# WIRE JOINING
# 710 CONNECTOR SYSTEM

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## 1. GENERAL

**1.01** This section covers the description and use of the tools and connectors of the 710 connector system for making modular splices in any combination of 17- through 26-gauge copper or aluminum conductor cables with PIC, PULP, or PAPER insulation.

**1.02** This section is reissued to update the 710 connector system to include new tools and connectors. Due to extensive changes, arrows ordinarily used to indicate changes have been omitted.

**1.03** This section provides information necessary so that proper connectors, tools, and methods are used in the 710 connector system. Following is an outlined of the information covered herein:

- 710 connector codes and their proper application
- Description, use, and maintenance of the D, E, and F cutter-pressser, 835, 836, 890A, and 945A tools, B support frame, 709A, 710A, and 710B tool mountings, and hand tools for mounting and assembling 710 connectors.
- Operation of the 152A test set for verifying splices before they are closed.
- Splicing configurations such as foldback, in-line, branch, facility and junction splices, half-tap, loading and unloading, rearrangements, and reentries.
- Special applications such as building use and setup for vertical splices.

**1.04** Refer to Section 632-020-200 for method of handling defective pair.

**1.05** Any of the following methods can be used for binder group identification:

- Wire ties
- Felt marker
- Securing binders using 710 connector as follows:

  (a) Binders from first cable under wires in index strip

  (b) Binders from second cable over the wires and under the cap (one binder per wire slot)

- Plastic color-coded ties
- Prenumbered tags.

## 2. SAFETY PRECAUTIONS

**2.01** Prior to starting any splicing operation, review the Safety Precautions outlined in the following Sections:

| SECTION | TITLE |
|---|---|
| 620-135-010 | Guarding Work Area |
| 620-135-100 | Outside Plant—Guarding Work Area—Standard Warning Device—Description and Installation |
| 620-140-501 | Testing and Ventilating Manholes |

## 3. CONNECTOR MODULES—DESCRIPTION AND USE


***The 25-pair 710 connector can be assembled using all tools covered herein. The 5-pair 710 connector can only be assembled with the 945A tool.***

**3.01** The three types of 25-pair and 5-pair 710 connector modules are illustrated in Fig. 1 and Fig. 2 respectively. The 25-pair 710 connector modules are used to splice 25 pair or more. The 5-pair 710 connector is used for splicing small size terminal stubs in pedestals, rehabilitation, and to splice service wires in splice closure. The 5-pair 710 connector components are identical to the 25-pair components except they are shorter. The connector modules are used as follows:

- The splicing connector consisting of an index strip, connector module, and cap.
- The bridge connector consists of a bridge module and cap. It is used in conjunction with a splicing connector to permit a 3-way splice.
- The half-tap connector consists of an index strip, half-tap connector module and cap. The half-tap connector permits joining one cable to through conductors in nonworking cable or working cable without interruption of service.

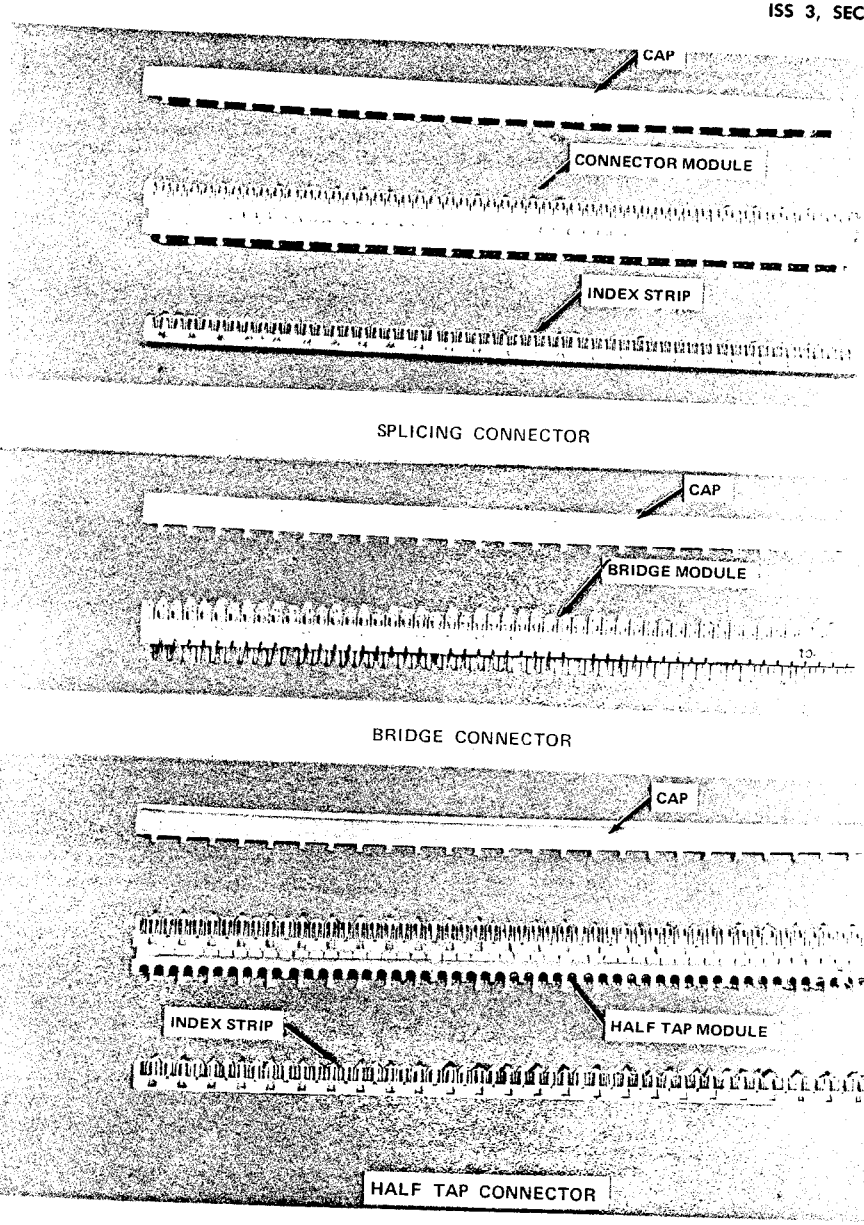



Fig. 1—710 Connector (25 Pair)

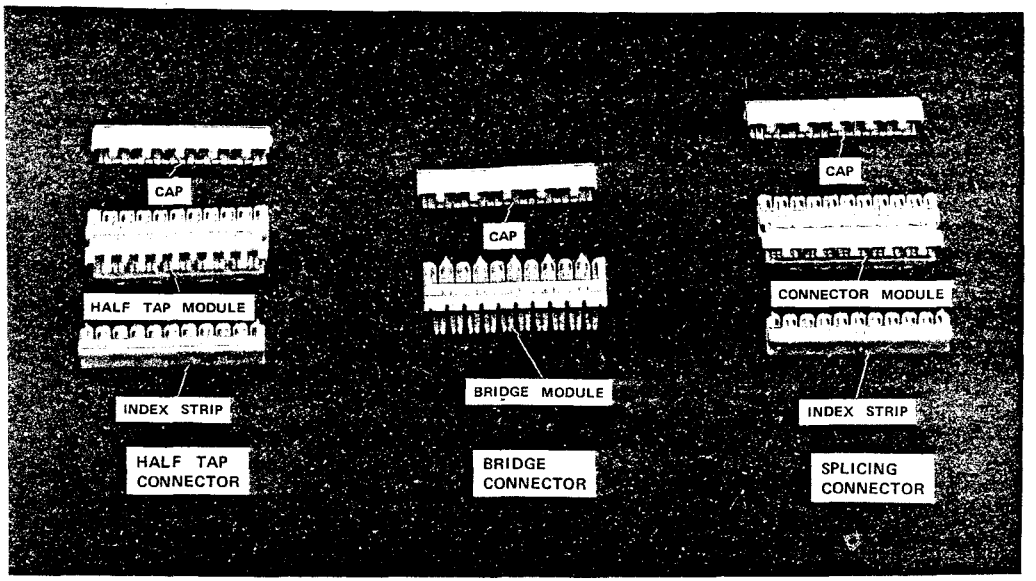



**Fig. 2—710 Connector (5 Pair)**

**3.02** The 710 connector components description and use are as follows:

- ***Index strip*** (Fig. 3)—Holds the pairs from the first or through cable. It has color coded peaked projections used to separate the tip and ring conductors. Wire grippers hold the conductors in the index strip and are also used for orientation of index strip for placing in tool.

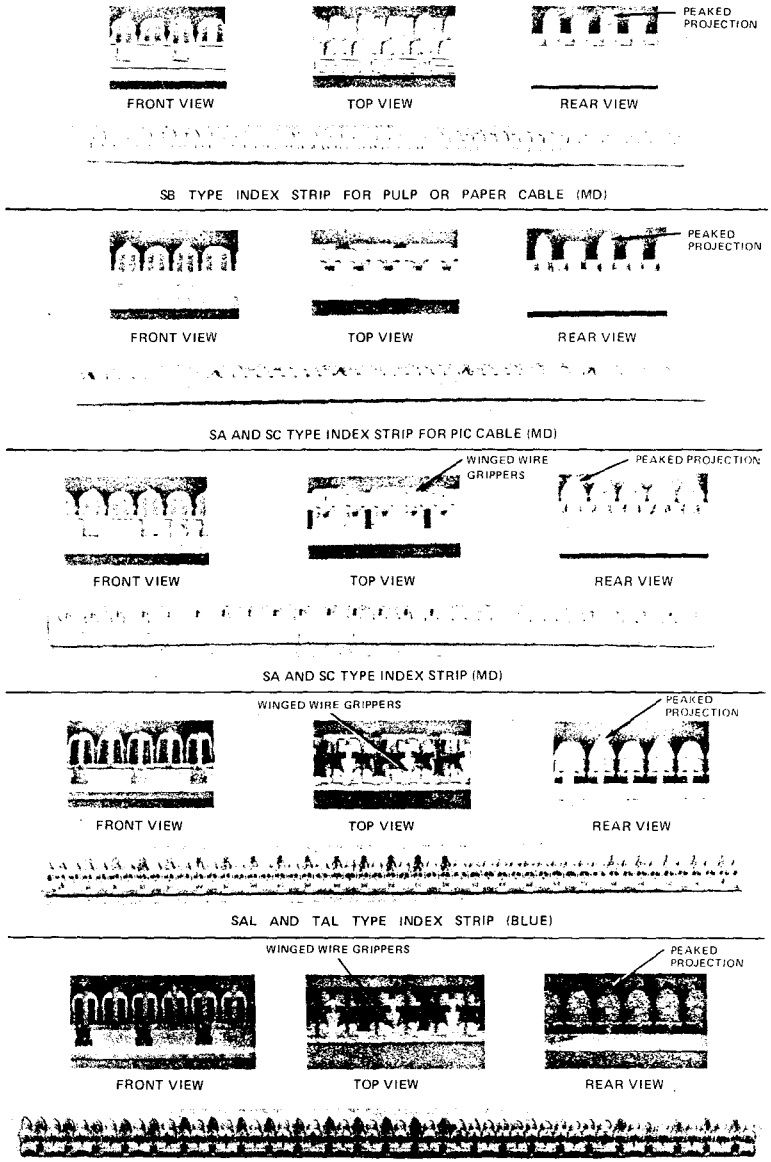
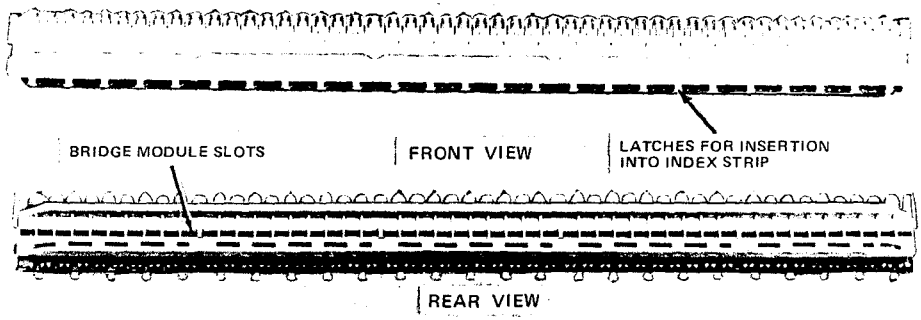


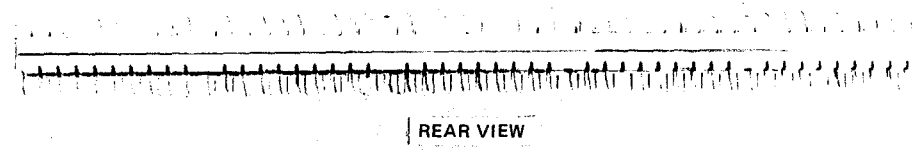

**Fig. 3—Index Strip**

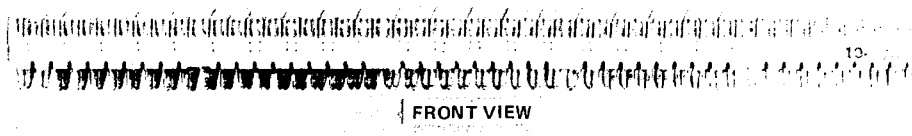
- ***Connector Module*** (Fig. 4)—Contains the double-ended slotted beam contact element for slicing through insulation to contact metallic conductor. The top of the module is similar to the index strip and holds the pairs from the second cable. Connector modules used on PIC cable are filled with encapsulant.

- ***Bridge Module*** (Fig. 4)—Top of the bridge module is the same as the connector module except the slotted beams are exposed in the bottom portion of the connector. Bridge modules used on PIC cable are filled with encapsulant.

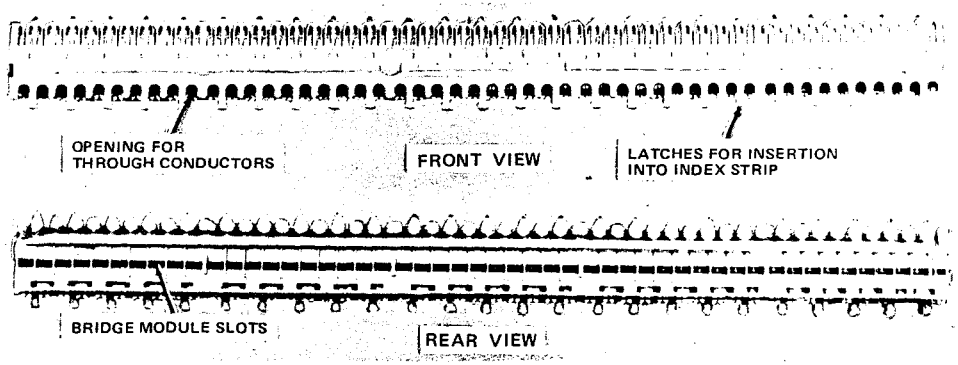



PIC CONNECTOR MODULE




BRIDGE MODULE




HALF TAP MODULE

**Fig. 4—Connector Module**

- ***Half-Tap Module*** (Fig. 4)—Is the same as the connector module except it has openings for through conductors.

- ***Cap*** (Fig. 5)—Provides the final wire retension when pressed onto connector bridge and half-tap module. The caps of connectors used on PIC cable are filled with encapsulant.

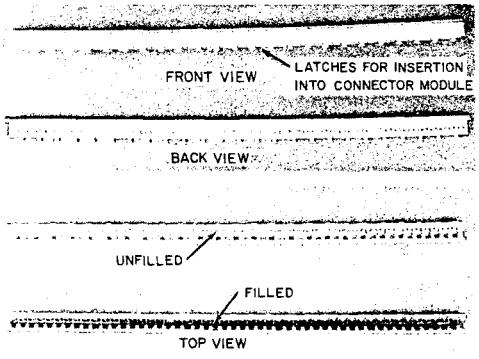



**Fig. 5—Cap**

**3.03** The following coding scheme covers the 710-type connector; eg, 710-SC1-25 connector.

(a) 710—Basic family identification

(b) First letter indicates function as follows;

S—Splice

T—Half-tap (for PIC cable only)

B—Bridge

(c) Second letter specifies conductor and types of insulation as follows:

A—Universal application primarily for aluminum conductors. May also be used for copper conductors. Filled with sealant for moisture protection.

B—Copper conductor with PULP and PAPER insulation for use where moisture protection is not required—unfilled.

C—Copper conductors with PIC insulation. Filled with sealant for moisture protection.

D—Copper conductor with PIC, PVC, PULP and PAPER insulation. Fire retardant for building and cable entrance facilities.

(d) Number or letter after second letter indicates design change, eg:

1—Indicates design change in index strip connector and bridge module to increase holding ability

L—Indicates design change for larger gauge cable (17-24 gauge) plus improved wire holding feature.

(e) 5/25—Number following dash indicates number of pairs.

(f) Connector—code name.

**3.04** The type of connector to select for a particular application is listed in Table A or Table B. Guidelines are as follows:

| When Splicing | Use |
|---|---|
| PIC to PIC | Encapsulated Connectors |
| Pulp to Pulp | Dry Connectors |
| PIC to Pulp | Dry Connectors |
| In Buildings | SD Connectors (Dry) |

**TABLE A**

**710 CONNECTOR CODES (25 PAIR)**

| CONNECTOR CODES | TYPE SPLICE | COLOR | TYPE CABLE | TYPE INSULATION | ENCAPSU-LATED | GAUGE |
|---|---|---|---|---|---|---|
| 710-BA-25* (Mfr Disc.) | Bridge | White | Aluminum or Copper | PIC | Yes | 20-26 |
| 710-BAL-25† | Bridge | Green | Aluminum or Copper | PIC | Yes | 17-26 |
| 710-BB-25* (Mfr Disc.) | Bridge | White | Copper | Pulp | No | 22-26 |
| 710-BB1-25† | Bridge | Green | Copper | Pulp | No | 19-26 |
| 710-BC-25 (Mfr Disc.) | Bridge | White | Copper | PIC | Yes | 22-26 |
| 710-BC1-25† | Bridge | Green | Copper | PIC | Yes | 19-26 |
| 710-BD-25‡ (Mfr Disc.) | Bridge | Pink | Copper | PIC, PVC, Pulp and Paper | No | 22-26 |
| 710-BD1-25†‡ | Bridge | Gray | Copper | PIC, PVC, Pulp and Paper | No | 19-26 |
| 710-SA-25 (Mfr Disc.) | Straight | White | Aluminum or copper | PIC | Yes | 20-26 |
| 710-SAL-25†§ | Straight | Green/Blue | Aluminum or Copper | PIC | Yes | 17-24§ |
| 710-SB-25 (Mfr Disc.) | Straight or Half-Tap | White | Copper | Paper or Pulp | No | 22-26 |
| 710-SB1-25† | Straight or Half-Tap | Green | Copper | Paper or Pulp | No | 22-26 |
| 710-SC-25 (Mfr Disc.) | Straight | White | Copper | PIC | Yes | 22-26 |
| 710-SC1-25† | Straight | Green | Copper | PIC | Yes | 22-26 |
| 710-SD-25‡ (Mfr Disc.) | Straight | Pink | Copper | PIC, PVC, Pulp and Paper | No | 22-26 |

**TABLE A (Contd)**

**710 CONNECTOR CODES (25 PAIR)**

| CONNECTOR CODES | TYPE SPLICE | COLOR | TYPE CABLE | TYPE INSULATION | ENCAPSU-LATED | GAUGE |
|---|---|---|---|---|---|---|
| 710-SD1-25†‡ | Straight or Half Tap | Gray | Copper | PIC, PVC, Pulp and Paper | No | 22-26 |
| 710-TA-25 (Mfr Disc.) | Half-Tap | White | Aluminum or Copper | PIC | Yes | 20-26 |
| 710-TAL-25† | Half-Tap | Green/Blue | Aluminum or Copper | PIC | Yes | 17-24§ |
| 710-TC-25 (Mfr Disc.) | Half-Tap | White | Copper | PIC | Yes | 22-26 |
| 710-TC1-25† | Half-Tap | Green | Copper | PIC | Yes | 22-26 |

* All bridge modules will mate all connector and half-tap modules.
† Component parts for two-letter codes are not interchangeable with three-letter codes.
‡ Fire retardant codes for use in building and cable entrance facilities.
§ Excluding 19-gauge solid polypropylene (PP) and high density polyethylene (HDPE) insulated conductor for waterproof (WP) and Locap cable.

**TABLE B**

**710 CONNECTOR CODES (5 PAIR)**

| CONNECTOR CODES | TYPE SPLICE | COLOR | TYPE CABLE | TYPE INSULATION | ENCAPSU-LATED | GAUGE |
|---|---|---|---|---|---|---|
| 710-BAL-5 | Bridge | Green | Aluminum or Copper | PIC | Yes | 19-26 |
| 710-BC1-5 | Bridge | Green | Copper | PIC | Yes | 19-26 |
| 710BD1-5* | Bridge | Gray | Copper | PIC, PVC, Pulp and Paper | No | 19-26 |
| 710-SAL-5 | Straight | Green/Blue | Aluminum or Copper | PIC | Yes | 19-24† |
| 710-SC1-5 | Straight | Green | Copper | PIC | Yes | 22-26 |
| 710-SD1-5* | Straight or Half-Tap | Gray | Copper | PIC, PVC, Pulp and Paper | No | 22-26 |
| 710-TAL-5 | Half-Tap | Green/Blue | Aluminum or Copper | PIC | Yes | 19-24† |
| 710-TC1-5 | Half-Tap | Green | Copper | PIC | Yes | 22-26 |

* Fire retardant

§ Excluding 19-gauge solid polypropylene (PP) or high density polyethylene (HDPE) insulated conductor for waterproof (WP) and Locap cable.

## 4. SPLICING TOOLS—DESCRIPTION, USE, AND MAINTENANCE

### 710A AND 710B TOOL MOUNTINGS

**4.01** The 710A and 710B tool mountings, Fig. 6 and 7, are used for mounting tools to assemble the 710-type connector.

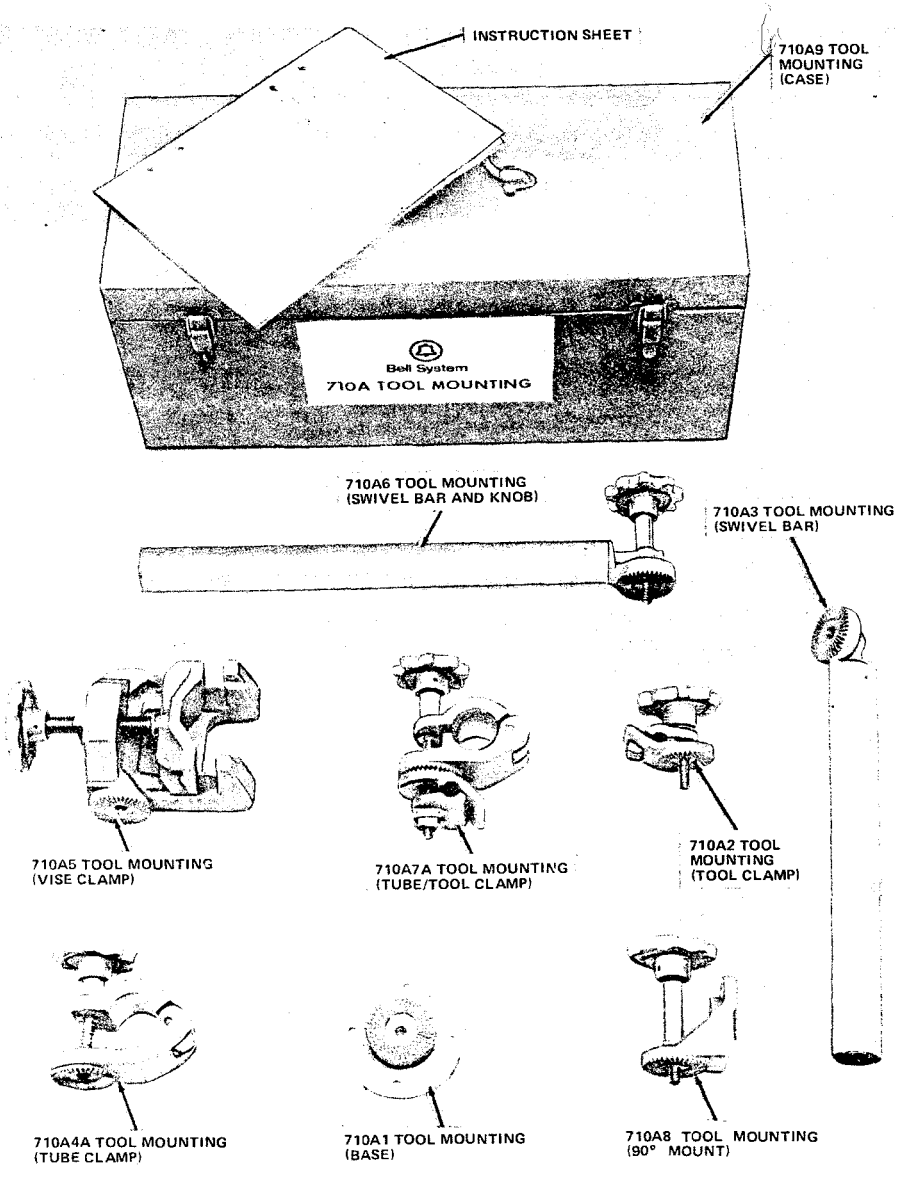



Fig. 6—710A Tool Mount

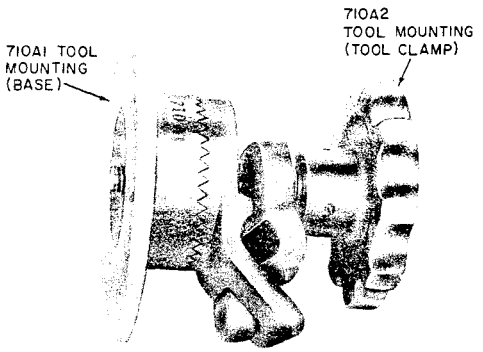



**Fig. 7—710B Tool Mount**

**4.02** Mounting is provided by two methods. The vise clamp can grip solid objects in the work areas as shown in Fig. 8, 9, and 10, or the base can be permanently attached to the surface as shown in Fig. 11. The other required parts can then be assembled onto the vise clamp of base to fit the needed configuration to mount the tool to assemble the connector.

