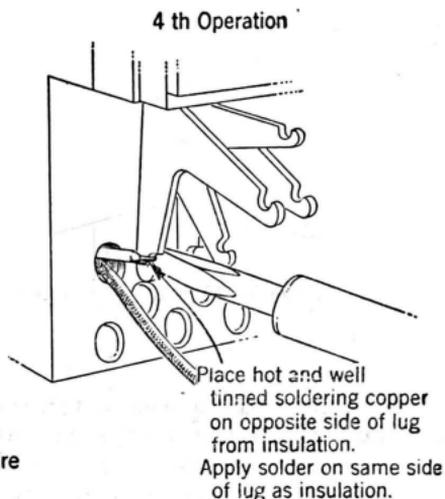
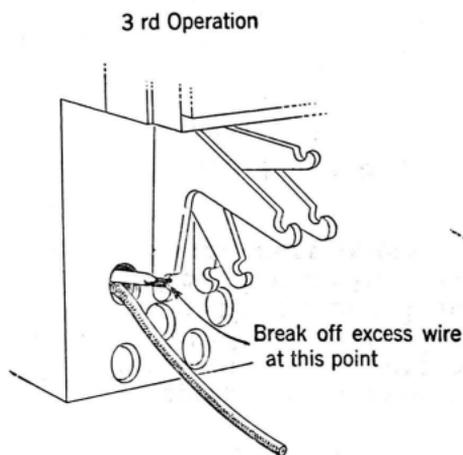


7.04 The procedure to be followed in connecting the skinners to the lugs is outlined and illustrated in the following:

- (1) Keeping the skinner tight, bend the wire around the lug to mark the point where the removal of the insulation is to be started. Remove the textile servings from the end of the skinner, being careful not to nick the wire. Enamel coating on the conductor can be removed with a pair of long nose pliers.