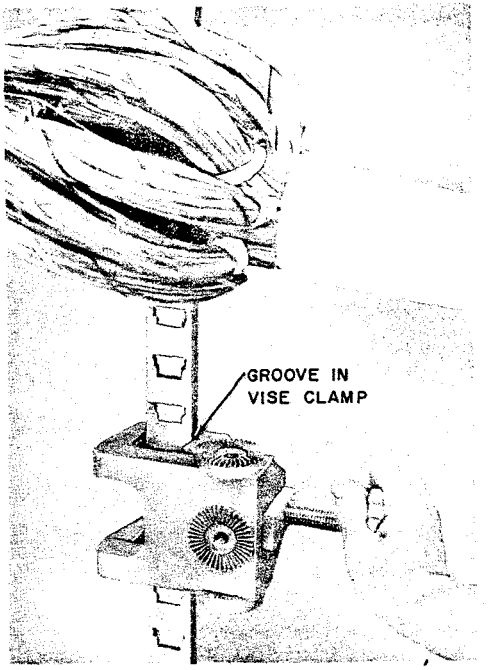



**Fig. 8—Securing Viseclamp to Manhole Rack**

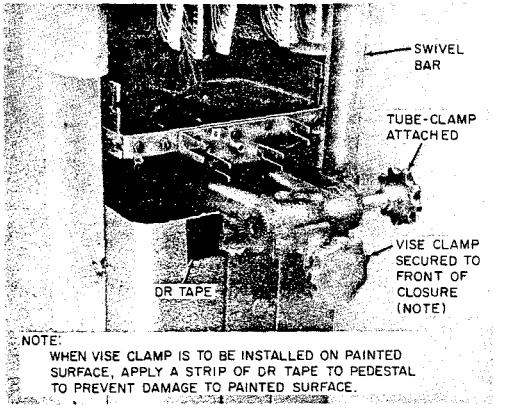



**Fig. 9—Clamp Secured to Closure**

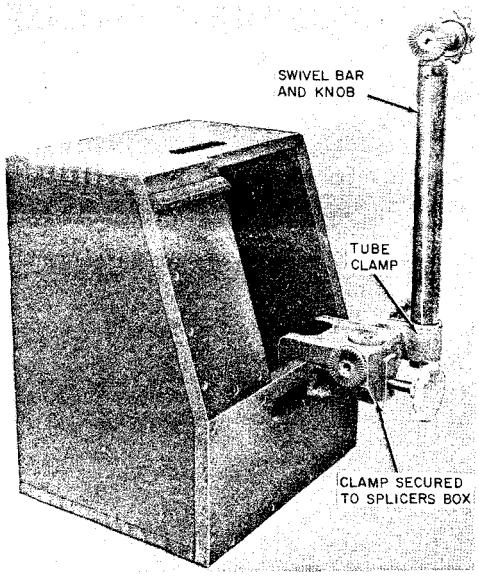



Fig. 10—Clamp Secured to Splicers Box

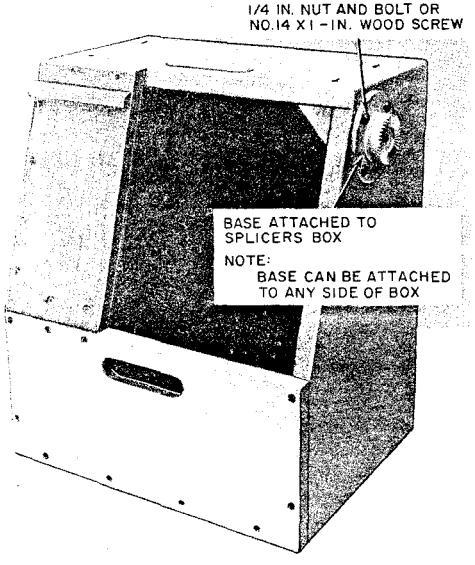



Fig. 11—Base Attached to Splicers Box

**4.03** Figures 12 through 17 illustrate the various tools mounted on a few of the different configurations of the 710A tool mounting.

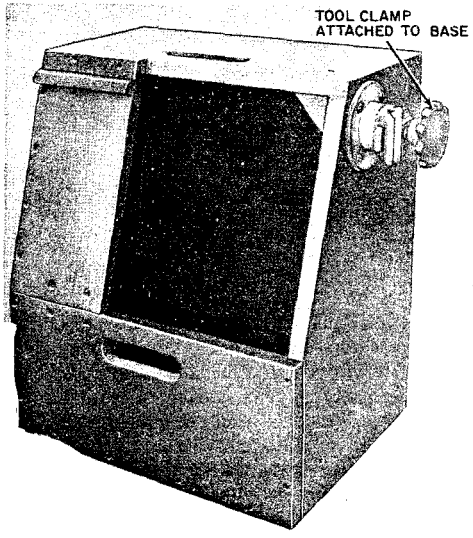



Fig. 12—Tool Clamp Attached to Base

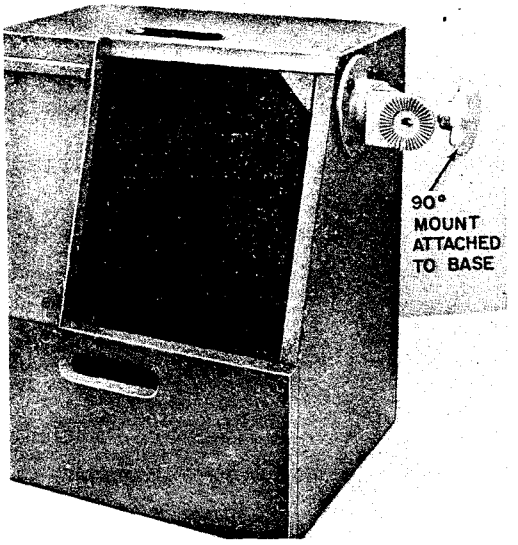



Fig. 13—90° Mount Attached to Base

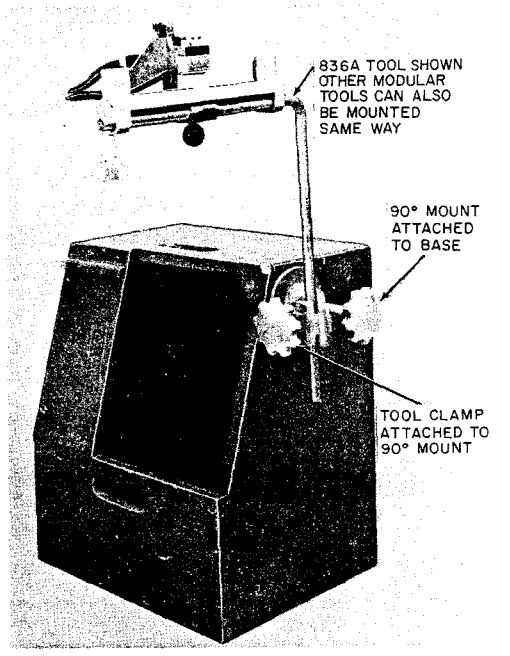



Fig. 14—Tools Setup on Splicers Box

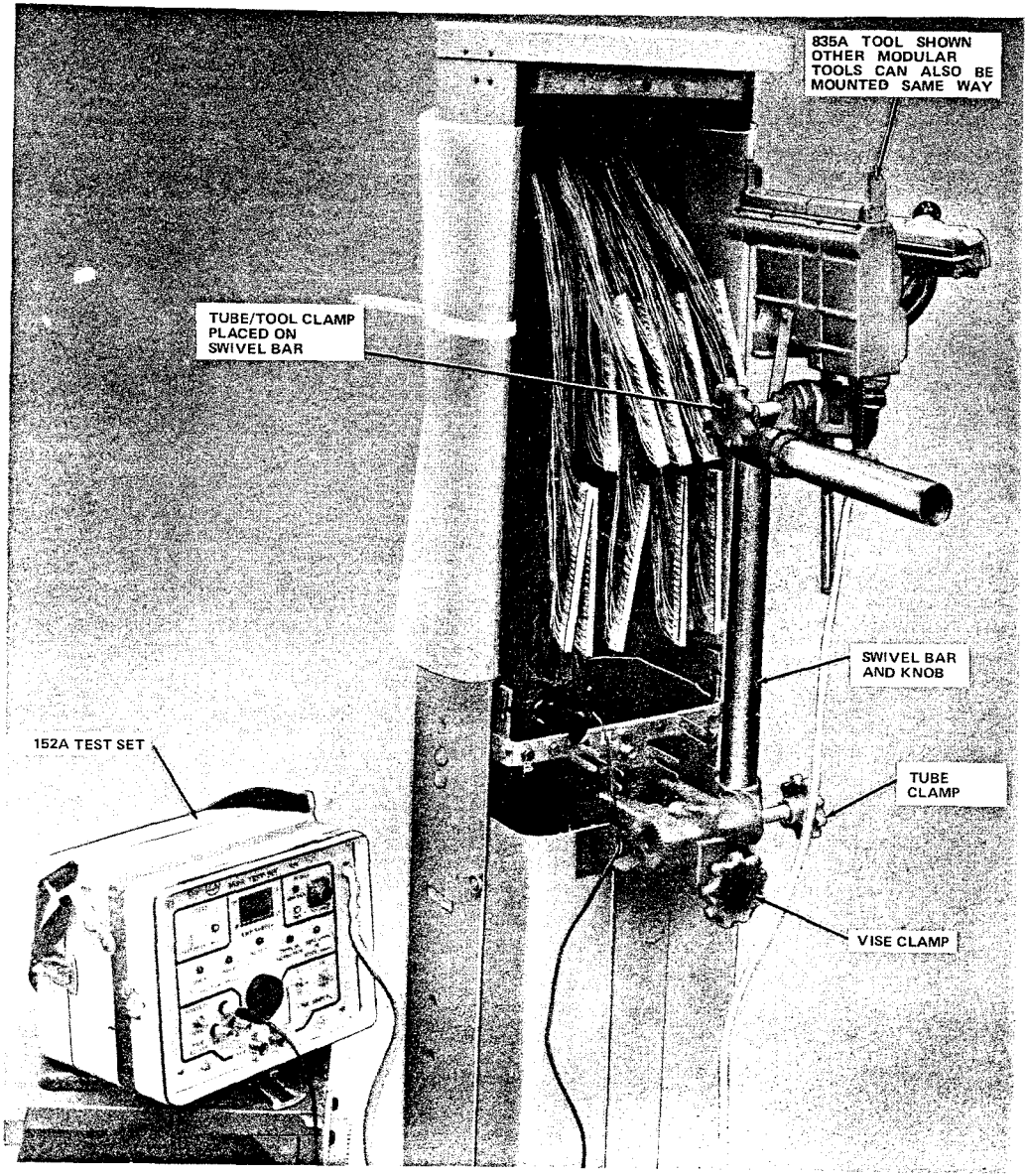



Fig. 15—Tool Setup at Pedestal

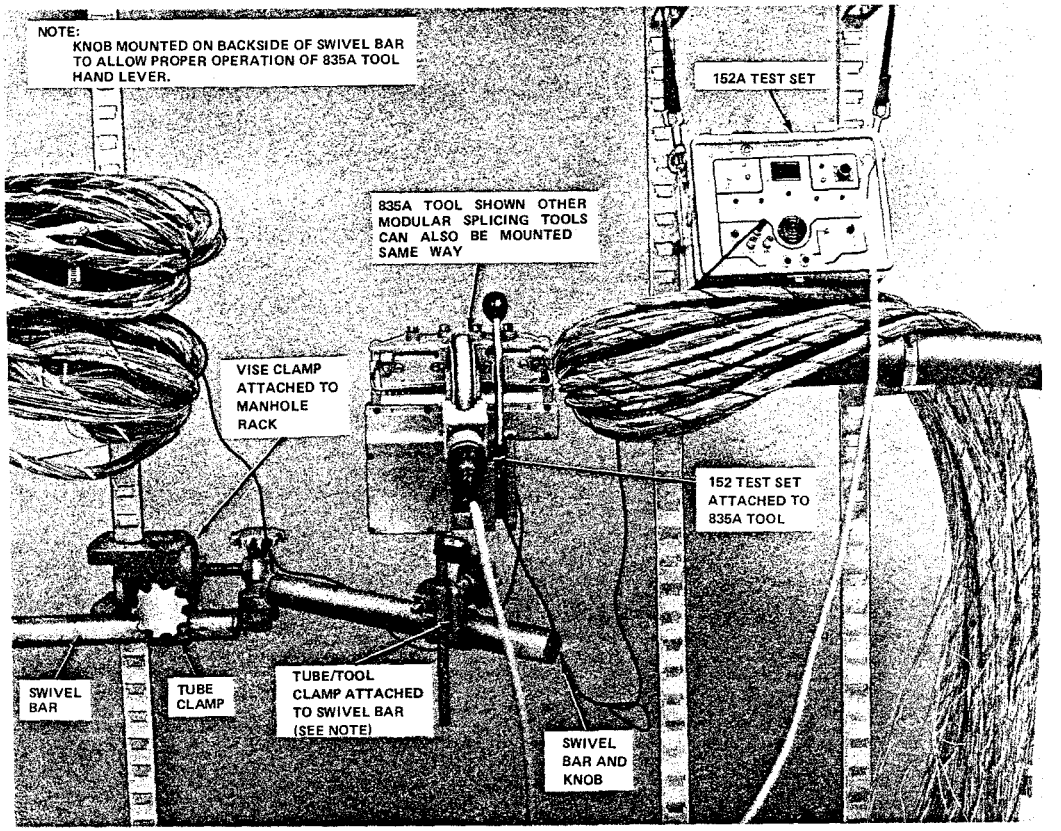
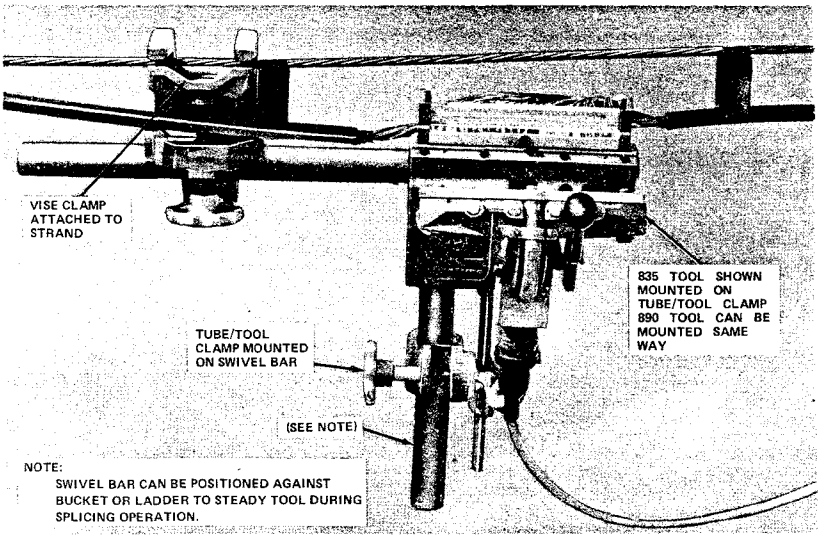
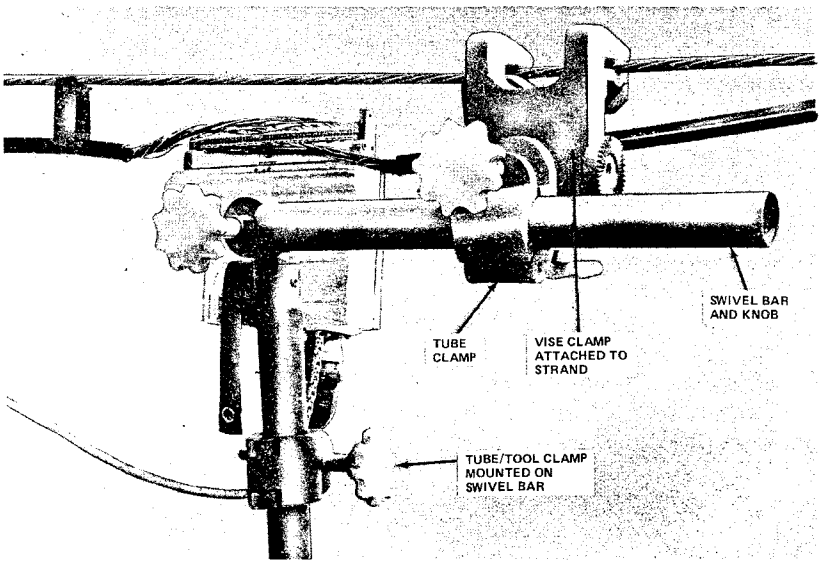



**Fig. 16—Method of Setting Up Splicing Tool in Manhole or Splice Pit**




FRONT VIEW




REAR VIEW

Fig. 17—Method of Setting up Splicing Tool on Strand

## B SUPPORT FRAME ASSEMBLY

**4.04** The B support frame assembly (Fig. 18) is used for mounting tools to assemble the 710 connector.

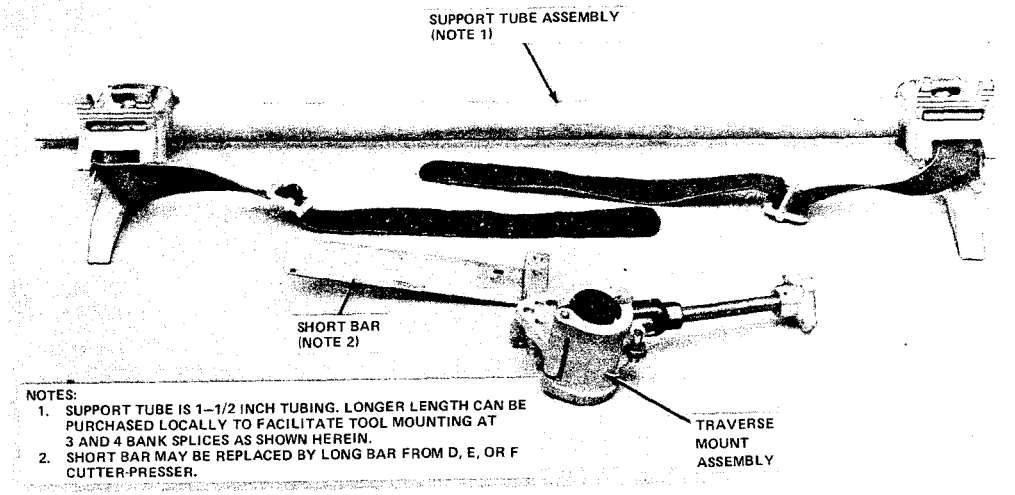



**Fig. 18—B Support Frame Assembly**

**4.05** Mount the B support frame on cable to support tools (Fig. 19).

**4.06** Attach the traverse mount assembly to the support tube assembly (Fig. 20). Secure clamp by pulling the latch upward. The handwheel can be used to adjust the size of the opening of the clamps to insure a tight hold on the support tube. A "B" leg swivel (Fig. 21) is used to reinforce support tube at two-man setup as shown in Fig. 43 (page 107).

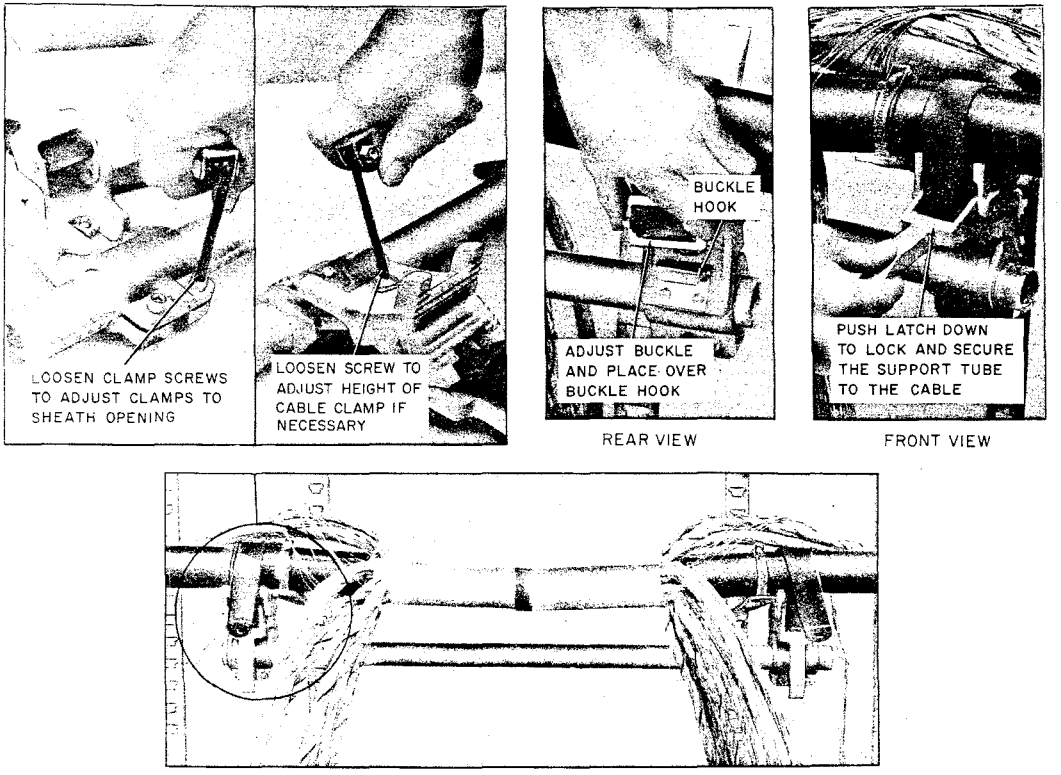



**Fig. 19—Installation of Support Tube on Cable**

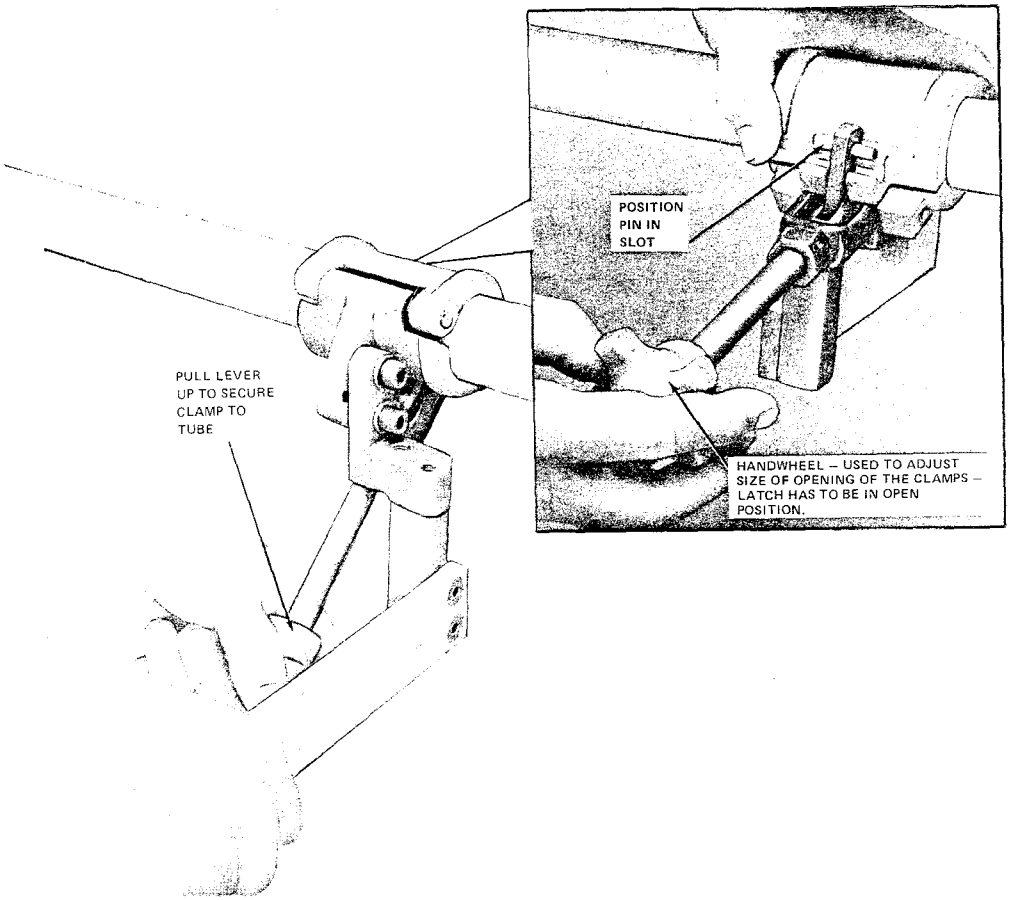



**Fig. 20—Installing Traverse Mount Assembly on Support Tube**

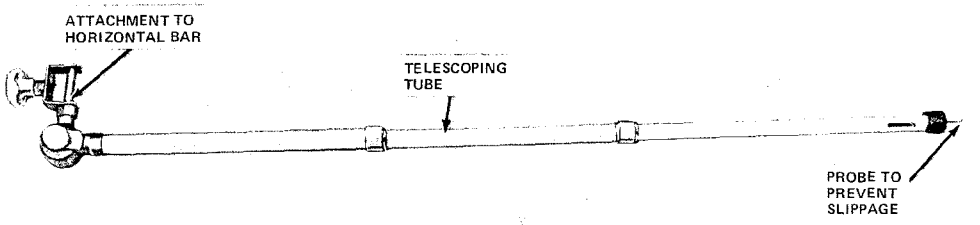



**Fig. 21—B Leg Swivel**

**4.07** Alternate methods of installing the B support frame assembly is shown in Fig. 22 and 23. If the sheath opening is for the B or C length covers for the 2-type closure, it will be necessary to obtain locally a longer 1-1/2 inch diameter tube for mounting the traverse mount assembly.

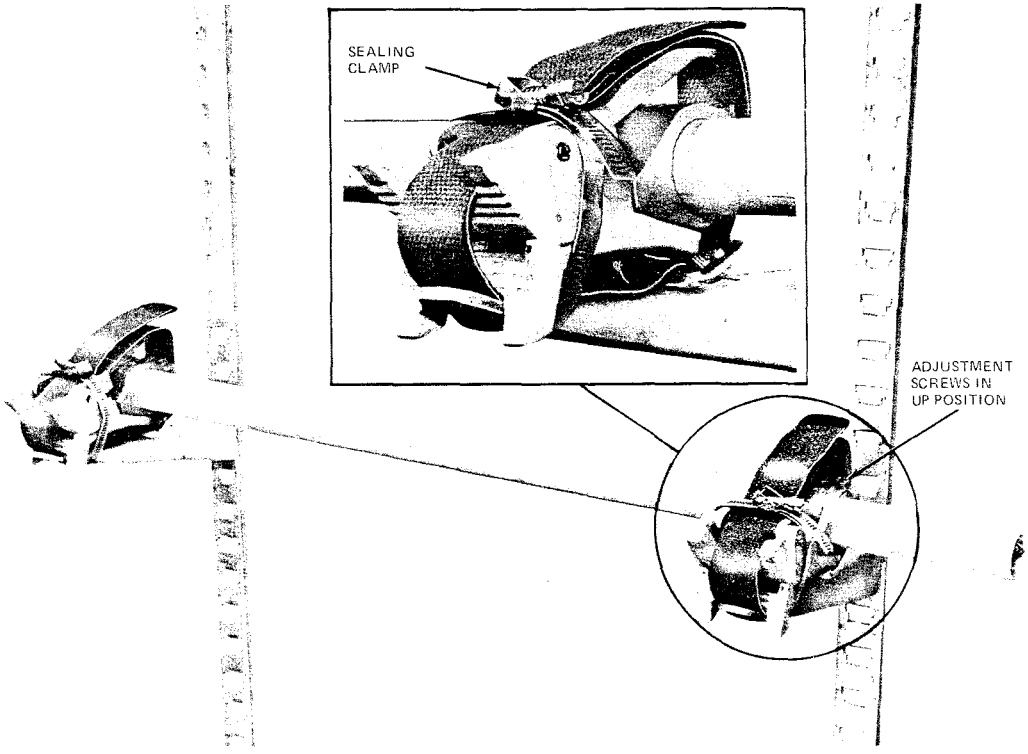



**Fig. 22—B Support Frame Installed on Cable Hook**

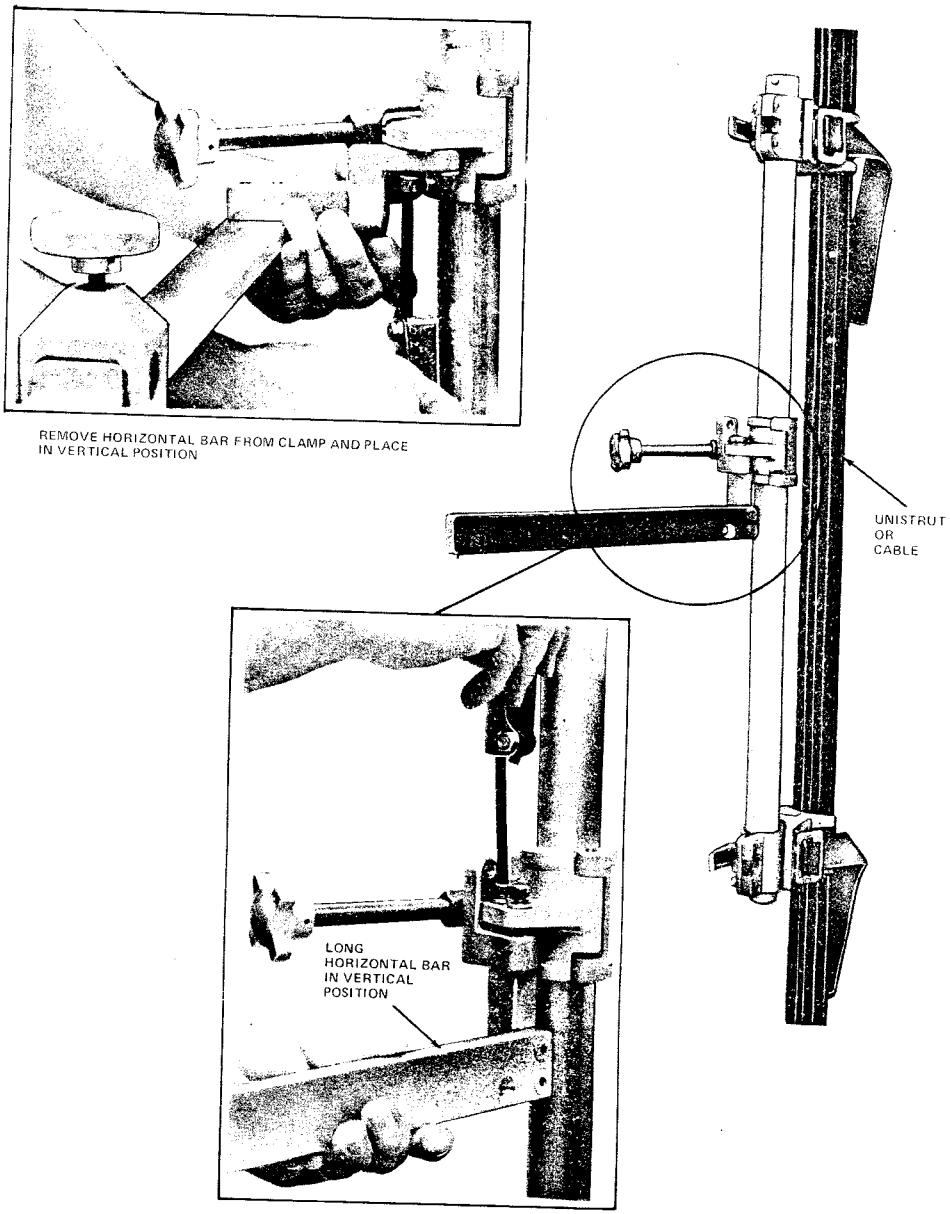



Fig. 23—B Support Frame Mounted in Vertical Position on Frame

## 709A TOOL MOUNTING

**4.08** The 709A tool mounting (Fig. 24) is an aerial tool mounting used with an E ladder support as shown in Fig. 25.

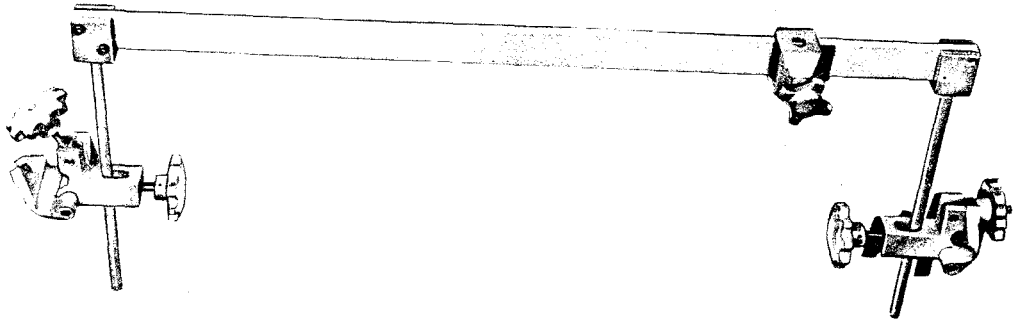


Fig. 24—709A Tool Mounting

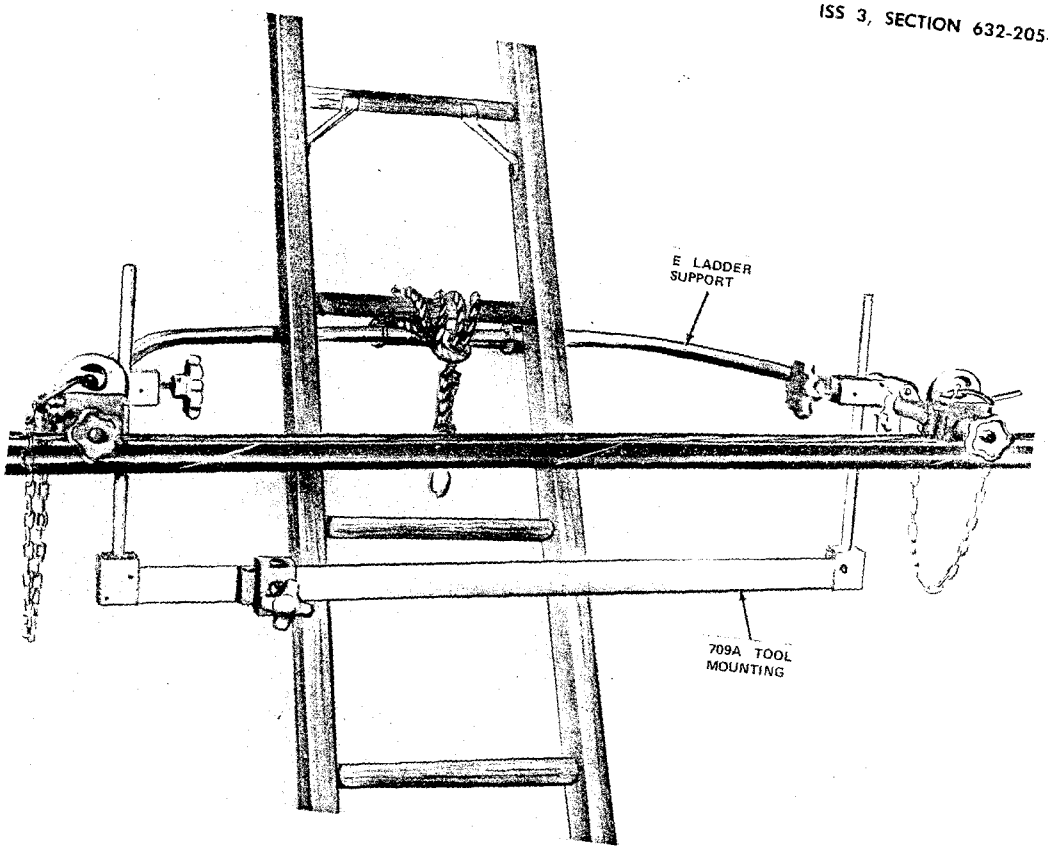



Fig. 25—709A Tool Mounting on E Ladder Support

## 890A TOOL

**4.09** The 890A tool, Fig. 26, is a manually lever operated tool which uses a cam/hydraulic system for power to assemble 25-pair 710 connector.

**4.10** The 890A tool is wired for use with a 152A test set for testing pairs as the splice is made with the new feature that allows testing of pairs in the index strip.

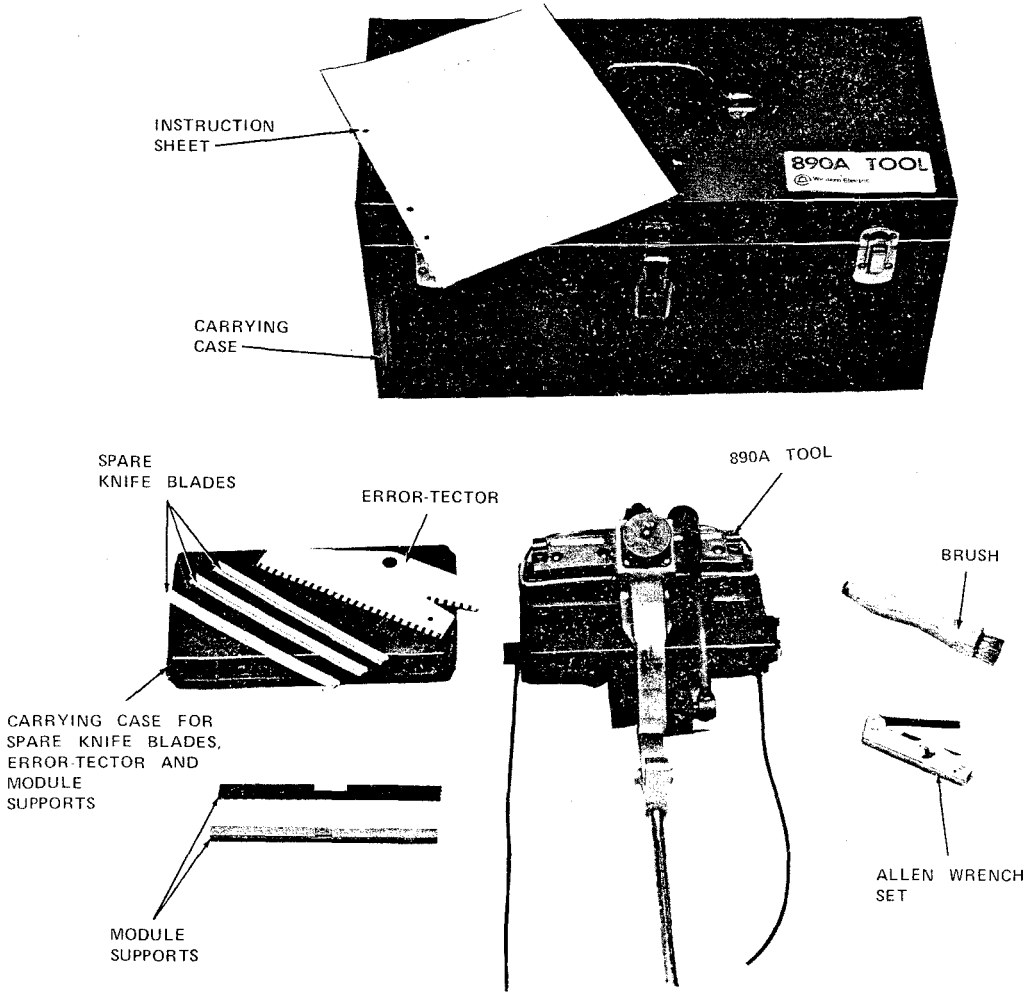



**Fig. 26—890A Tool**

**A. Installation**

**4.11** Mount the 890A tool as shown in Fig. 14 through 17 and on the B support frame assembly as shown in Fig. 27.

*Note:* It will be necessary to obtain a press clamp assembly from D, E, or F cutter-presser. Press clamp assembly may be ordered separately as a spare part, Comcode No. 401496211.

(a) Depress the spring on the bottom of the horizontal bar and slide the press clamp assembly on the horizontal bar with the knob on the left.

(b) Place the 890A tool into the press clamp assembly and tighten the knob to hold it in place.

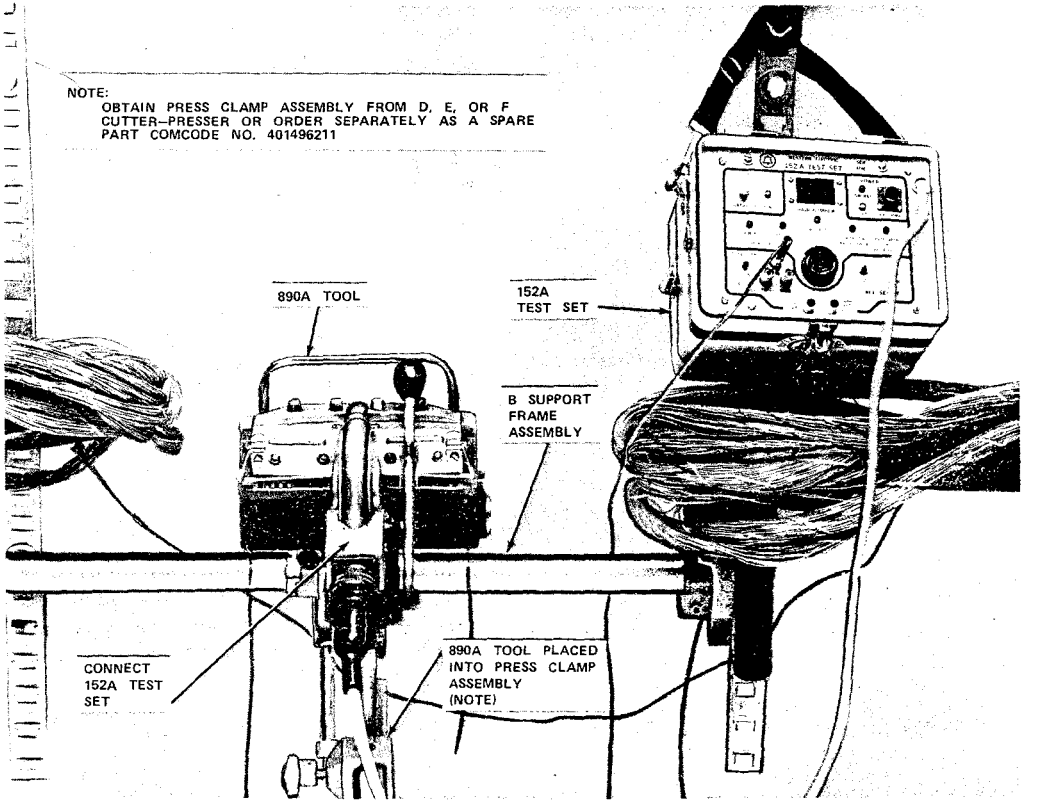
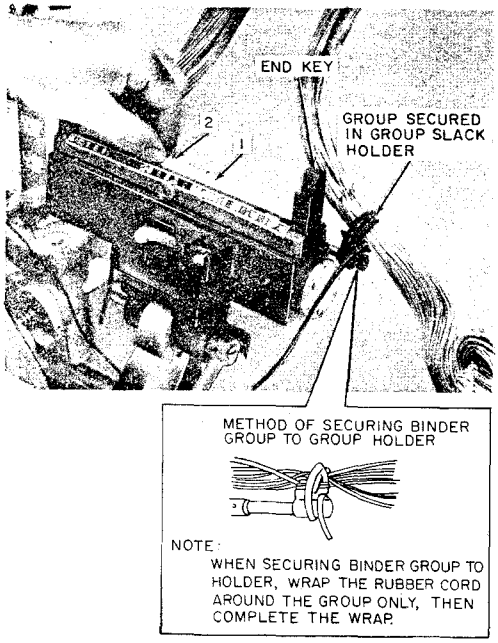



**Fig. 27—890A Tool Mounted on B Support Frame Assembly**

B. Use

***Danger: Exercise care when operating 890A tool as the knife blade is very sharp.***

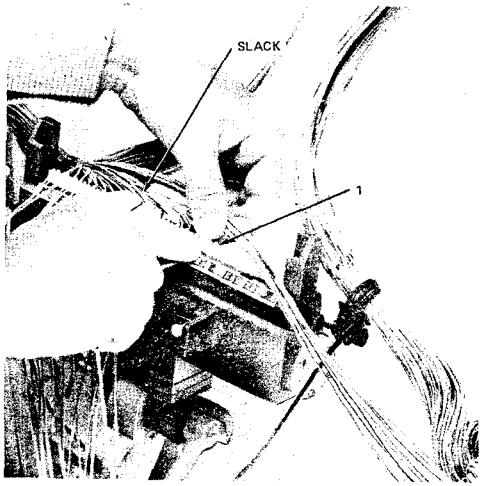
4.12 The use of the 890A tool to assemble the 710 connector module is covered in Steps 1 through 18. When in-line splicing two sections of cable together, secure the groups in group slack holder, placing the ***shortest*** section of cable in index strip to enable testing of splice using 152A test set as covered in Part 5.




**Step 1—Placing Index Strip**

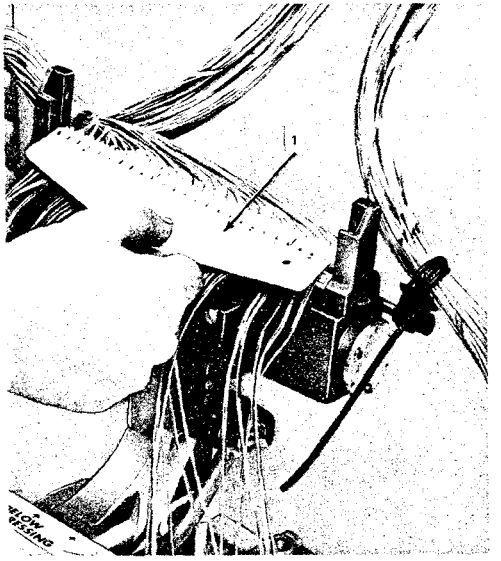
1. With the arched wire grips facing the T-bar, place index strip into connector holding bracket assembly. Assure ends of index strips are placed into the end key.

2. Push down on index strip. If necessary, push in on button to secure index strip underneath the L-spring located on back of tool. This prevents bowing of index strip during wire dressing.




**Step 2—Placing Conductor Into Index Strip**

1. Use the thumb and forefinger of each hand, grasp a pair from the binder group. Separate the tip and ring conductor on the colored peaked projections of the index strip, tip side to the left and ring side to the right. Dress the conductors into the wire grips leaving approximately 3/8-inch slack behind index strip for 24 through 26 gauge and 1 inch for 17 through 22 gauge. ***In dressing pulp or noncolor-coded PIC conductors, select the pairs at random and place them into the index strip starting at end of tool nearest cable being placed. In dressing PIC select the pairs at random and place them into the strip in proper color code sequence using color code strip and colored peak projections as a guide.***

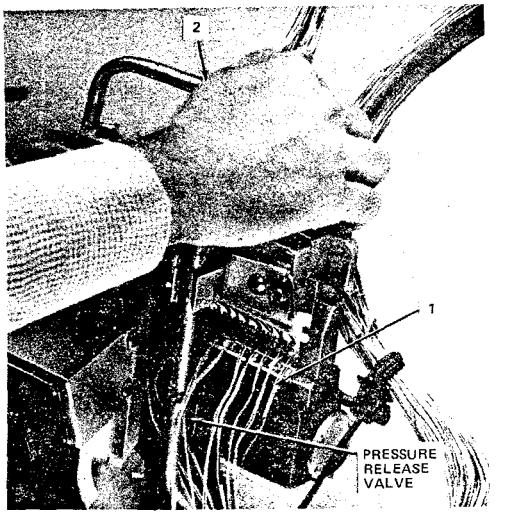



**Step 3—Checking Placed Conductors**

1. When the 25 pairs have been placed in the index strip, use the error-tector to check for splicing errors such as: two conductors in one slot, vacant slots, tip and ring reversals, or transposed pairs as follows:

   (a) Place the error-tector over the index strip and slide to the left—only the tip conductors should show. Slide the error-tector to the right—only ring conductors should show.

   (b) If an error is found, make the correction and check the conductors again with error-tector.



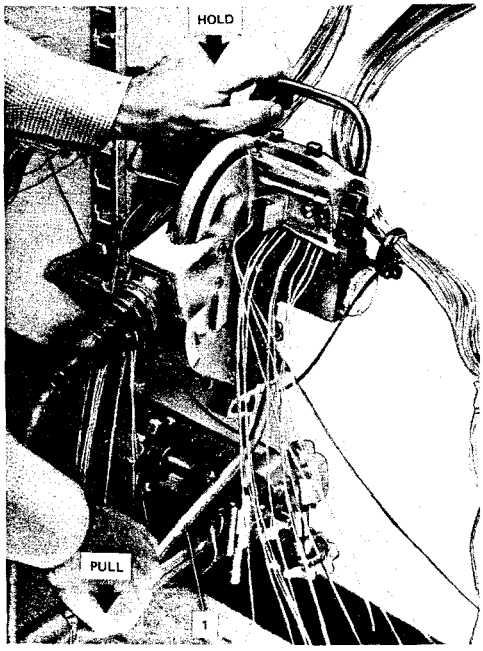

**Step 4—Placing T-Bar Over Index Strip**

1. Gently separate conductors around T-bar and clear of the pressure release valve.

2. Position T-bar over the index strip.

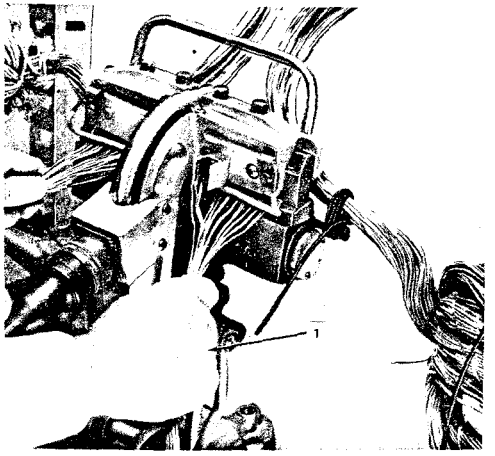

**Step 5—Positioning Tool for Cutting Operation**

1. Push down on T-bar for proper position over the index strip.



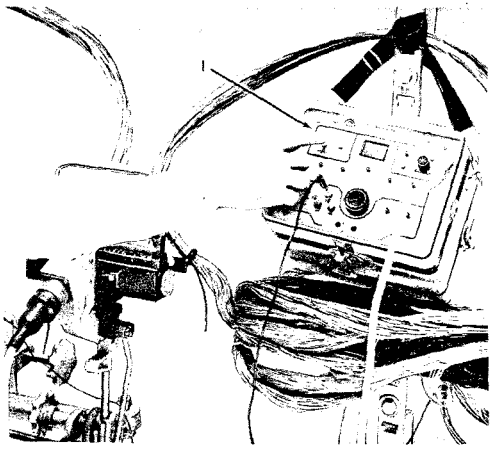

**Step 6—Seating and Cutting Conductors**

1. With T-Bar held in down position, pull lever until it hits the stop. All conductors should now be cut.



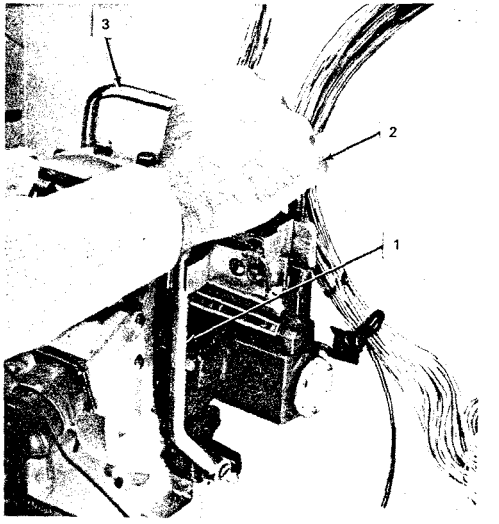

**Step 7—Removing Cut Conductors**

1. With T-bar in down position, remove cut conductors. If all conductors are not cut, refer to tool maintenance as outlined in paragraph 4.26.