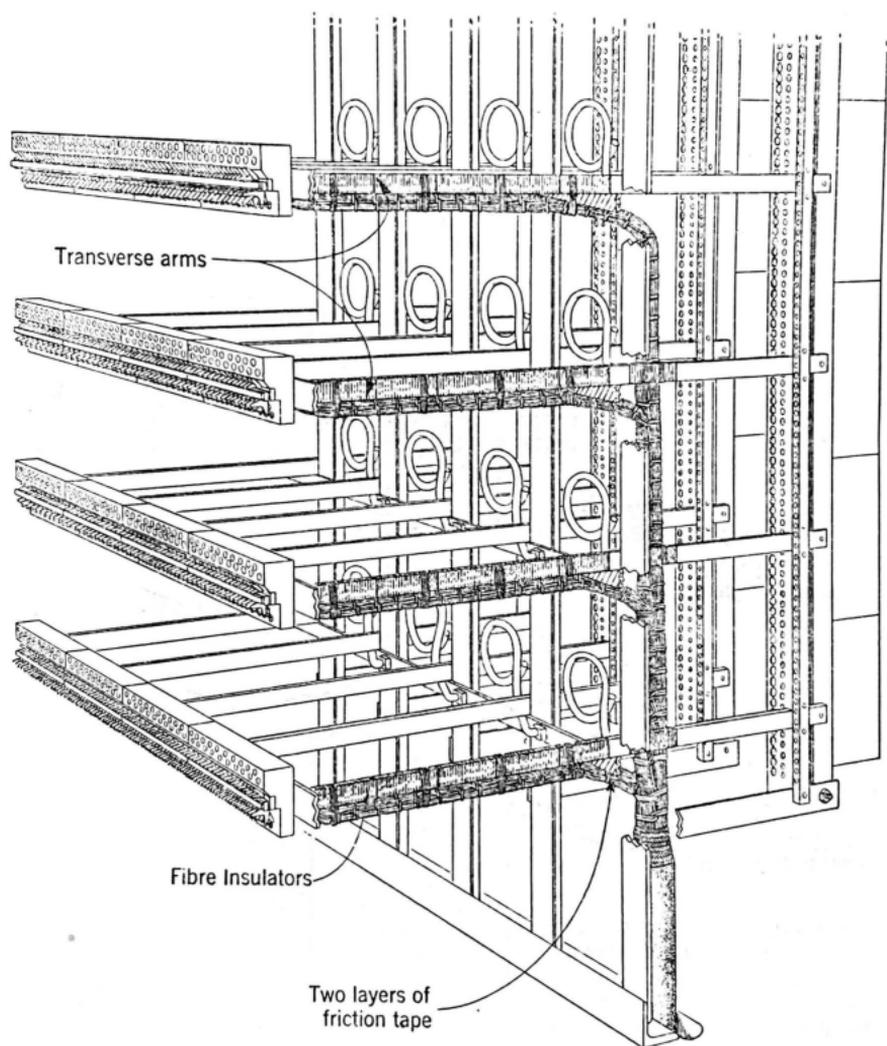


- (2) Bring the wire around the lug and through the notch, pinching the end of the insulation between the wire and the notch. Make one complete turn around the lug.
- (3) Break off the excess wire at the point indicated.



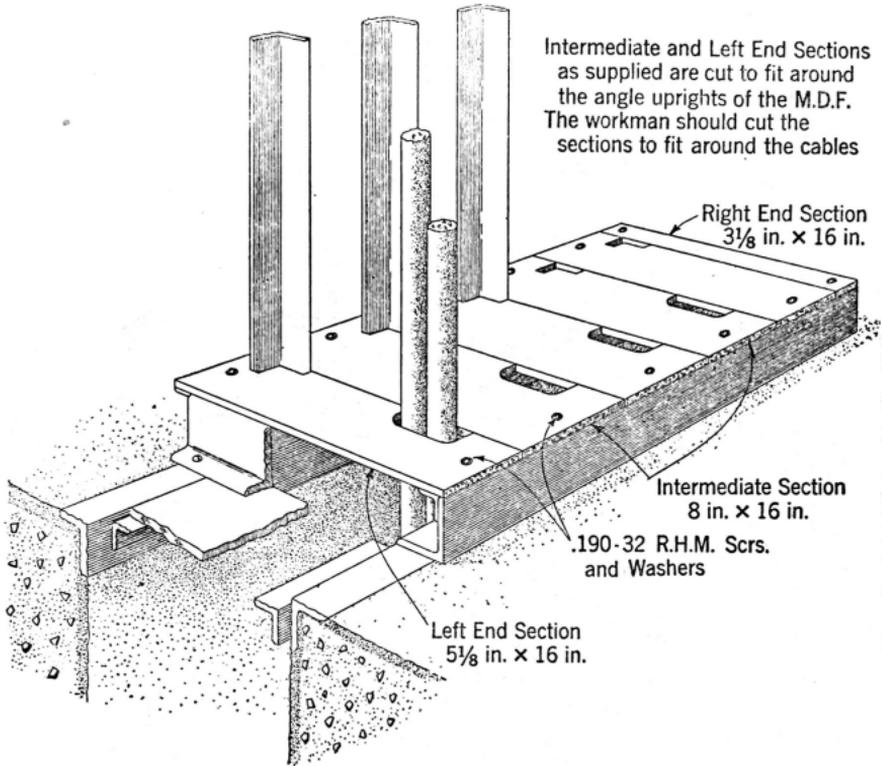
- (4) Solder the connection with rosin core solder, using a hot and well tinned copper. Care should be taken to prevent small pieces of solder dropping on terminal lugs below. Equipment should be protected by means of a piece of canvas while soldering is in progress.

- 7.05 An electric soldering copper will facilitate soldering.
- 7.06 The following illustration shows a multi-leg cable form installed on an "A" type main distributing frame.



5. CLOSING CABLE OPENINGS UNDER MAIN FRAMES 7

8.01 The method of closing cable slots under a main distributing frame with asbestos boards is shown in the following sketch.



2.02 The following sketch illustrates the method of closing cable slots beneath double-sided protector frames with asbestos boards.

Asbestos boards (FA-202 Slot Covers) are available for closing openings where 2-202 pair cables are terminated on a vertical.

Where other than 2-202 pair cables are terminated on a vertical, blank covers should be cut by the workman to fit around the cables

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