**Step 8—Testing Pairs Using 152A Test Set**

1. With the lever in the down position, and using 152A test set, test the pairs as outlined in Part 5.

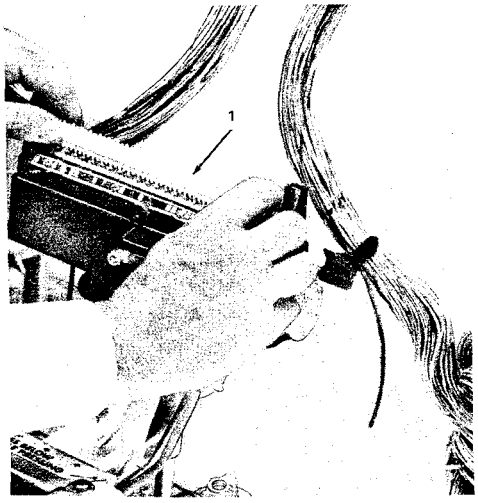



**Step 9—Returning T-Bar to Horizontal Position**

1. Push hand lever back to its original latched position.

   Raise T-bar to its full upright position.

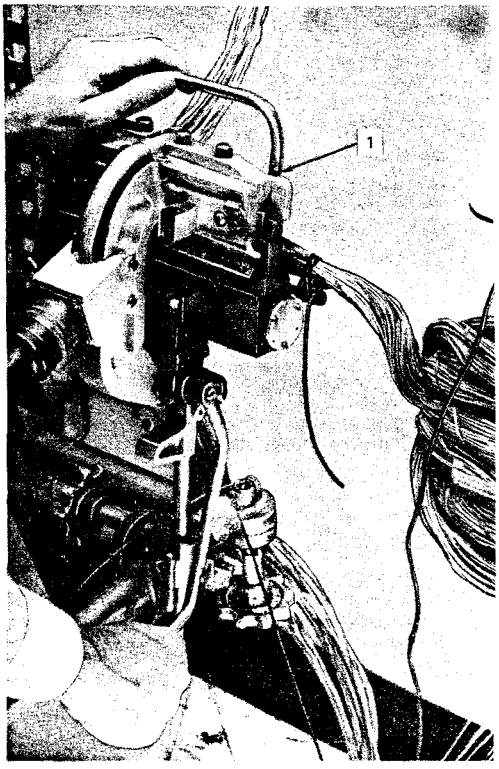
3. Pull T-bar back to horizontal position.




**Step 10—Placing Connector Module**

1. With the arched wire grips of connector module facing T-bar, place connector module into tool keeping it parallel to the index strip. Push connector down until latches on connector partially engage in slot on index strip.

   ***WARNING: If the connector module is not lowered parallel to index strip, it may be damaged causing opens, shorts, or crosses in end pair positions 1, 2, or 24, 25.***

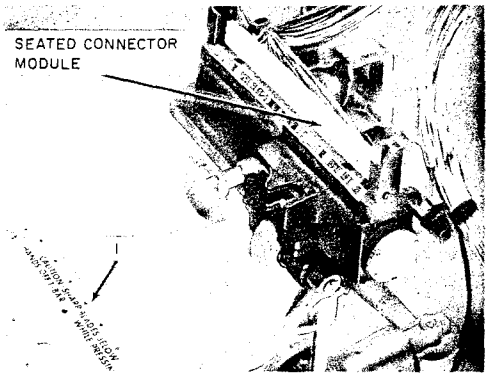



**Step 11—Seating Connector Module**

1. Position T-bar over the connector module, push down on T-bar to position over connector module; then while holding T-bar, pull the hand lever to seat connector module.

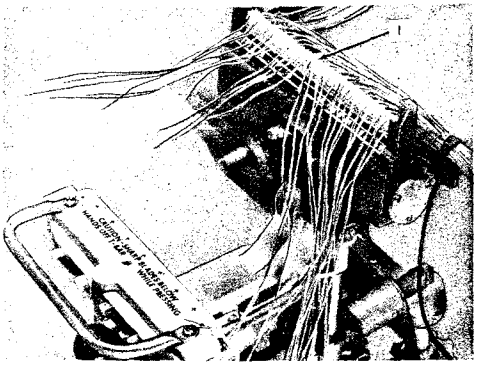
   ***Note:*** If the connector module is not properly seated, return lever to the latched position, pull T-bar back, then push down on connector module until latches on connector partially engage slots on index strip. Repeat 1 above.

2. (Optional) With the lever in the down position and using a 152A test set, test the connector module.




**Step 12—Seated Connector Module**

1. Return T-bar back to horizontal position as outlined in Step 9.



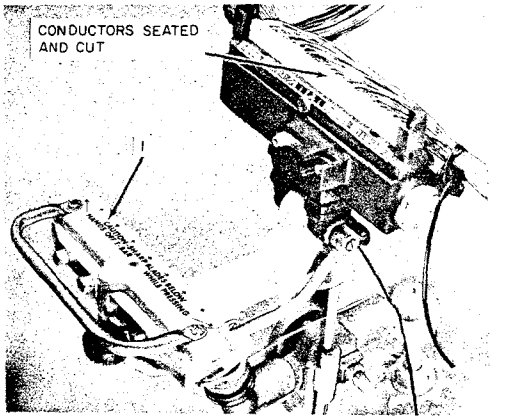
**Step 13—Conductors Placed in Connector Module**

1. Select the 25-pair group of conductors matching the group previously placed in the index strip and place into the connector module following the same procedure as outlined in Step 2.

2. Using error-tector as shown in Step 3, check the placed conductors.

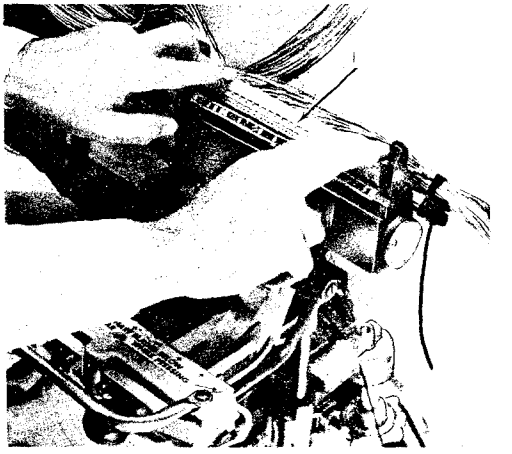
3. Gently separate conductors around T-bar and clear of pressure release valve, then position T-bar over connector module.

4. Cut conductors as shown in Steps 5, 6, and 7. With the lever in the down position and using 152A test set, test the pairs.




**Step 14—Conductors Seated and Cut**

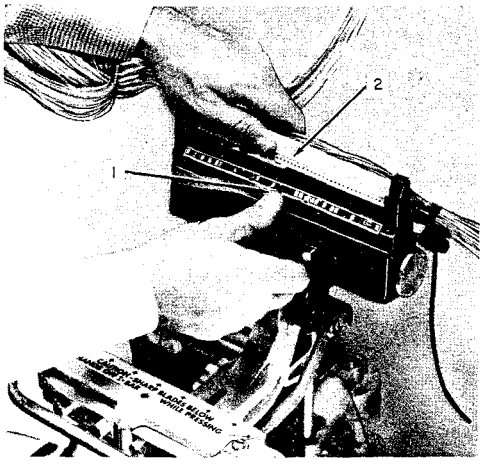
1. Return T-bar to horizontal position as outlined in Step 9.



**Step 15—Placing Cap on Connector Module**

1. With latches facing T-bar, place cap on connector module; then using fingers, partially seat the cap on connector module by pressing down on cap and running fingers across length of cap.

2. Set the cap by placing T-bar over the cap, then while ***pushing forward and down*** on T-bar, pull the hand lever to seat cap on connector module. Return T-bar to horizontal position.




**Step 16—Removing Completed Module**

1. Push button to release completed module and remove from tool.

2. Using felt marker, mark unit number on ***unfilled*** module. For filled module, identify unit number by using binder group identification tie approximately 3 inches from module.

**C. Maintenance**

**4.13** The procedures for cleaning, lubricating, and replacing knife blade in the 890A tool are identical to the procedures outlined in Steps 30, and 32 through 36 for the D, E, or F cutter-presser except the T-bar is manually operated.

**Unlocking T-Bar**

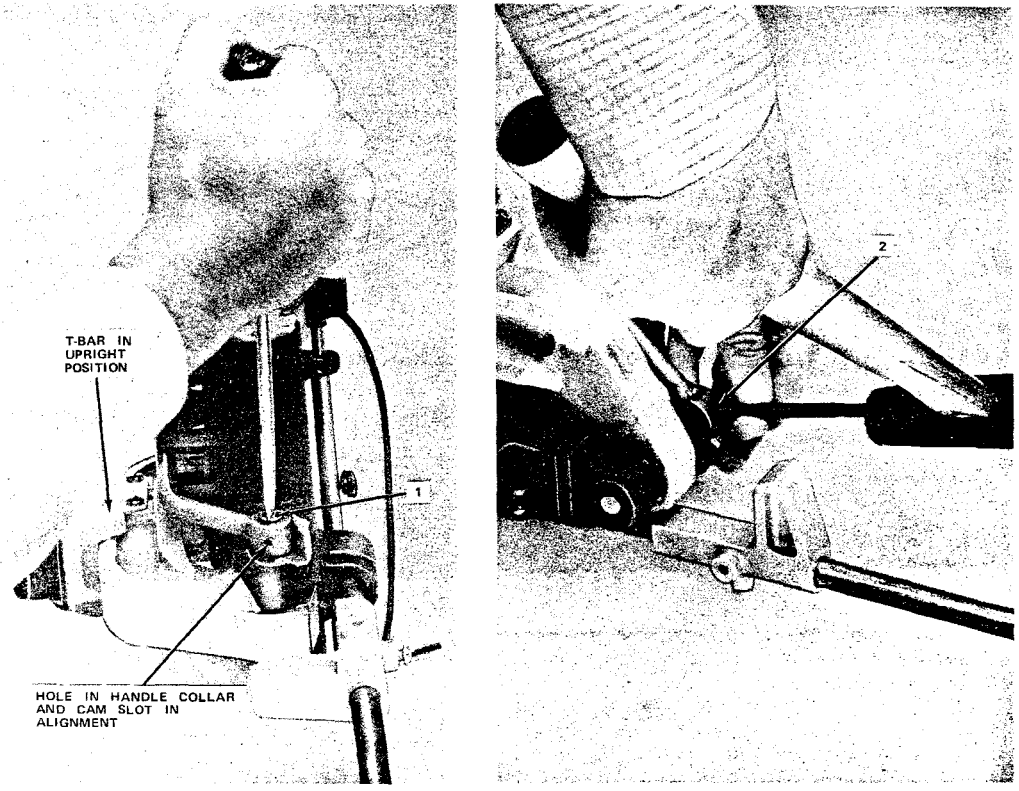
**4.14** If the T-bar will not clear the end post, when placed in the vertical position, return T-bar to horizontal position and push pressure release valve to release T-bar lock as shown in Step 17.



**Step 17—Releasing T-Bar Lock**

**Replacing Handle Pin**

**4.15** If no cutting or seating pressure occurs when pulling lever to down position, replace handle pin as outlined in Step 18.




**Step 18—Replacing Handle Pin**

1. With T-bar in full upright position, use a screwdriver to rotate cam until slot of cam is in alignment with holes in handle collar.

2. With a hammer and punch, knock the pin out about halfway and drive a new pin ***flush*** with the collar. The new pin will drive out the broken pieces of the old pin. The tool should now be checked to see if it functions properly. Ordering information for the pin is

   GROOVED PIN: 1/8-inch diameter × 3/4-inch long Comcode 900523663

**D, E, AND F CUTTER-PRESSER—DESCRIPTION**

*Note:* The D, E, and F cutter-pressers are used to assemble the 25-pair 710 connector.

4.16 ***The D cutter-presser (Fig. 28)*** is a pneumatic/hydraulic operated tool for assembling 710 connectors. The hydraulic pump operates off a required air pressure of 80-100 PSI available from a bottled air supply or compresser.

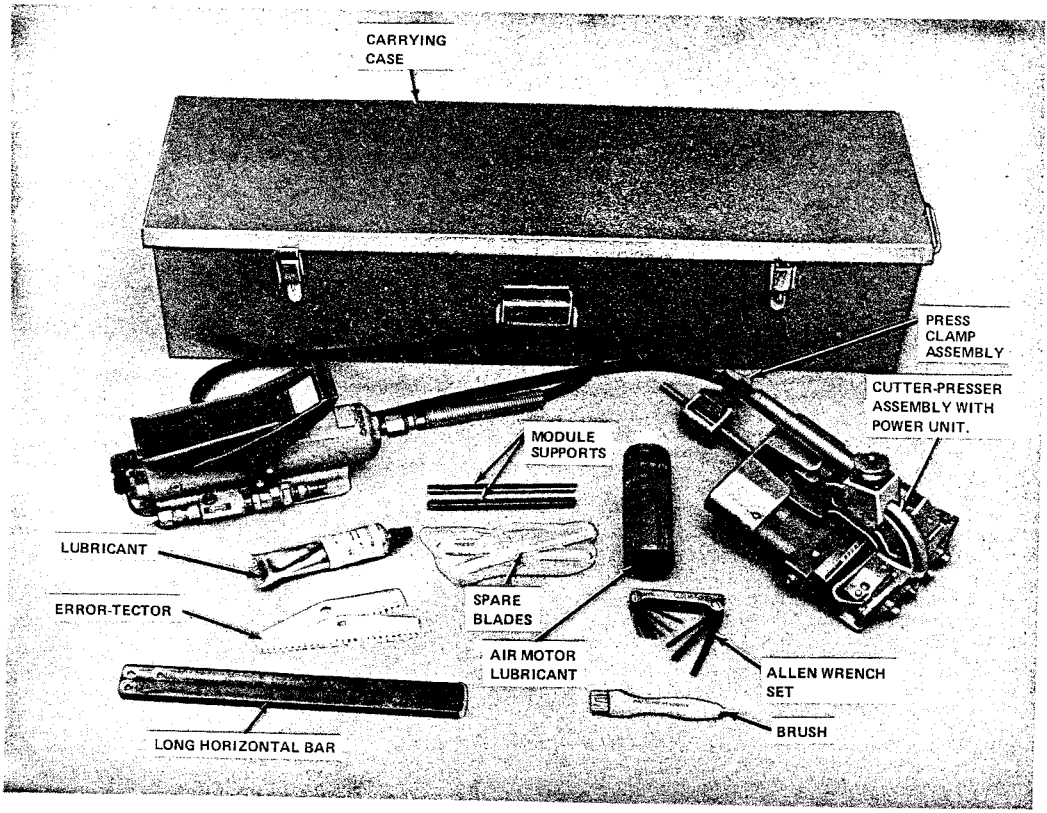



Fig. 28—D Cutter-Presser

4.17 ***The E cutter-presser (Fig. 29)*** is a pneumatic/hydraulic operated tool for use by those companies who have the B modular connector tool kits. ***When used with the modular connector tool kits, the relief pressure setting of the hydraulic pump (Enerpack unit) must be adjusted to 2900 + 300 PSI for satisfactory operation with the 710 connector.*** This setting may be made at Enerpac service centers or by using a preset capsule valve SPL-1338 which is available at Enerpac dealers.

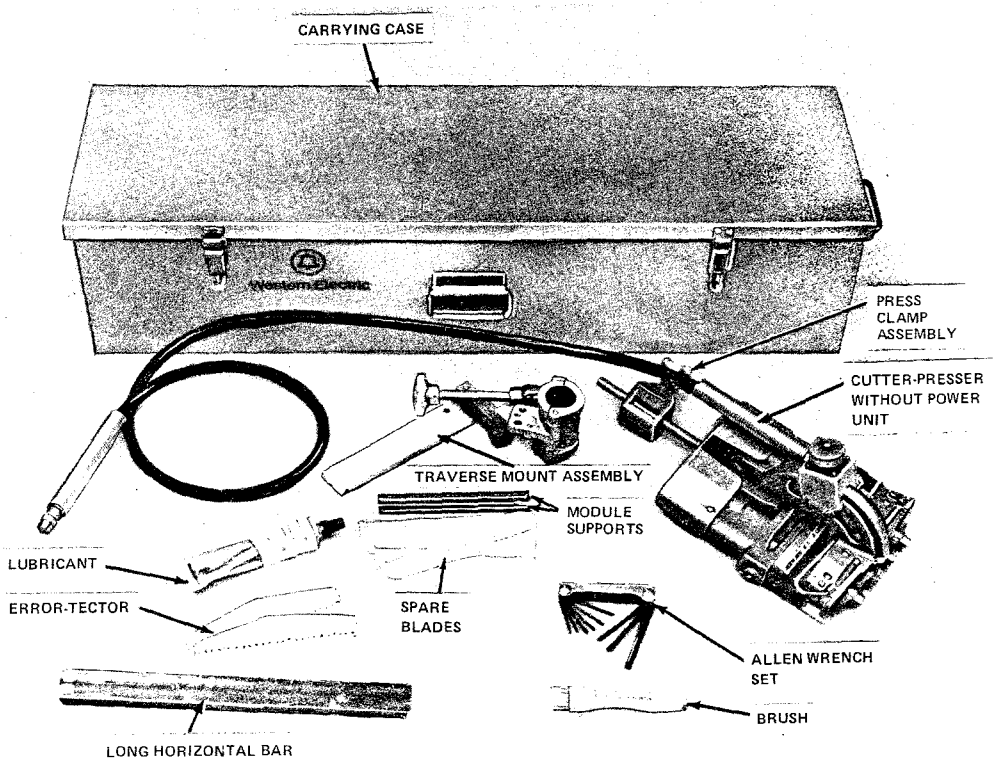



Fig. 29—E Cutter-Presser

4.18 ***The F cutter-presser (Fig. 30)*** is a hydraulic tool operate by a hand pump.

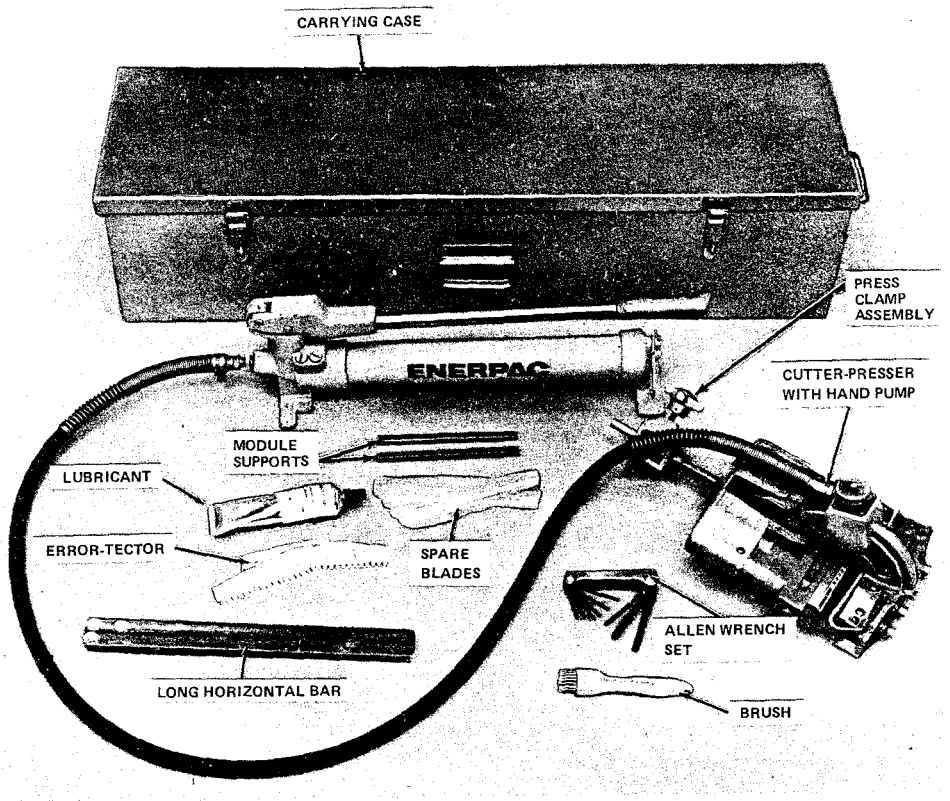



Fig. 30—F Cutter-Presser

**A. Installation**

**4.19** ***The D, E, or F cutter-presser*** can be installed on the 710-type tool mounting as shown Fig. 14, 15, or 16.

**4.20** ***The D, E, or F cutter-presser*** is installed on the B support frame assembly as follows (Fig. 31):

(a) Depress the spring on the bottom of the horizontal bar and slide the press clamp assembly on the horizontal bar with the knob on the right.

(b) Place the cutter-presser into the press clamp assembly and tighten the knob to hold it in place.

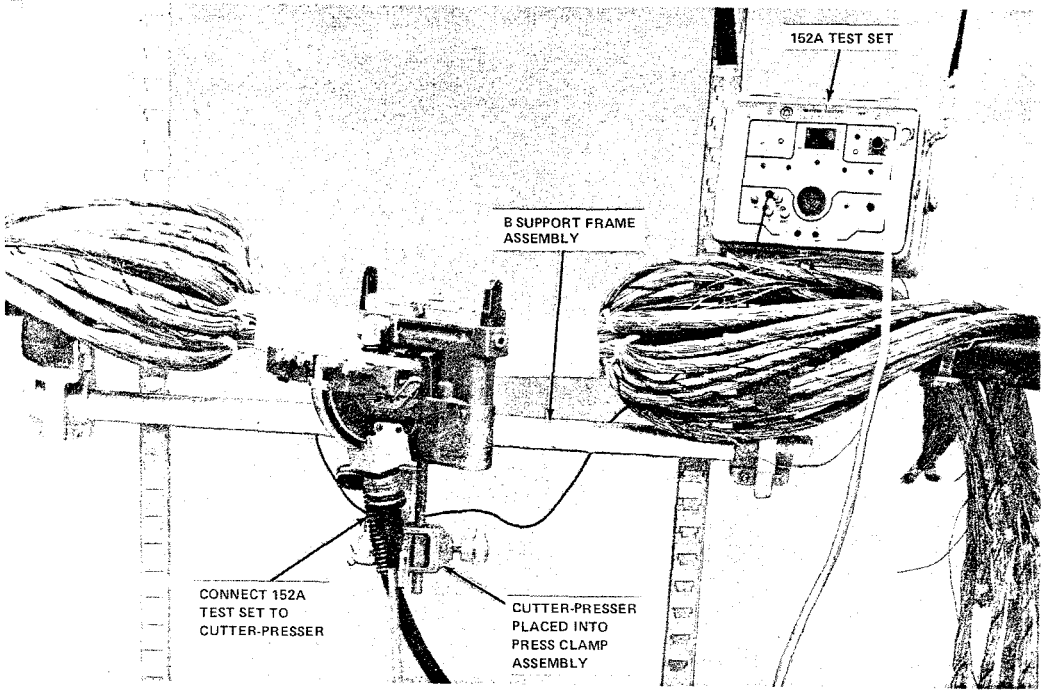



**Fig. 31—Installation of Cutter-Presser on Support Frame**

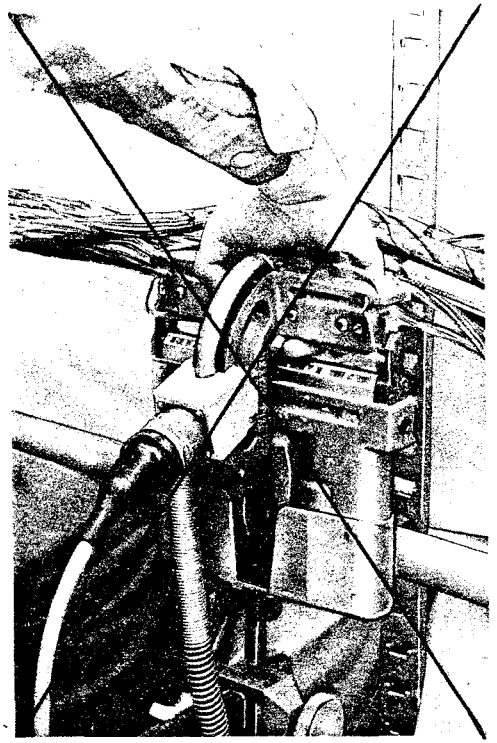
**4.21** Connect the air hose to the hydraulic pump. The hydraulic pump operates off a required air pressure of 80 to 100 PSI.

**4.22** Position 152A test set at convenient location and connect to cutter-presser as outlined in Part 5.

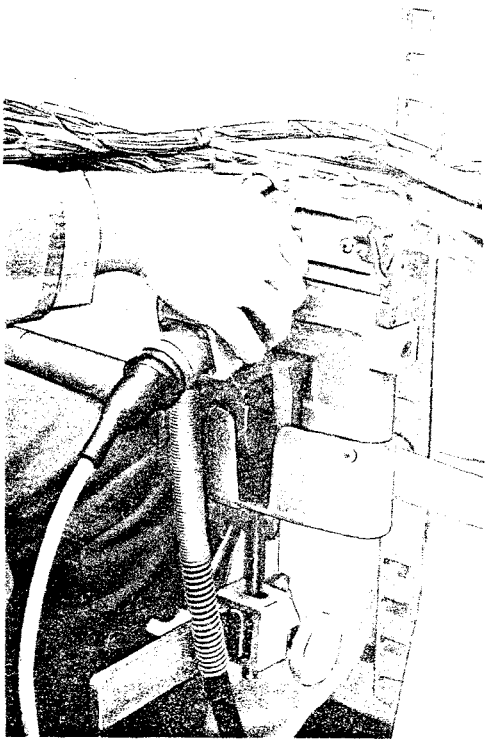
**B. Use**

***Danger: Do not operate hydraulic/ pneumatic pump with fingers underneath T-bar. When handling T-bar, place hand on back portion. Do not put fingers in back of base when operating pump (Fig. 32).***

**4.23** The use of the D, E, or F cutter-presser to assemble the 710 connector module is covered in Steps 19 through 28. When splicing two lengths of cable together, the ***shortest*** section of cable must be placed in index strip to enable testing of splicing using 152A test set as covered in Part 5.

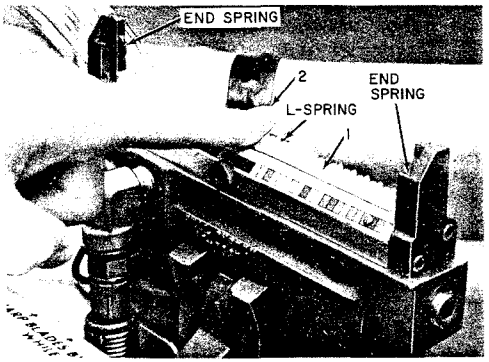


WRONG



RIGHT

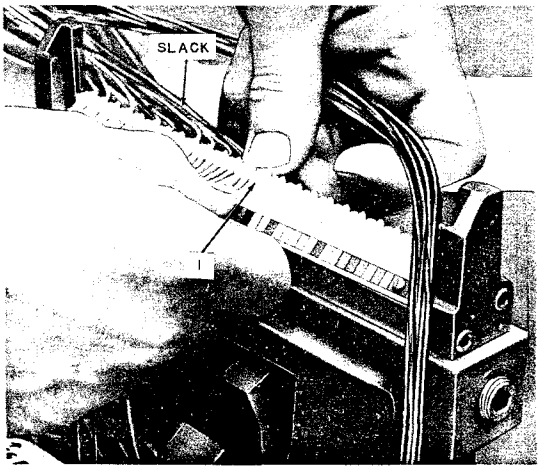
**Fig. 32—Handling Cutter-Presser**

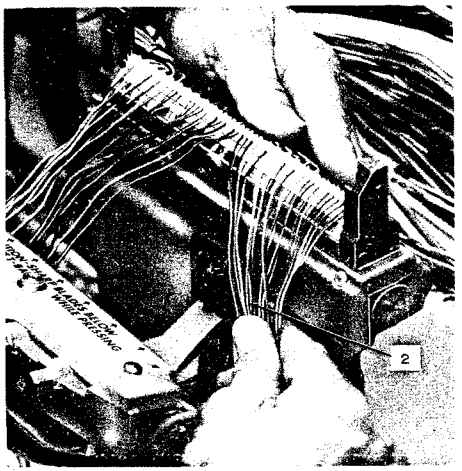



**Step 19—Placing Index Strip**

1. With the arched wire grips of index strip facing the T-bar, place index strip into the connector holding device. Assure ends of index strips are keyed into the end spring.

2. Push down on index strip to secure underneath the L-spring located on back of tool. This prevents bowing of index strips during wire dressing.

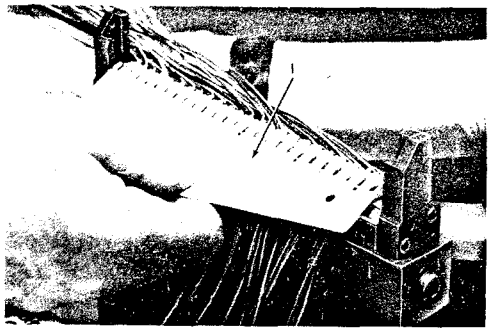



**Step 20—Placing Conductors Into Index Strip**

1. Using the thumb and forefinger of each hand, grasp a pair from the binder group to be spliced. Separate the tip and ring conductors on the colored peaked (A) projection of the index strip, tip side to the left and ring side to the right. Dress the conductors into the wire grips leaving approximately 3/8-inch slack behind the index strip for 24 to 26 gauge and 1 inch for 19 to 22 gauge and including T2 22 gauge LOCAP cable. ***In dressing pulp and noncolor-coded PIC conductors, select the pairs at random and place them into the index strip starting at end of tool nearest cable being placed. In dressing PIC, select the pairs at random and place them into the strip in proper color code sequence using color code strip and peaked projections as a guide.***

2. Gently separate conductors around T-bar. For 17 through 22 gauge, apply light pressure on wires on each side of index strip to prevent index strip from rotating forward when cutting.

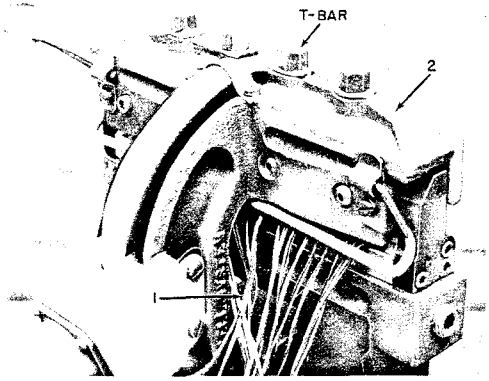


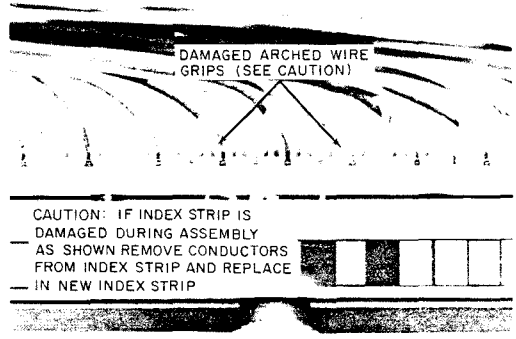
**Step 21—Checking Placed Conductors**

1. When the 25 pairs have been placed in the index strip, use the error-tector to check for splicing errors such as two conductors in one slot, vacant slots, tip and ring reversals, or transposed pairs as follows:

   (a) Place the error-tector over the index strip and slide to the left—only the tip conductors should show. Slide the error-tector to the right—only ring conductors should show.

   (b) If an error is found, make the correction and check the conductors again with error-tector.



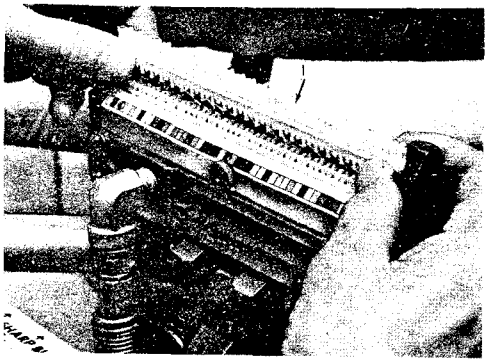

DAMAGED INDEX STRIP

**Step 22—Cutting Conductors**

1. Gently separate conductors around T-bar.

2. Position T-bar over the index strip.

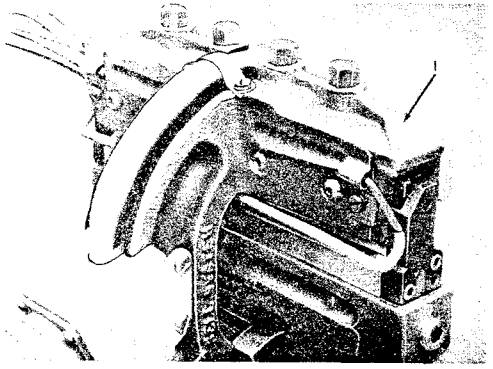
3. Operate the hydraulic pump to cut the conductors. Remove cut conductors. With the T-bar in the down position, it may be necessary to gently tug the conductors to remove from cutter-presser. ***Do not pull on conductor ends until the pump reaches full pressure as the index strip will be damaged as shown or the conductors may pull out of the index strip.*** Release pressure and pull T-bar back to its original position.



**Step 23—Placing Connector Module**

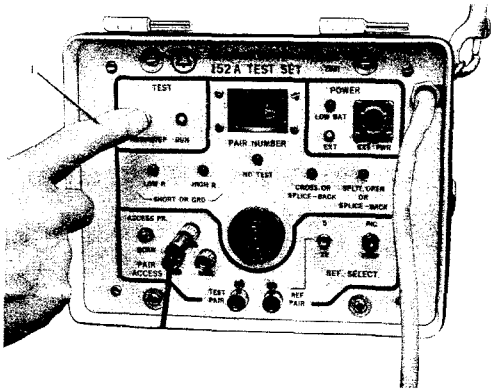
1. With the arched wire grips of connector module facing T-bar, place connector module into cutter-presser keeping it parallel to the index strip.

   ***WARNING: If the connector module is not lowered parallel to index strip, it may be damaged, causing opens, shorts, or crosses in end pair positions 1, 2, or 24, 25.***



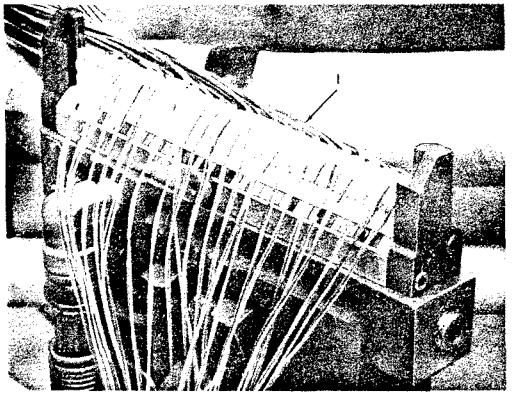
**Step 24—Seating Connector Module**

1. Close the T-bar, operate the pump, and seat the module. ***Do not release pressure and pull T-bar back until the conductors have been tested as outlined in Step 25.***

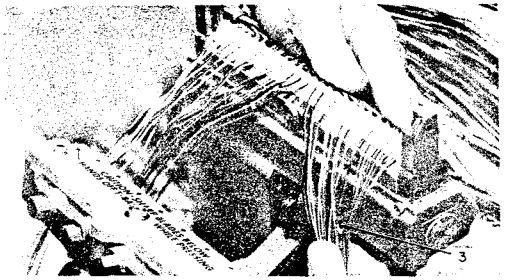


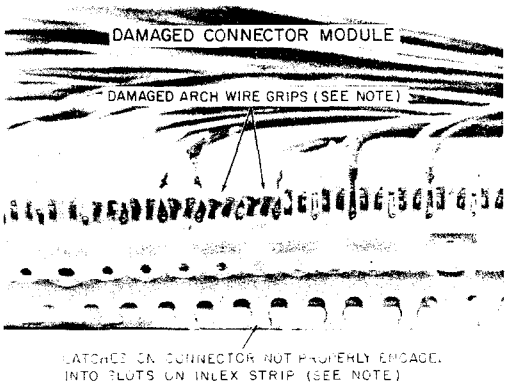

**Step 25—Operate 152A Test Set**

1. Operate the 152A test set as covered in Part 5 to test the conductors; then release pressure and pull T-bar back to its original position.



NOTE:
REMOVE CONDUCTORS FROM CONNECTOR MODULE AND REPLACE CONNECTOR MODULE





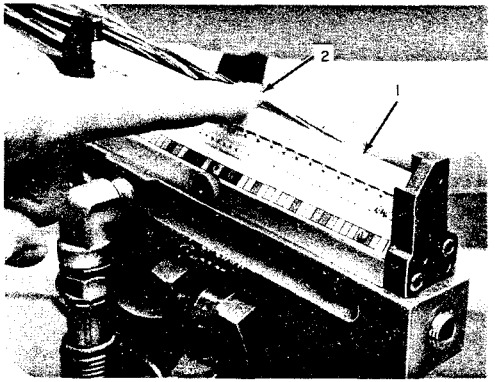

**Step 26—Conductors Placed in Connector Module**

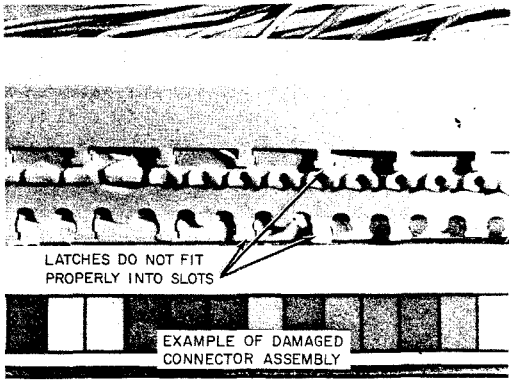
1. Select the conductors from the corresponding group of the second cable and dress them into the connector module. Bring each pair across the top of the module and separate the tip and ring conductors on the peaked projections on the top of the module. Tip conductors go to the left and ring conductors to the right. Leave approximately 3/8-inch slack behind connector module for 24 through 26 gauge and 1 inch for 17 through 22 gauge.

2. Using error-tector, check the placed conductors as outlined in Step 21.

3. Gently separate conductors around T-bar, for 17 through 22 gauge, apply light pressure on wire on each side of connector module, close T-bar over module, then operate the hydraulic pump to seat and cut the conductors. ***Do not pull on conductors while operating pump. This pulls the connector module underneath the cutting blade, thus damaging the connector modules as shown.*** With the T-bar in the fully down position, it may be necessary to gently tug the conductors to remove from cutter-presser.

4. Use 152A test set as outlined in Part 5 to test the conductors. Release pressure and pull T-bar back to original position.

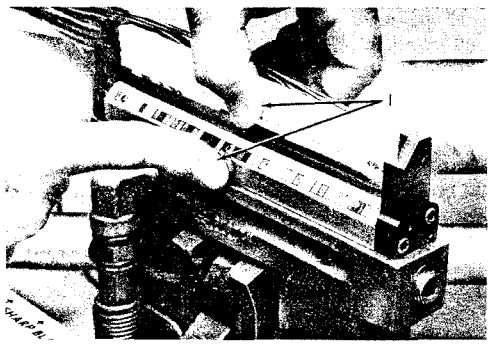



**Step 27—Placing Cap**

1. With latches of cap facing the T-bar, place cap on connector module.
2. Using finger, partially seat the cap on connector module by pressing down and running finger across length of cap.
3. Seat the cap by closing T-bar over the cap and operating the hydraulic pump. Release pressure and pull T-bar back to its original position.

***CAUTION: If connector is damaged during assembly as shown, remove the conductors from damaged connector and resplice them into a new module.***




**Step 28—Removing Spliced Unit**

1. Push button to release completed module. Remove from cutter-presser.
2. Using felt marker, mark unit number on ***unfilled module.*** Identify filled module by applying a binder group identification tie approximately 3 inches from module.

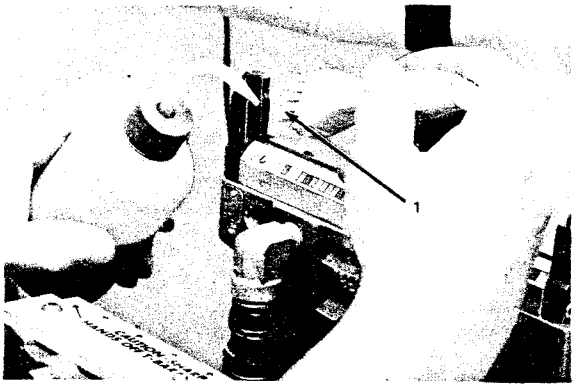
## C. Maintenance

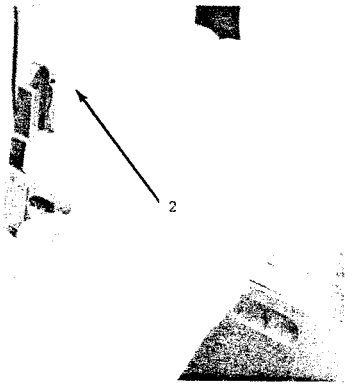
***Warning: Disconnect air pressure and release hydraulic pressure from cutter-presser to prevent accidental activation of tool while performing maintenance.***

### Cleaning

**4.24** Cleaning of the cutter-pressers as outlined in Steps 29 and 30 may be required, especially when splicing with filled connectors and waterproof cable.

***Note:*** Clean the tool after splicing with filled connectors. Assure tool is clean before splicing with unfilled connectors.



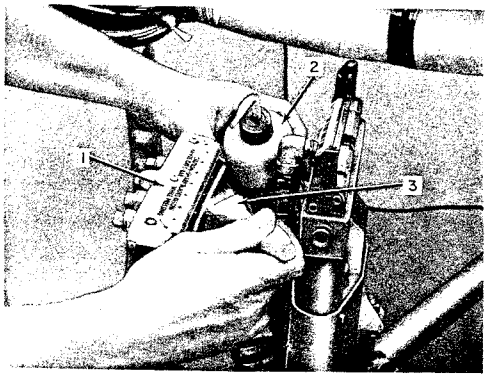



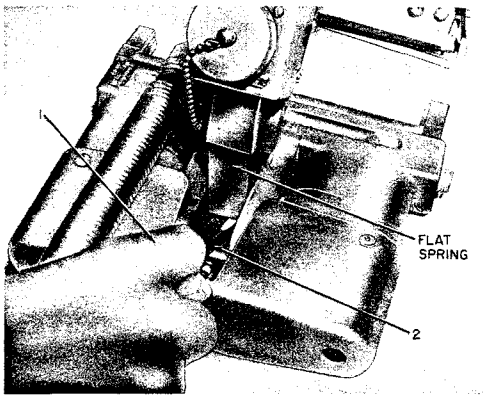

### Step 29—Cleaning End Spring

1. Spray and brush the end spring with KS-21446 solvent or KS-7860 petroleum spirits. Work the solvent into end spring to assure the springs are thoroughly cleaned. Problems are caused by buildup behind the end spring when using filled connector.

   ***Warning: Do not use B cleaning fluid or other unapproved fluids to clean the tool as some residue will remain on tool causing damage to the connectors and cutting blade.***

2. With a cloth, depress the springs several times to loosen the buildup, then clean and dry.




**Step 30—Cleaning Guide and Blade Assembly**

1. Pull T-bar back in horizontal position.
2. Using KS-21446 solvent, spray the knife blade and guide area.
3. Brush the guide and blade thoroughly to clean and remove all wire scraps left in the guide area to prevent any false defective pair indication when using 152A test set.
4. Using a cloth, clean and dry.

***Warning: Extreme caution must be exercised when cleaning and drying guide assembly as the blade is very sharp.***

**Lubrication**

**4.25** If operation of the T-bar becomes difficult, apply grease to the flat closing spring as outlined in Step 31. The grease is available in the tool kit.

**Step 31—Lubricating Cutter-Presser**

1. Insert screwdriver between T-bar and spring to deflect the spring 1/16 inch.
2. Place lubricant into opening.

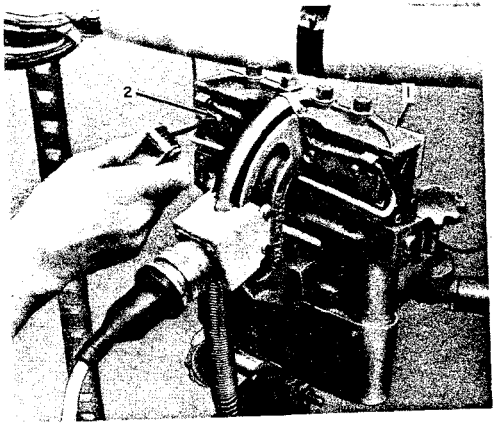
**Knife Blade Replacement**

***Danger: Exercise care when handling knife blade as the blade is very sharp.***

**4.26** Knife blades should be replaced when they become dull or damaged and will not cut the ***conductors.*** A sign of a dull or broken knife blade is the ragged and incomplete ***cutting of the conductors.***

***Note:*** A sharp knife blade may not cut all the way through the bottom of pulp or paper insulation or through 17- or 19-gauge conductors. ***Unless the conductor shows ragged cutting, the blade does not need replacing.***

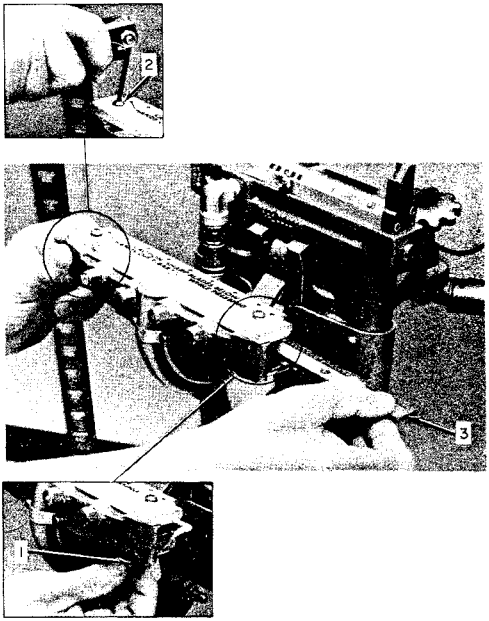
**4.27** Procedures for replacing knife blade in D, E, and F cutter-pressers are outlined in Steps 32 through 36.




**Step 32—Loosening Screws**

1. Push T-bar in the upright position.

2. Using the allen wrench set ***loosen, DO NOT REMOVE,*** the four allen head screws on the back of the T-bar. The screws secure the holder assembly and blade in place. If the screws are removed while the T-bar is in the up position, the holder assembly and blade will fall out.

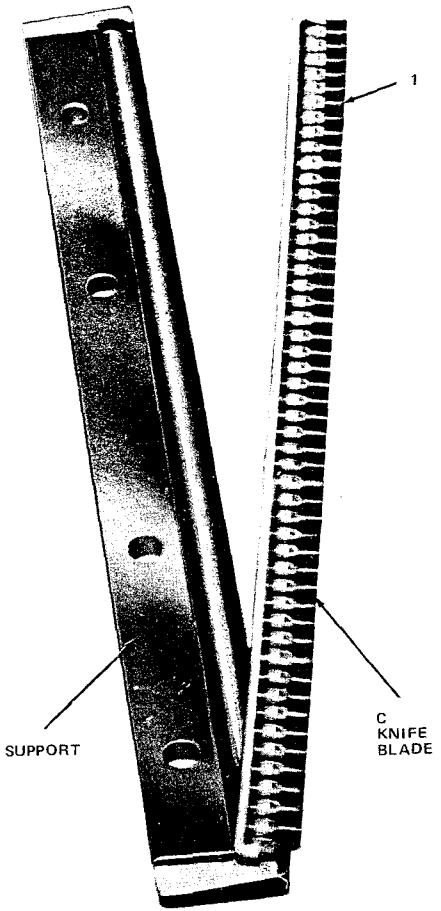



**Step 33—Removing Blade**

1. Pull the T-bar back to its rest position and remove the four allen head screws.

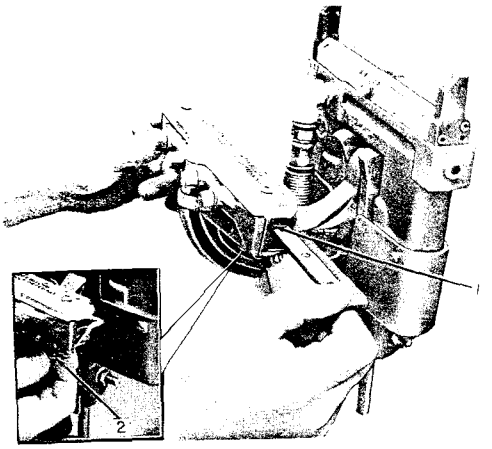
2. It may be necessary to loosen (do not remove) the screws securing the wire cover to the T-bar to relieve pressure on the blade.

3. Push down the knife blade guard and slide the old blade and the support out of the side of the T-bar. Be careful not to drop any other parts of the T-bar.



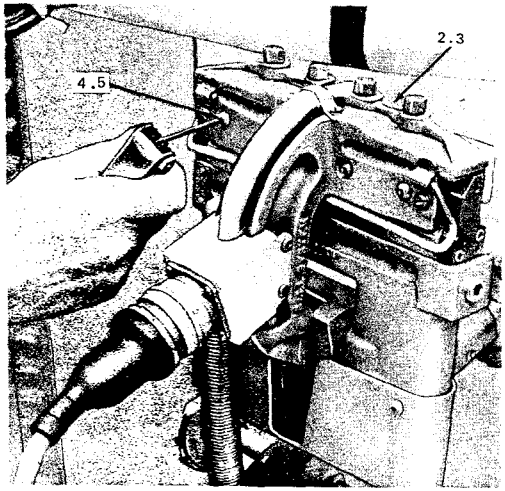

**Step 34—Placing Blade in Knife Blade Support**

1. Place blade in knife support as shown.




**Step 35—Replacing Knife and Support**

1. Slide support into space provided until knife blade is centered.
2. Replace allen head screws into the T-bar and FINGER TIGHTEN. Blade has to be aligned before tightening with allen wrench.


**Step 36—Aligning Blade**

1. Insert index strip into holder of cutter-presser with arched wire grip facing T-bar. Assure index strip is secure beneath the L-spring in the center of the holder.

2. Push T-bar to the upright position. Connect air pressure.

3. Operate the hydraulic pump. This brings the blade in contact with the index strip and aligns the blade properly.

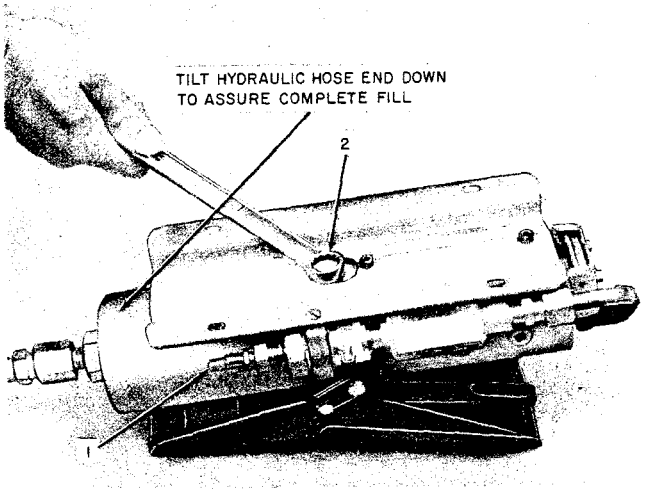
4. With the T-bar in the down position, tighten all four allen screws snugly until the lockwashers around the screws are fully compressed. ***Do not overtighten, the plastic guide could be damaged.***

5. Release the hydraulic pump, then check index strip to ensure a slight knife cut is visible. Disconnect air pressure.

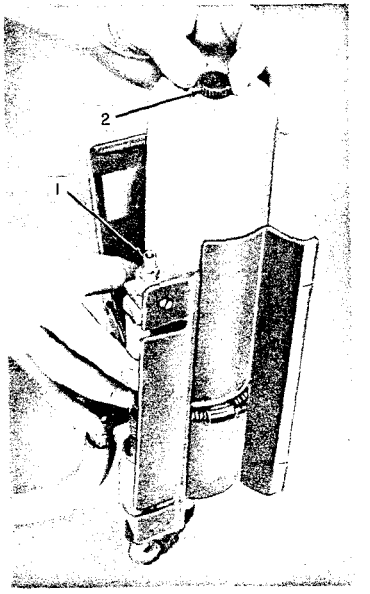
6. Tighten screws to secure wire cover.

**Enerpac Unit (Checking Oil Level)**

**4.28** Check all hydraulic and air connections to be sure they are tight and not leaking. Loose or leaking connections may cause erratic and/or loss of operation. Procedures for checking oil level are outlined in Steps 37 through 39.




ENERPAC MODEL NO. PA13I-SP(MD)

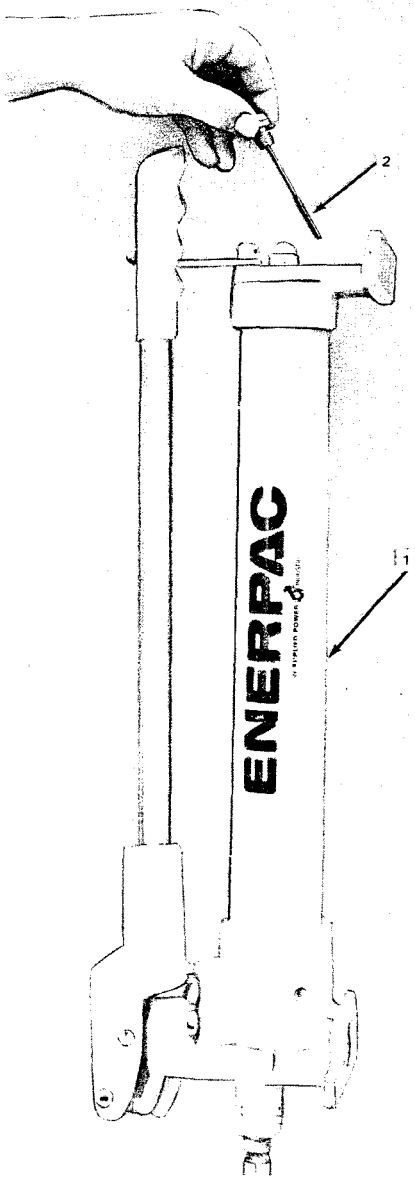



ENERPAC MODEL NO PA136-SP

**Step 37—Checking Oil Level (Air Pump)**

1. Disconnect air and turn pump upside down.
2. Keeping the hydraulic hose end down, remove filler plug and check oil level.
3. If oil is required, fill the pump with Enerpac hydraulic fluid (HF-100 series) or equivalent. ***Assure pump is completely filled (oil overflows).***

***Caution: Use Enerpac hydraulic fluid (HF-100 series) or equivalent. Do not use brake fluid. The use of other types of oil may damage pump. Hydraulic oil should be changed after every 50 hours of use. In dusty areas, it may be neccessary to change the oil more frequently.***

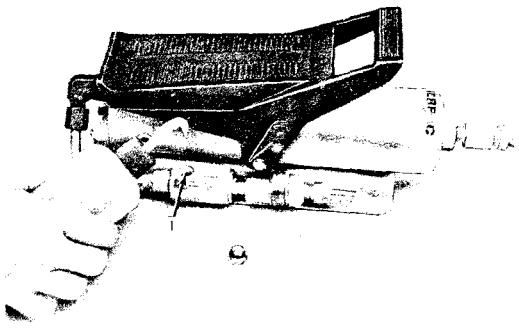



Step 38—Checking Oil Level (Hand Pump)

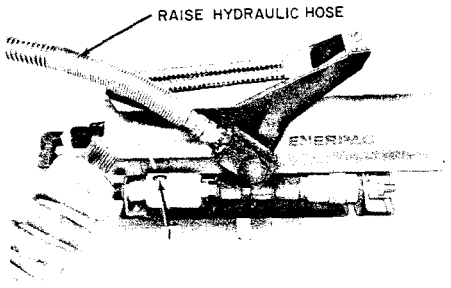
**Step 38—Checking Oil Level (Hand Pump)**

1. Position hand pump in vertical position.
2. Remove the dip stick and check oil level.
3. If oil is required, fill the pump with Enerpac fluid (HF-100 series) or equivalent. ***Assure pump is completely filled (oil overflow).***

   ***Caution: Use Enerpac hydraulic fluid (HF-100 series) or equivalent. Do not use brake fluid. The use of other types of oil may damage pump. Hydraulic oil should be changed after every 50 hours of use. In dusty areas, it may be necessary to change the oil more frequently.***



ENERPAC MODEL NO. PA131-SP MD




ENERPAC MODEL NO. PA136-SP

**Step 39—Filling Filter Lubricator**

1. Remove plug and fill cylinder with air motor lube or KS-19519 L1 oil or equivalent. This should be done weekly.

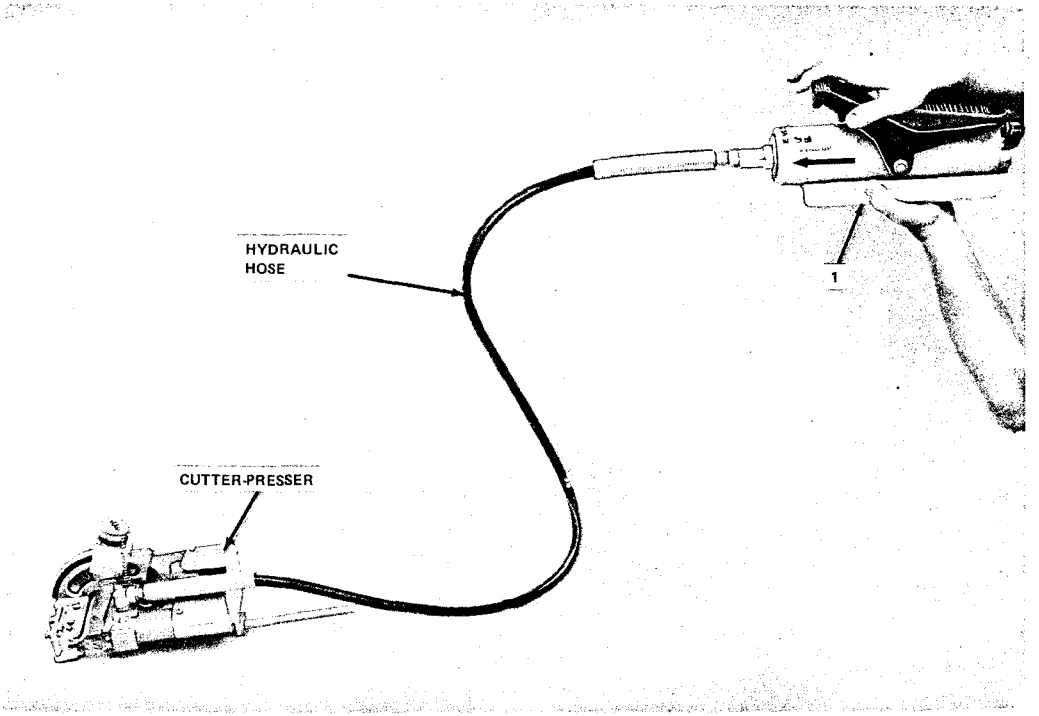
**Troubleshooting Enerpac**

**4.29** Table C outlines some problems which may be experienced with the Enerpac unit if air or dirt enters the system or if air is not completely purged from the unit.

TABLE C

ENERPAC TROUBLESHOOTING GUIDE

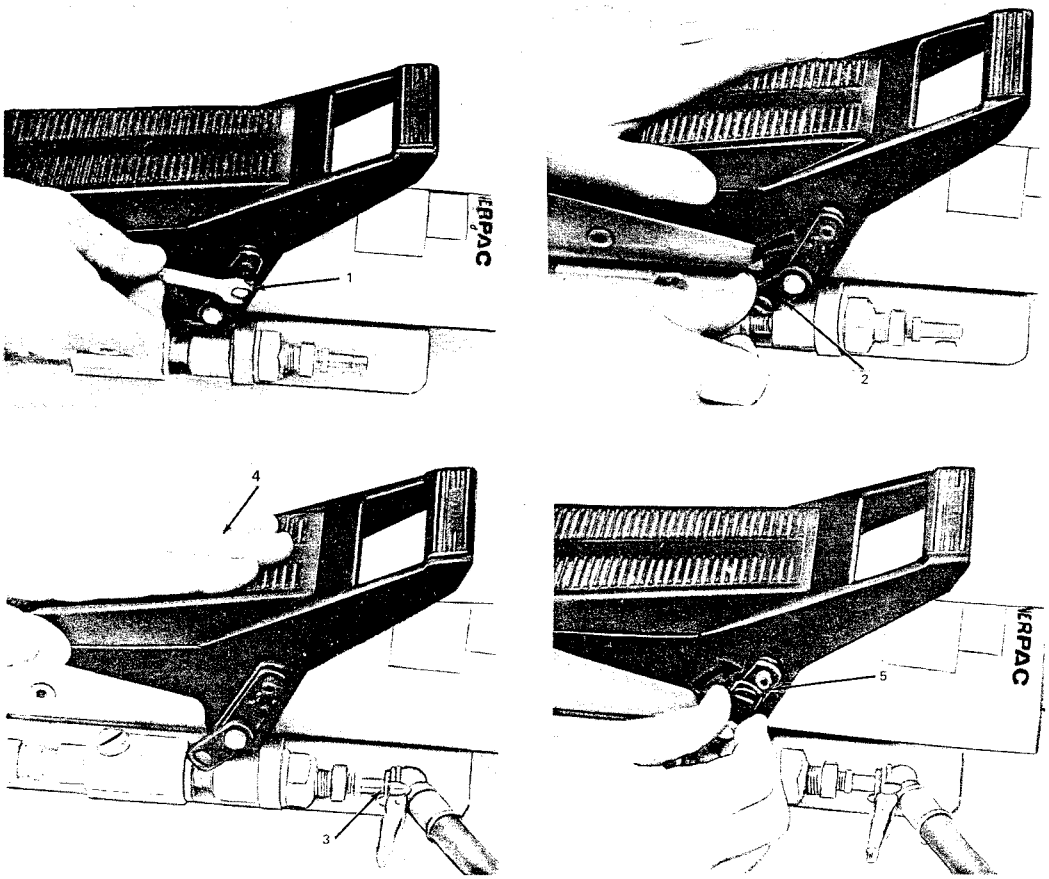
| PROBLEM | PROBABLE CAUSE | CORRECTING PROCEDURE PROCEDURES |
|---|---|---|
| Air motor operates (putting sound) but no hydraulic pressure | (1) Release valve may be out of adjustment,<br>or<br>(2) Air may be in the hydraulic pump | Step 41<br><br>Step 42 |
| Hydraulic pressure builds up but will not hold (T-bar creeps open after closing) | Release valve is out of adjustment | Step 41 |
| Air motor fails to operate (no putting sound or operates slowly) | Dirt has entered the air motor and gummed up the air piston ring | Step 44 |
| No movement of T-bar | Air in cutter-presser | Steps 41 and 43 if necessary |




**Step 40—Bleeding Air From Head of Cutter-Presser**

1. To bleed the air from head of cutter-presser, hold the pump above the cutter-presser and operate treadle valve several times. This should force any air to the pump reservoir, check the pump, and fill with hydraulic fluid (Step 39), if required.

***Warning: Do not operate the hydraulic pump upside down or with hydraulic hose end down.***




**Step 41—Adjustment of Release Valve (Enerpac PA131-SP) (No adjustment required for Enerpac PA136-SP Pump)**

1. Using 5/16-inch wrench, remove screw and lockwasher that secures adjustment arm.

2. Rotate adjustment arm 1/3 turn counterclockwise.

3. Attach air source to pump.

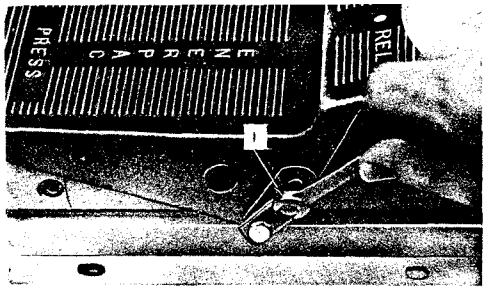
4. Depress the treadle. If the release valve was out of adjustment, hydraulic pressure should build up as the treadle is depressed.

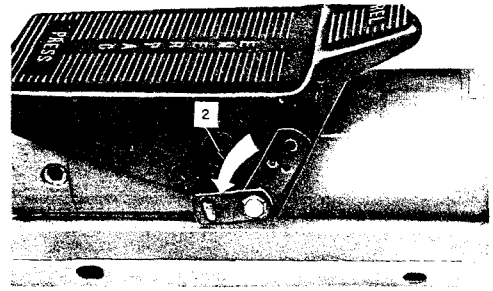
5. With pressure built up, rotate the adjustment arm clockwise until the hydraulic pressure releases. Mark point of release on pump. Repeat 2 and 4. With pressure built up again, rotate the adjustment arm clockwise to a point of resistance just before reaching point where pressure releases. Replace the screw and lockwasher in the adjustment arm and secure in place.

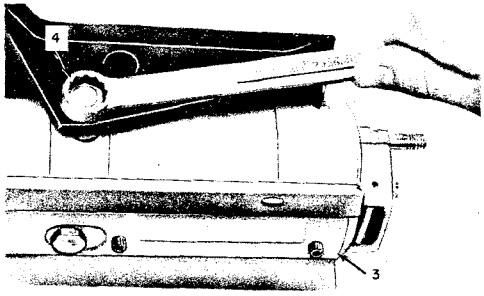
**Step 41—Adjustment of Release Value (Enerpac PA131-SP) (No Adjustment Required for Enerpac PA136-SP) (Contd)**

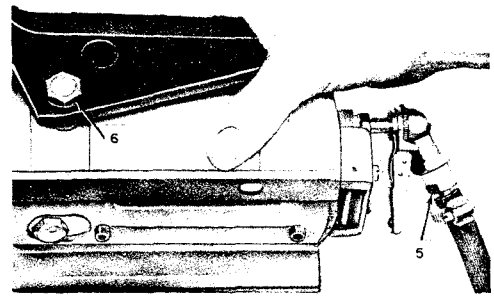
6. Operate the pump a few times to ensure that the setting is correct.

   ***Note:*** If pump was badly misadjusted, it may be necessary to remove the arm and relocate so that the locking screw aligns with one of the tapped holes in the fixed plate.




**Step 42—Removing Air From Pump (Enerpac PA131-SP)**

1. Using 5/16-inch wrench, remove screw and lockwasher that secures adjustment arm.

2. Rotate adjustment arm 1/3 turn counterclockwise.

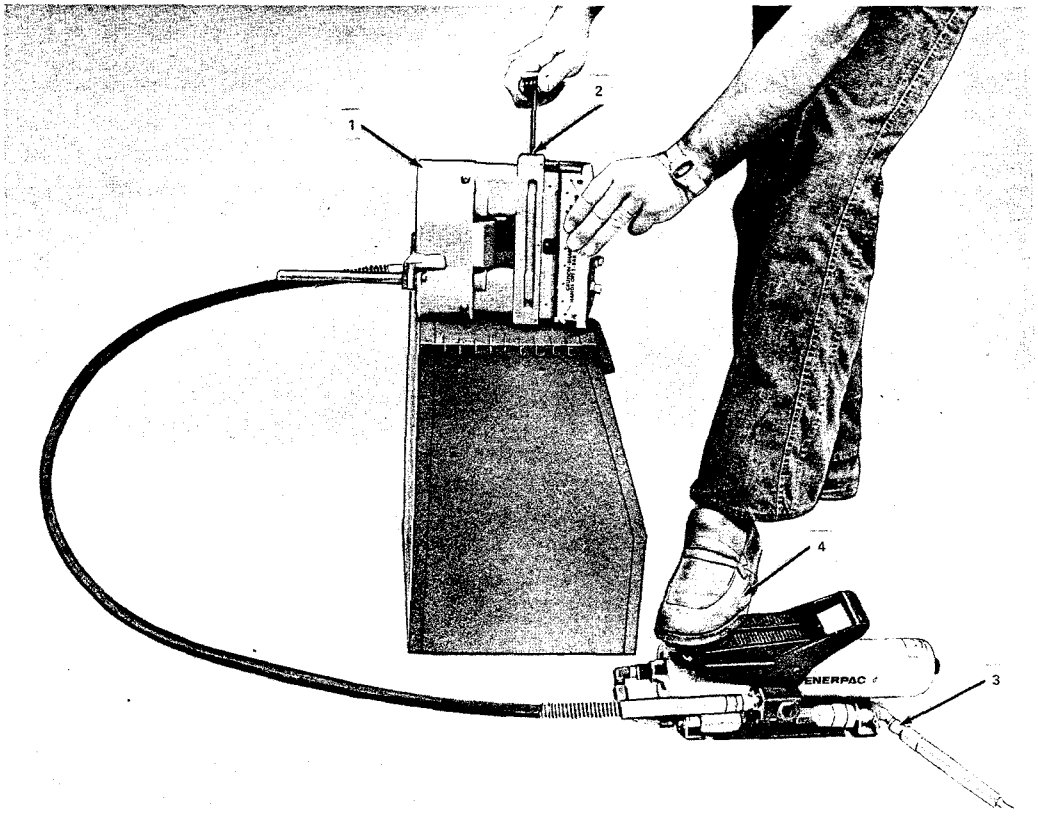
3. Turn pump on side so the adjustment arm is down and treadle bearing is up.

4. Using a 5/8-inch wrench, loosen the treadle bearing three turns.

5. Attach air supply and operate the pump; some air and hydraulic fluid should leak from the base of the treadle bearing. If no fluid is detected, it may be necessary to loosen the treadle bearing in 1/4-turn increments until hydraulic fluid is seen. Continue to operate the pump until hydraulic pressure builds (T-bar of cutter-presser closes and only hydraulic fluid, no air, is seen coming from the base of the treadle bearing).

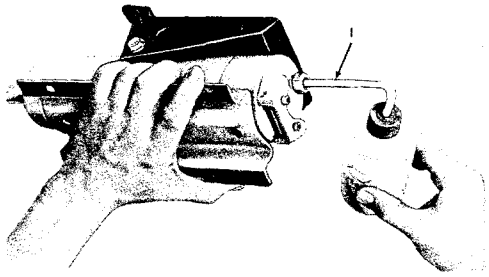
6. Retighten the treadle bearing while the pressure is built and adjust the release value as outlined in Step 41.

7. Bleed the air from head of cutter-presser as outlined in Step 40.




**Step 43—Removing Air From Cutter-Presser (Enerpac PA136-SP and Enerpac PA131-SP Mfr Disc.)**

1. Position cutter-presser higher than pump.
2. Remove setscrew on side of tool.
3. Attach air hose to the pump.
4. Depress the treadle; air and hydraulic fluid should leak from the cutter-presser. Repeat this operation until no air is seen coming from the cutter-presser, then replace setscrew.
5. Recheck oil level in pump and fill, if required.



**Step 44—Lubricating Air Motor**

1. Using air motor lube or KS-19519 L1 lubricating oil, or in an emergency SAE No. 10 motor oil, lubricate the air motor by placing the oil directly into the quick connect air fitting or remove F pressure valve fitting and place oil directly into fitting hole until it floods. Replace F pressure valve and apply air.

   ***Note:*** If the lubricant was placed into the fitting, attach the air and operate the pump. Repeat this procedure until the air piston begins to cycle.

   If problems with the pump are not solved by the procedure discussed, return for repair in accordance with company procedure.

   ***Note 1:*** If the pump is disconnected from the hydraulic hose, be sure to cover the end of the hose with a 1/4 NPT cap, so that the fluid does not run out. Also, when reconnecting the pump the system must be bled as discussed in Step 42.

   ***Note 2:*** If it is necessary to replace a pump, the SPL-1430-E5 pump may be purchased from Western Electric Company. Or if it is necessary to purchase a pump from an Enerpac dealer, a PA-136 with the pressure set at 2900 + 300 PSI or equipped with an SPL-1338 preset capsule valve may be used.

## 835-TYPE TOOL—DESCRIPTION

**4.30** The 835A or 835A1 tools are manually operated cutter-pressers which use a lever system instead of a hydraulic system for power to assemble 25-pair 710 connector. The 835A tool is shown in Fig. 33. The 835A1 tool is an improved version of the 835A tool.

**4.31** The 835A and 835A1 tools are wired for use with a 152A test set for testing pairs as the splice is made.

### A. Installation

**4.32** Install the 835-type tool on 710-type tool mounting as shown in Fig. 14, 15, 16 or 17.

**4.33** The 835-type tool can also be installed on the B support frame assembly using the same procedure as outlined in paragraph 4.12 for the 890A tool.

### B. Use

***Danger: Exercise care when operating 835-type tool as the knife blade is very sharp.***

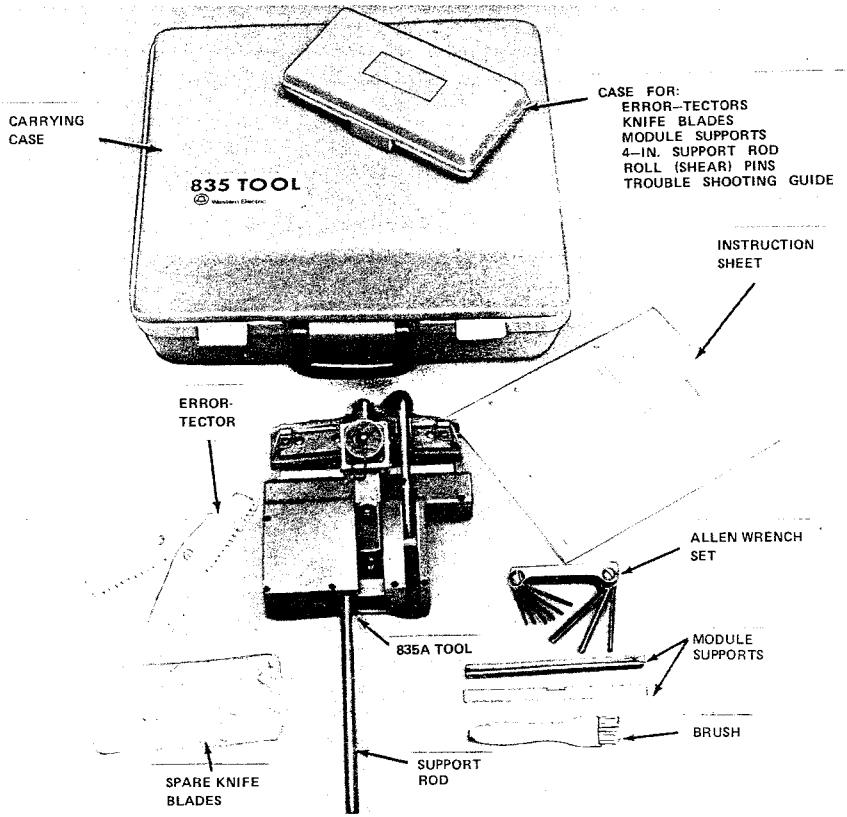
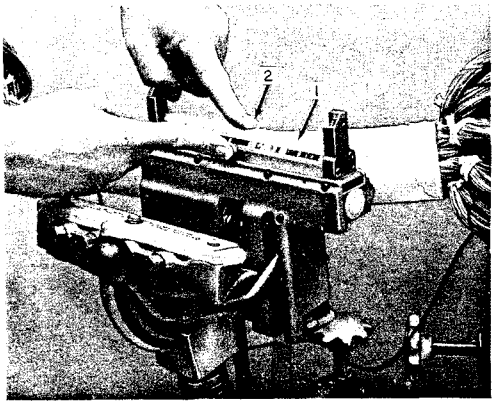



Fig. 33—835A Tool

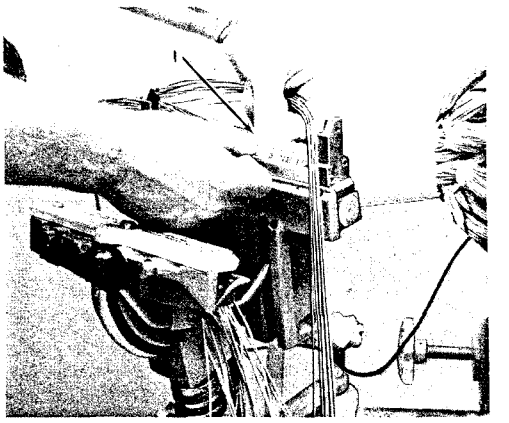
**4.34** The use of the 835A tool to assemble the 710 connector module is covered in Steps 45 through 61. When splicing two sections of cable together, the ***shortest*** section of cable must be placed in index strip to enable testing of splice using 152A test set as covered in Part 5.




**Step 45—Placing Index Strip**

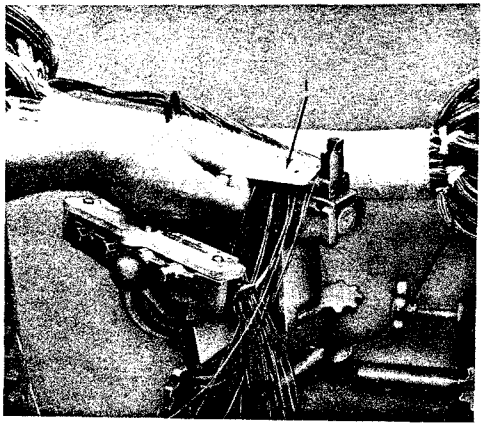
1. With the arched wire grips facing the T-bar, place index strip into connector holding bracket assembly. Assure ends of index strips are keyed into the end springs.

2. Push down on index strip. If necessary, push in on button to secure index strip underneath the L-spring located on back of tool. This prevents bowing of index strip during wire dressing.




**Step 46—Placing Conductor Into Index Strip**

1. Use the thumb and forefinger of each hand, grasp a pair from the binder group. Separate the tip and ring conductor on the colored peaked (∧) projections of the index strip, tip side to the left and ring side to the right. Dress the conductors into the wire grips leaving approximately 3/8-inch slack behind index strip for 24 through 26 gauge and 1 inch for 17 through 22 gauge. ***In dressing pulp and noncolor-coded PIC conductors, select the pairs at random and place them into the index strip starting at end of tool nearest cable being placed. In dressing PIC select the pairs at random and place them into the strip in proper color code sequence using color code strip and colord peak projections as a guide.***

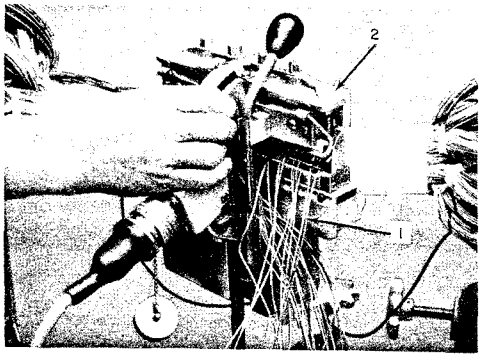



**Step 47—Checking Placed Conductors**

1. When the 25 pairs have been placed in the index strip, use the error-tector to check for splicing errors such as: two conductors in one slot, vacant slots, tip and ring reversals, or transposed pairs as follows:

   (a) Place the error-tector over the index strip and slide to the left—only the tip conductors should show. Slide the error-tector to the right—only ring conductors should show.

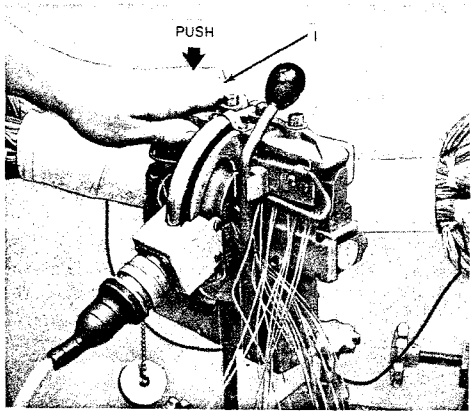
   (b) If an error is found, make the correction and check the conductors again with error-tector.




**Step 48—Placing T-Bar Over Index Strip**

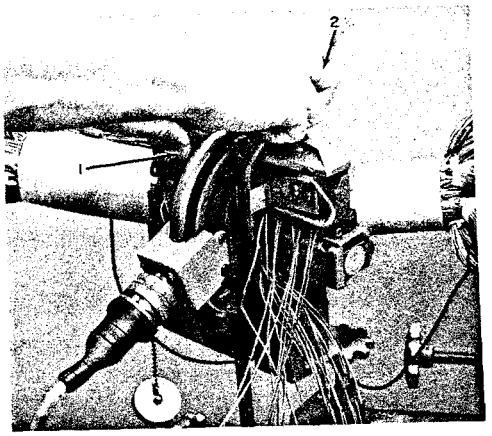
1. Gently separate conductors around T-bar as shown in Step 26.

2. Position T-bar over the index strip.



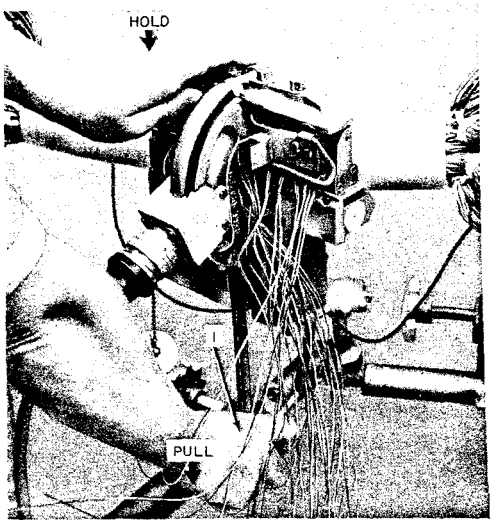

**Step 49—Positioning Tool for Cutting Operation**

1. Push down on T-bar for proper position over the index strip.



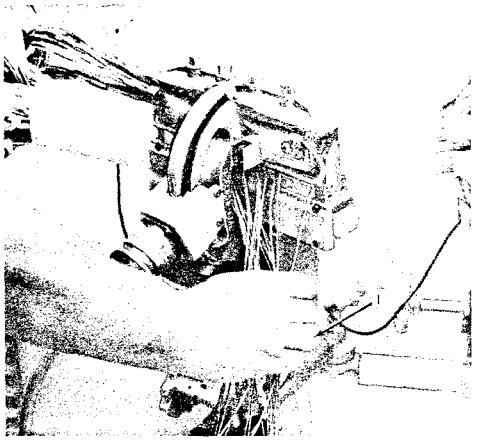

**Step 50—Tool Positioned for Cutting**

1. Hold T-bar in down position.
2. Grasp hand lever.



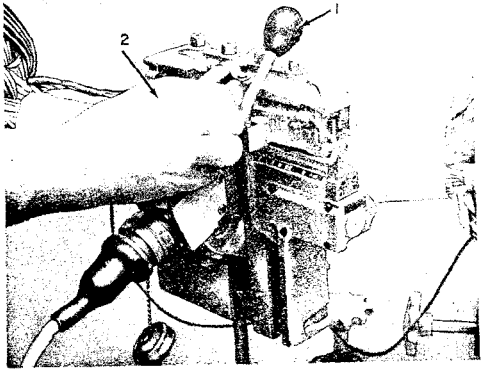

**Step 51—Seating and Cutting Conductors**

1. With T-bar held in down position, pull lever until it hits the stop. All conductors should now be cut.



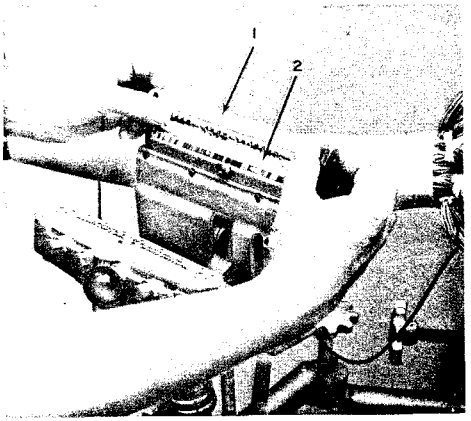

**Step 52—Removing Cut Conductors**

1. With T-bar in down position, remove cut conductors. If all conductors are not cut, refer to tool maintenance as outlined in paragraph 4.26.




**Step 53—Returning T-Bar to Horizontal Position**

1. Push hand lever back to its original latched position.
2. Pull T-bar back to horizontal position.

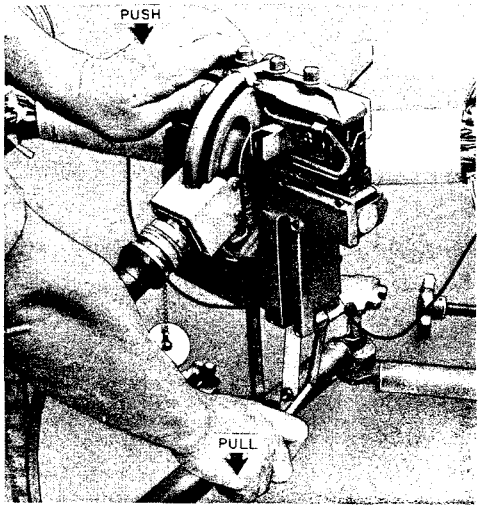



**Step 54—Placing Connector Module**

1. With the arched wire grips of conductor module facing T-bar, place connector module into tool keeping it parallel to the index strip.

   ***WARNING: If the connector module is not lowered parallel to index strip, it may be damaged causing opens, shorts, or crosses in end pair positions 1, 2, or 24, 25.***

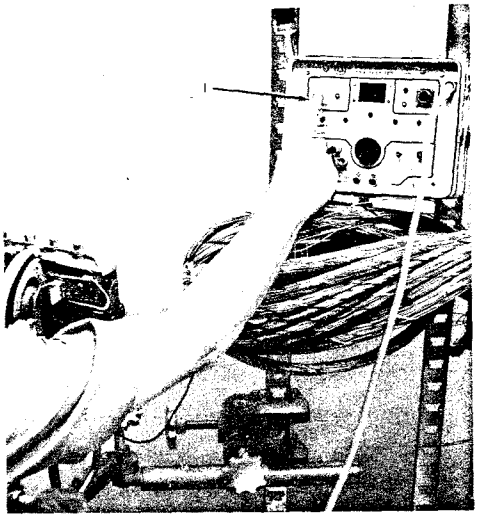
2. Push connector down until latches on connector partially engage in slot on index strip.




**Step 55—Seating Connector Module**

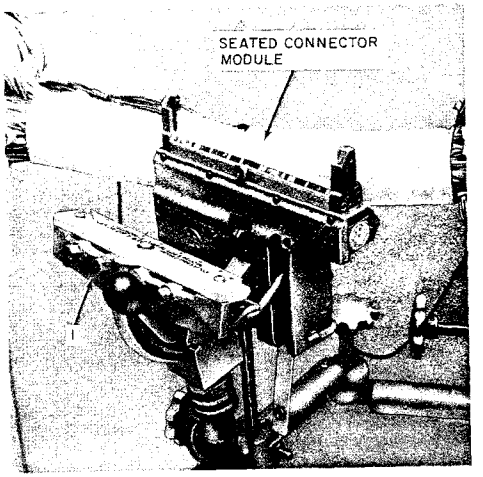
1. Position T-bar over the connector module, push down on T-bar to position over connector module; then while holding T-bar, pull the hand lever to seat connector module.

   *Note:* If the connector module is not properly seated, return lever to the latched position, pull T-bar back, then push down on connector module until latches on connector partially engage slots on index strip. Repeat 1 above.



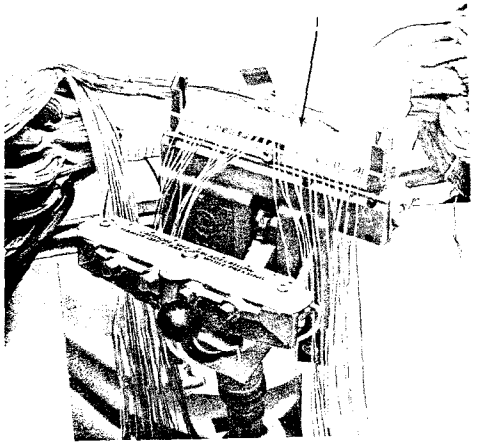
**Step 56—Testing Pairs Using 152A Test Set**

1. With the lever in the down position, and using 152A test set, test the pairs as outlined in Part 5.




**Step 57—Seated Connector Module**

1. Return T-bar back to horizontal position as outlined in Step 53.



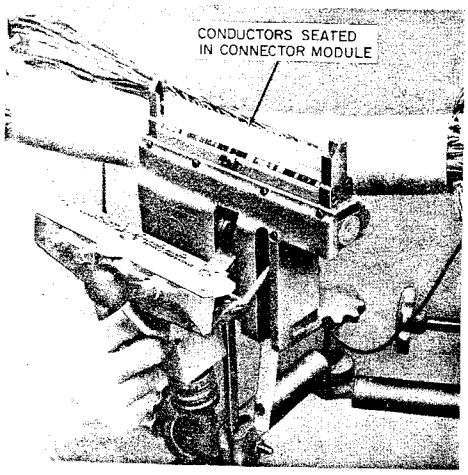
**Step 58—Conductors Placed in Connector Module**

1. Select the 25-pair group of conductors matching the group previously placed in the index strip and place into the connector module following the same procedure as outlined in Step 46.

2. Using error-tector as shown in Step 47, check the placed conductors.

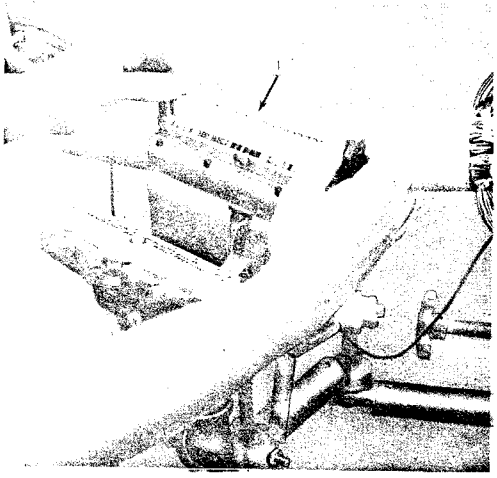
3. Gently separate conductors around T-bar, then position T-bar over connector module.

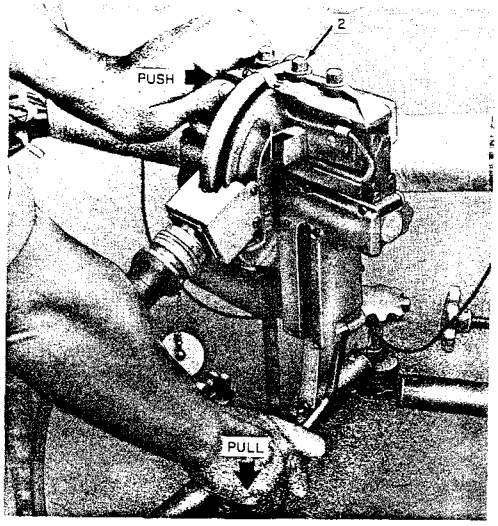
4. Cut conductors as shown in Steps 49, 50, 51 and 52. With the lever in the down position and using 152A test set, test the pairs as outlined in Part 5.




**Step 59—Conductors Seated and Cut**

1. Return T-bar to horizontal position as outlined in Step 53.





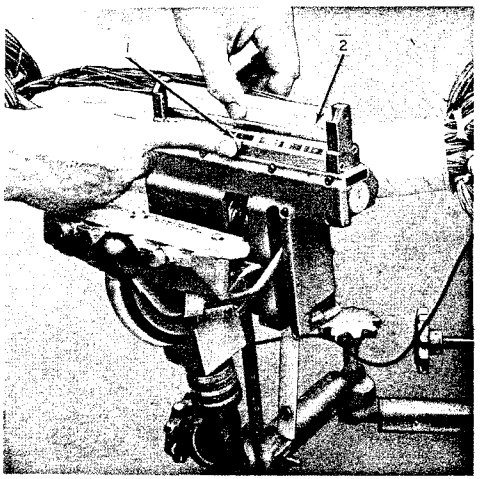

**Step 60—Placing Cap on Connector Module**

1. With latches facing T-bar, place cap on connector module; then using fingers, partially seat the cap on connector module by pressing down on cap and running fingers across length of cap.

**Step 60—Placing Cap on Connector Module (Contd)**

2. Seat the cap by placing T-bar over the cap, then while ***pushing forward*** on T-bar, pull the hand lever to seat cap on connector module. Return T-bar to horizontal position.

   ***Warning: If resistance is met in pulling lever down, reposition lever. Repeat 2 above.***




**Step 61—Removing Completed Module**

1. Push button to release completed module and remove from tool.

2. Using felt marker, mark unit number on ***unfilled*** module. For filled module identify unit number by using binder group identification tie approximately 3 inches from module.

### C. Maintenance

**4.35** Blade replacement and cleaning procedures for the 835-type tool are identical to those for the D, E, and F cutter-pressers outlined in Steps 29 through 36, except the T-bar, is manually operated.

**4.36** Procedures for adjusting slide assembly are outlined in Fig. 34 and on troubleshooting guide packaged with tool.

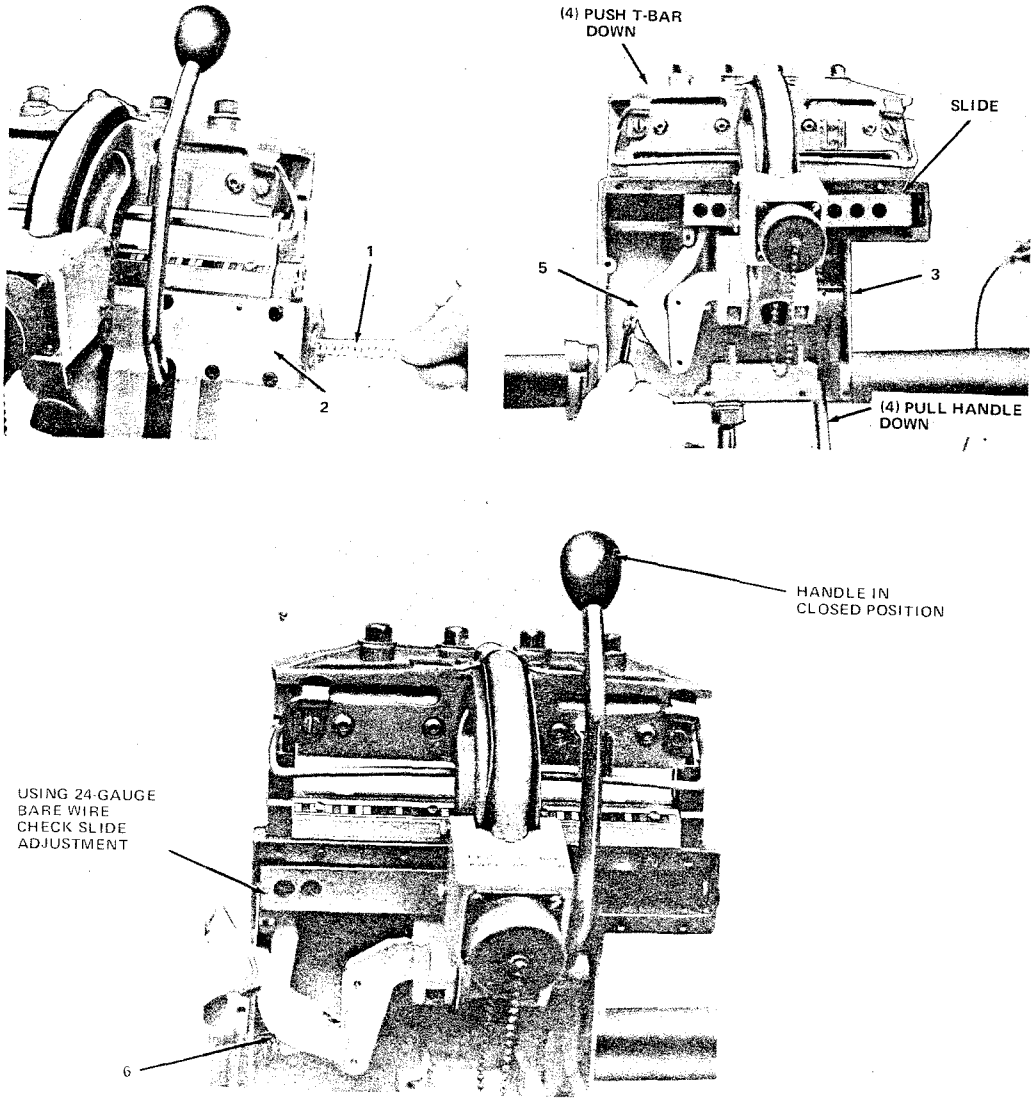
## 835-TYPE TOOL TROUBLESHOOTING GUIDE

| | PROBLEM | CAUSE | REMEDY |
|---|---|---|---|
| A. | T-bar will not spring back to upright position after the cutting and pressing operation (Step 53) | Slide out of adjustment | Adjust slide mechanism (Step A) |
| | Problem persists or there is no more travel left on the adjusting screw | Bent or broken roll pin | Replace roll pin (Step B) |
| B. | T-bar will not move up and down freely | Burred knife blade holder | Remove knife blade holder from the T-bar. Lightly file the burrs until the part is able to slide freely in the end post slots. Replace the knife blade holder. (Steps 32-36) |
| | | Slide out of adjustment | Adjust slide mechanism (Step A) |
| | Problem persists | Bent or broken roll pin | Replace roll pin (Step B) |
| C. | Tool will not completely cut through the conductors | Dull knife blade | Replace knife blade (Steps 32-36) |
| | | Bent or broken roll pin | Replace roll pin (Step B) |
| D. | Knife blades breaking on the ends of the knife blade assembly | Shim located behind knife blade | Remove shim (Step C) |
| | | Connector holding bracket assembly is located too high | Readjust height (Step D) |
| | Knife blades breaking in the middle of the knife blade assembly | Connector is bowed during the cutting and pressing operation | Make sure the connector components are properly seated (Steps 45, 54, and 60) |
| E. | Knife blades cut deep and the handle pressure required to cut the wires seems excessive | Connector holding bracket assembly is located too high | Readjust height (Step D) |
| F. | Index strip lift up | (1) Cutting into cathedral window | Improper placement of index strip |
| | | (2) Interference with stuffers | Grease stuffer (Step E) |
| | | (3) Deep cutting knife blade | Replace blades (Steps 32-36) |

G. Should some other problem be encountered or the tool still not function after attempted repair, send the tool in for repair in accordance with the local practices and include a description of the problem.

***Note:*** The problems caused by the slide being out of adjustment or a bent or broken roll pin or a burred knife blade support is the result of the T-bar not being properly positioned while seating a cap (Step 60).

**Fig. 34—Troubleshooting Chart for 835A Tool**




STEP A – UNLOCKING AND ADJUSTING SLIDE MECHANISM

**STEP A—UNLOCKING AND ADJUSTING SLIDE MECHANISM**

(1) To unlock the T-bar, insert an index strip or screwdriver through the grommet on the right side of the housing and push the slide to the left.

**Step A—UNLOCKING AND ADJUSTING SLIDE MECHANISM (Contd)**

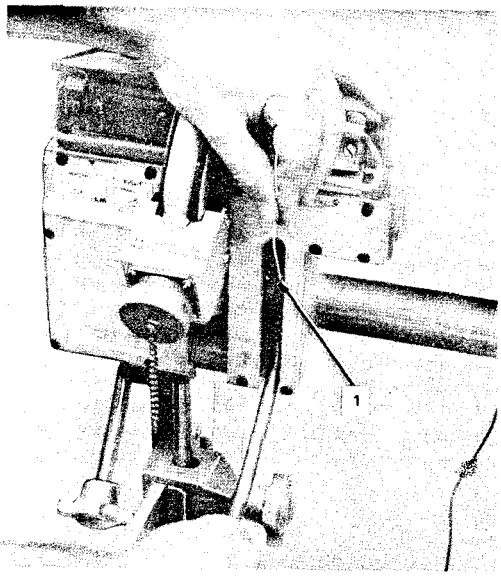
(2) Remove the eleven screws from the cover and remove the cover from the housing.

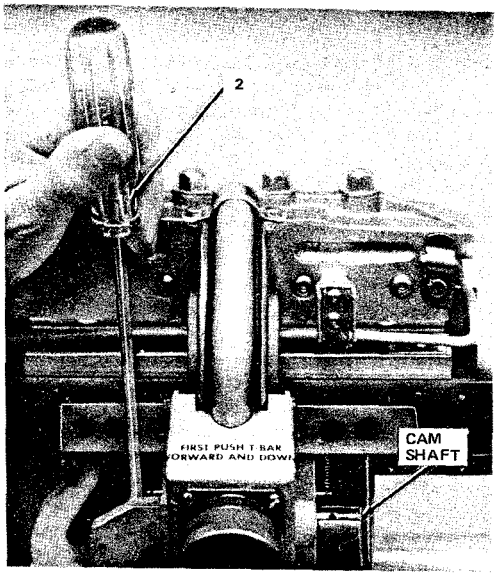
(3) Have the tool tilted back slightly while working on it so the slide does not jump out of its track.

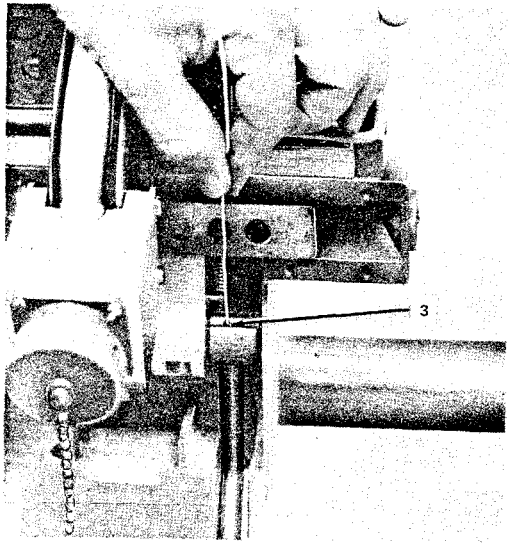
(4) For easier access to the adjusting screw, push the T-bar down all the way and pull the handle to let the slide index to the right.

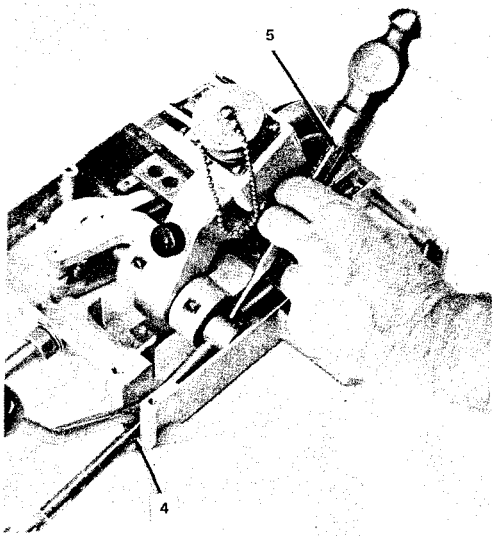
(5) Loosen the locking nut and adjust the screw using a trial and error method move the slide to within .010/.030 inches (approximate thickness of 24 gauge bare wire) of the inside wall of the housing when the handle is returned to its closed position. Turning the screw in (clockwise) will move the slide to the left and correct problem A; turning screw out (counterclockwise) will move the slide to the right and correct problem B. The adjustment should require only one or two turns of the adjusting screw. Over adjustment when trying to solve problem A will cause problem B and vice-versa.

(6) Once the adjustment has been made, secure the adjusting screw in place with the locking nut and recheck the clearance between the slide and the housing. Readjust if necessary, repeating the above procedure. Replace the cover on the housing and install the screws. The four short screws go along the top of the cover.




STEP B – REPLACING ROLL PIN

**Step B—REPLACING ROLL PIN**

**STEP B—REPLACING ROLL PIN (Contd)**

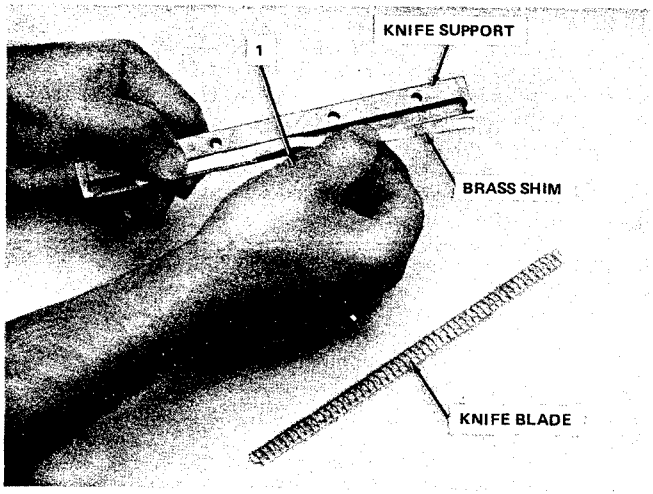
(1) Before removing the roll pin, check to see if the holes in the handle collar and the cam shaft are aligned by pulling handle down and inserting a wire into the roll pin. If the wire does not go through, rotate the handle on the shaft until the wire goes all the way through the roll pin.

(2) If the holes cannot be aligned, remove the cover. Place a screwdriver into the mechanism on the opposite end of the cam shaft to prevent the shaft from rotating when the handle is moved. Now rotate the handle until the hole in the handle collar is lined up with the pin on the opposite end of the shaft.

(3) The alignment is correct when a wire can be inserted completely through the roll pin. Remove the screwdriver from the mechanism.

(4) Pull the handle down all the way and put a screwdriver underneath it for support. ***Do not remove the pin with the handle in its position as this will cause damage to the tool.***

(5) With a hammer and punch, knock the pin out about halfway and drive one of the new pins supplied with the tool in until it is ***flush*** with the groove in the collar. The new pin will drive out the broken pieces of the old pin. The tool should now be checked to see if it functions properly. If problems A or B are encountered, the slide should be adjusted (Step A). Ordering information for the pin is: Roll Pin, 420 stainless steel, .125 diameter by .75 long, Comcode No. 900477514.

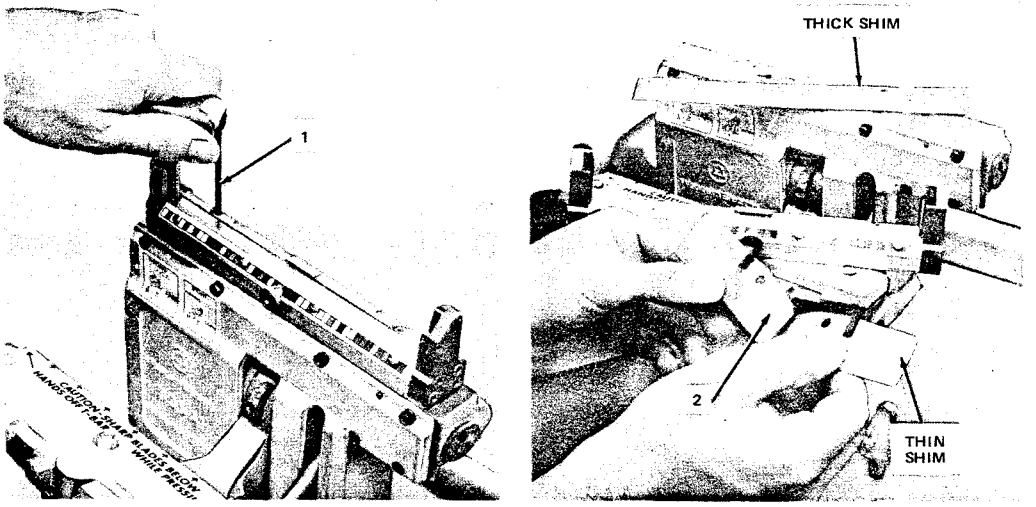



STEP C – REMOVING SHIM FROM KNIFE SUPPORT POCKET

**STEP C—REMOVING SHIM FROM KNIFE SUPPORT POCKET**

Remove the knife support from the tool and take out the knife blade assembly from the knife support (Steps 32 and 33).

(1) Remove any brass shims that might be in the knife support pocket. Replace the knife blade assembly in the support, then place in the tool (Steps 34 through 36).

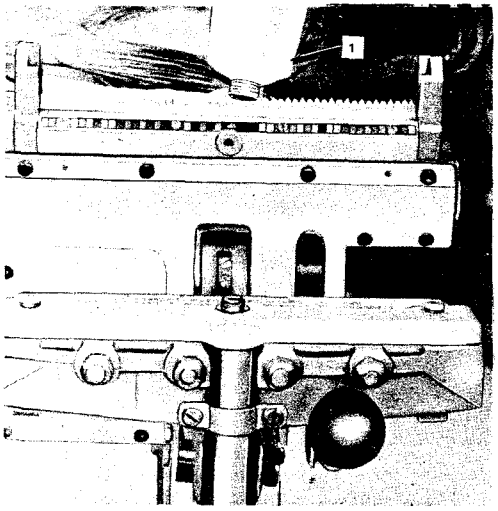


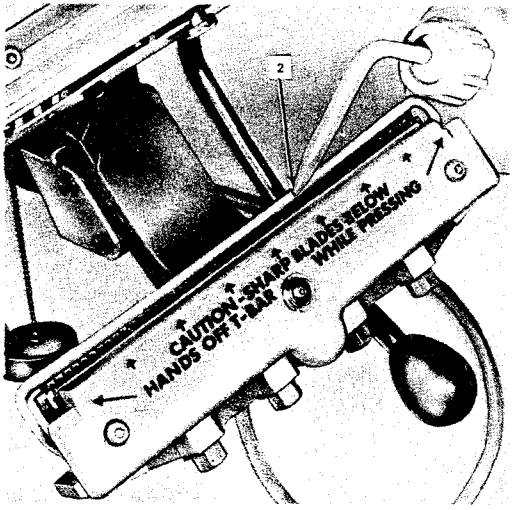

STEP D – ADJUSTING HEIGHT OF CONNECTOR HOLDING BRACKET

**STEP D—ADJUSTING HEIGHT OF CONNECTOR HOLDING BRACKET**

(1) Remove the connector holding bracket assembly from the tool by unscrewing the two attaching screws and lifting it straight up. There should be a thin and a thick brass shim remaining on top of the tool (if there is only one shim and the problem is acute, send the tool in for repairs). Remove the thin shim and attach the holding bracket on the tool. Assemble a connector module onto an index strip (Steps 54 and 55). Cut and press 25 pairs of 22 gauge wire (scrap) on the connector module (Step 58). If the wire conductors are not completely cut (the bottom of pulp insulation may not be cut all the way through, paragraph 4.26, additional shims must be added.

(2) Peel a few layers off of the thinner shim which is laminated and reinstall it with the thick shim. Repeat the above procedure to check for completeness of cut. Add or remove shims as necessary until the wire conductors are completely cut.




**STEP E—LUBRICATING STUFFERS OF PRESSING TOOL**

(1) Apply petroleum jelly such as vaseline across length of index strip, then operate the T-bar on and off the index strip 4 or 5 times to transfer some jelly to the stuffer blades. Remove and discard index strip, or

(2) Lubricate stuffer blades by applying KS-21446 solvent. ***Do not use substitute solvent.***

## 836A TOOL—DESCRIPTION (MFR DISC.)

**4.37** The 836A tool (Fig. 35) is a manually operated tool to assemble the 25-pair 710 connector. Five cut/press positions are provided along the length of the base guide to allow positioning of the cutter-presser to press and cut five pairs at a time throughout the length of the module. The tool is equipped with two support brackets for aerial mounting, or it can be used with any of other tool mounts (Fig. 14, 15, and 16).

### A. Installation

**4.38** Install the 836A tool on 710-type tool mounting as shown in Fig. 14 and 15 for buried or underground use or as shown in Step 62 for aerial use. The 836A tool can also be mounted on the B support frame using the same procedure as outlined in paragraph 4.19 for the D, E, or F cutter-presser except it will be necessary to obtain a press clamp assembly from D, E, or F cutter-presser.

> ***Note:*** Press clamp assembly may be ordered separately as a spare part, Comcode No. 401496211.

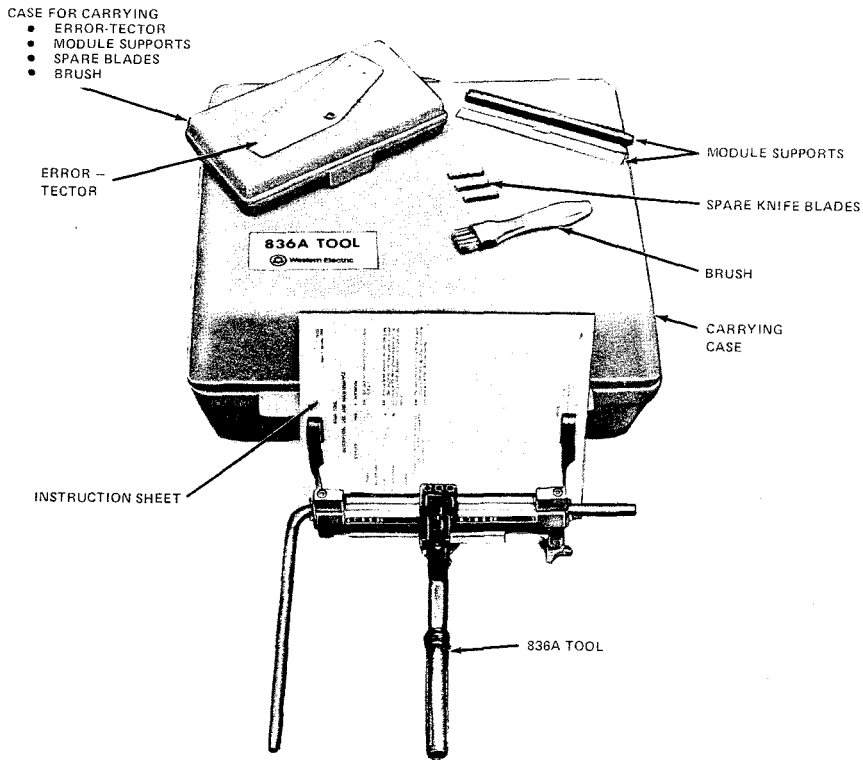
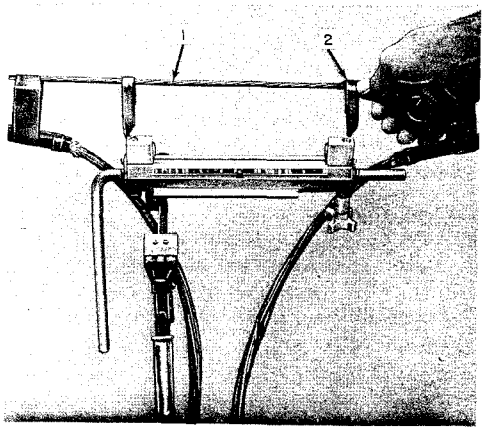



**Fig. 35—836A Tool**



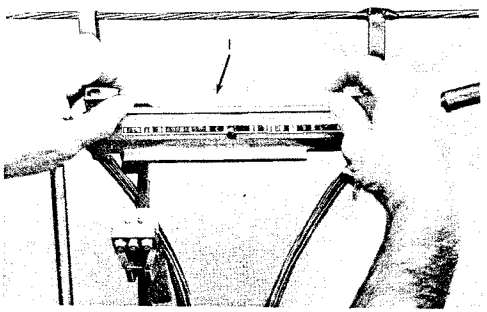

**Step 62—836A Tool Installed for Aerial Use**

1. Hang the 836A tool on the strand and place in proper position for splicing.

2. Secure tool to strand with vinyl tape.

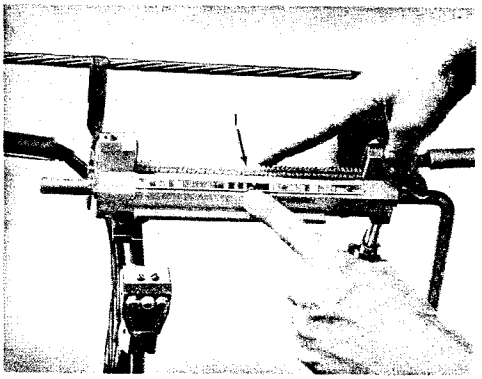
**B. Use**

**4.39** The use of the 836A tool to assemble the 25-pair 710 connector module is covered in Steps 63 through 73.



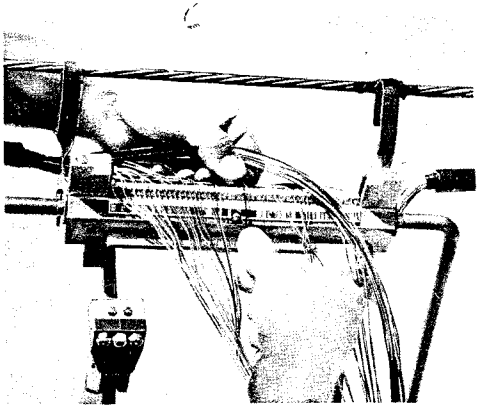

**Step 63—Placing Index Strip**

1. With the arched wire grips of index strip facing the cutter-presser, place the index strip into the connector holding device. Assure ends of index strips are keyed into the side posts.




**Step 64—Securing Index Strip**

1. Push down on center of index strip and push in on button to secure index strip underneath the L-spring located on back of tool. Assure L-spring has latched-over groove provided in index strip.

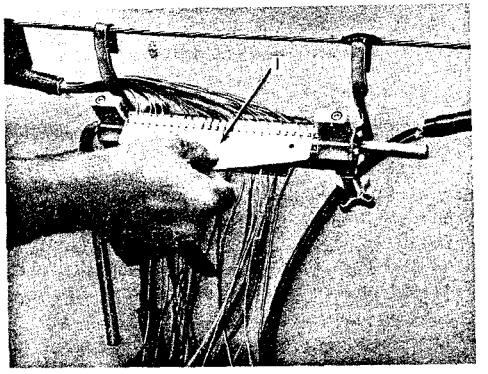


**Step 65—Placing Conductors Into Index Strip**

1. Using the thumb and forefinger of each hand, grasp a pair from the binder group. Separate the tip and ring conductor on the colored peaked (/\) projections of the index strip, tip side to the left and ring side to the right. Dress the conductors into the wire grips leaving approximately

**Step 65—Placing Conductors Into Index Strip (Contd)**

3/8-inch slack behind index strip. ***In dressing pulp or noncolor-coded PIC conductors, select the pairs at random and place them into the index strip starting at end of tool nearest the cable being placed. In dressing PIC, select the pairs at random and place them into the index strip in proper color code sequence using color strip and colored peak projections as a guide.***

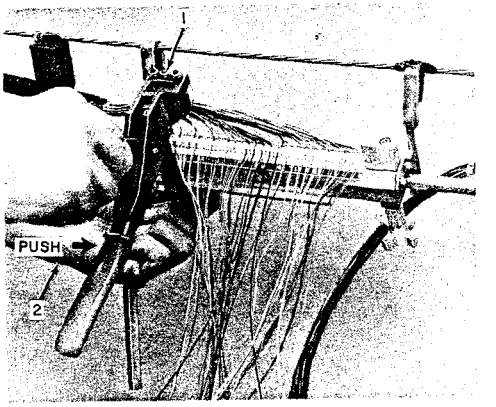


**Step 66—Checking Placed Conductors**

1. When the 25 pairs have been placed in the index strip, use the error-tector to check for splicing errors, such as two conductors in one slot, vacant slots, tip and ring reversls, or transposed pairs as follows:

   (a) Place the error-tector over the index strip and slide to the left—only the tip conductors should show. Slide the error-tector to the right—only ring conductors should show.

   (b) If an error is found, make the correction and check the conductors again with error-tector.



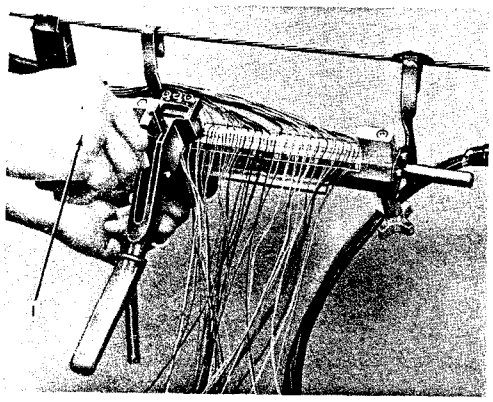

**Step 67—Positioning Cutter-Presser for Cutting**

1. Slide the cutter-presser all the way to the left and then rotate upward to position over index strip.

   ***Caution: Exercise care when raising cutter-presser to prevent head from hitting side post.***

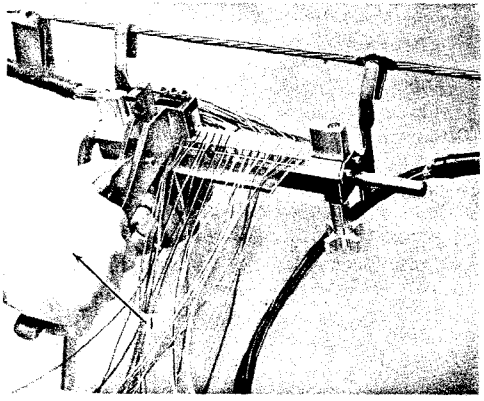
   ***Note:*** Information outlined herein shows the cutter-presser being operated from left to right; however, it can be operated from right to left.

2. Push the cutter-presser to the right until the presser indexes into first index position.



**Step 68—Lowering Head of Cutter-Presser**

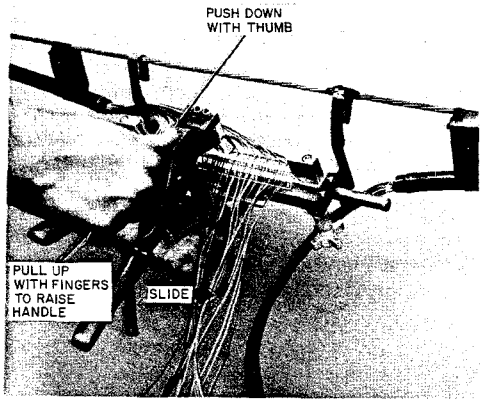
1. Raise the top handle to unlock head of cutter-presser so it can be lowered into position for cutting.



**Step 69—Cutting Conductors**

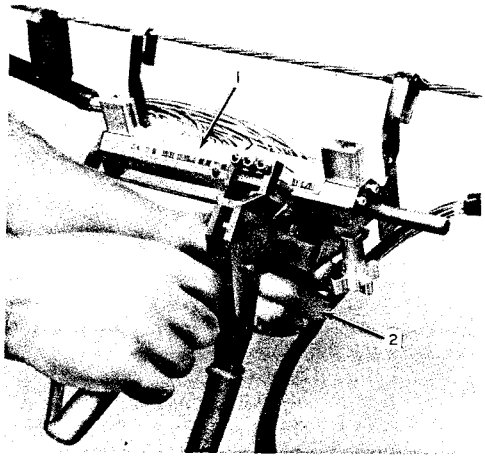
1. Squeeze handles of cutter-presser to seat and cut five pairs of conductors.

2. Remove all cut conductors by hand while tool is down to prevent wires from interfering with indexing to next position.




**Step 70—Raising Handle and Sliding Tool to Next Index Position**

1. Pull up the top handle with fingers while pushing down on top of gear rack with thumb of one hand until tool is raised to top position, then using the other hand slide the cutter-presser to the next index position using the knob located underneath.



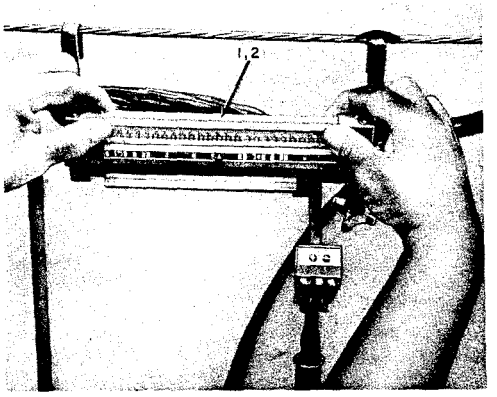
**Step 71—Conductors Seated and Cut**

1. Repeat Steps 68, 69, and 70 until all 25 pairs have been seated and cut.

**Step 71—Conductors Seated and Cut (Contd)**

2. Rotate cutter-presser downward.

   *Note:* Tool may remain in the right position and then be worked back to the left for next operation.

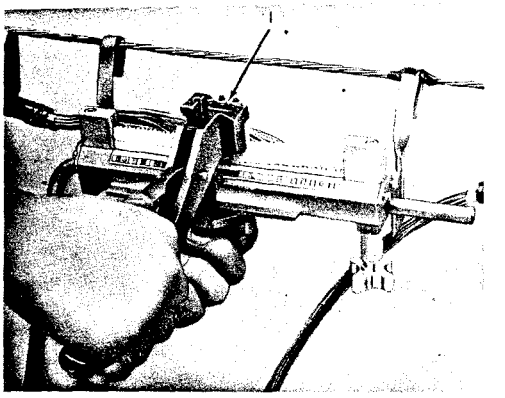



**Step 72—Placing Connector Module**

1. Place a connector module between the end springs of the base with the arched wire grips facing cutter-presser. ***Guide the module down the end springs keeping it parallel to the index strip.***

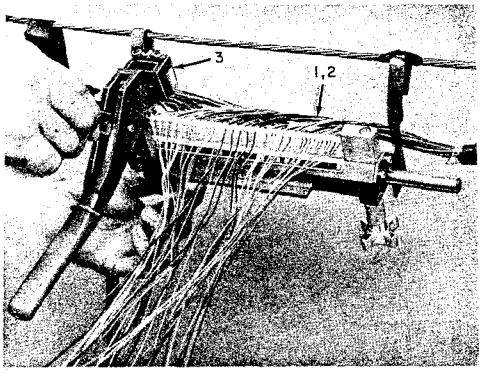
   ***WARNING: If connector module is not lowered parallel to index strip, it may be damaged causing open, shorts, or crosses in end pairs 1, 2, or 24, 25.***

2. Push connector module down until latches on connector partially engage in slot on index strip.



**Step 73—Seating Connector Module**

1. Set the connector module on the index strip by indexing across for five presses following the same procedures used for cutting the conductors from index strip (Steps 68, 69, and 70).

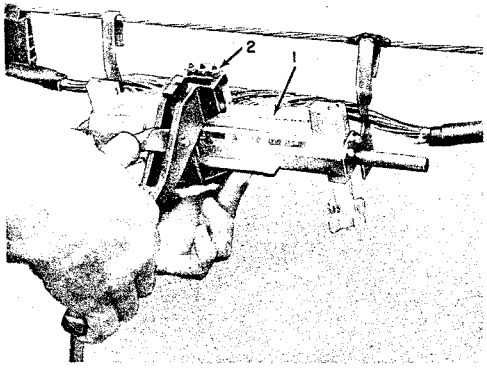



**Step 74—Conductors Placed in Connector Module**

1. Place the conductors from the matching binder group of the second cable into the slots of the connector module.

2. Using the error-tector as shown in Step 66, check the placed conductors.

3. Seat and cut the conductors following the same procedures used in cutting the conductors as outlined in Steps 68, 69, 70, and 71.



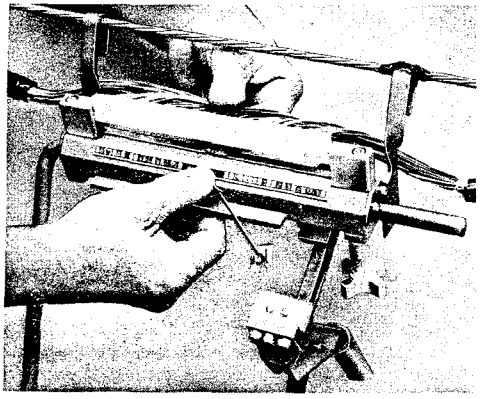

**Step 75—Placing Cap**

1. With latches of cap facing cutter-presser, place cap on connector module. Using finger, partially seat cap on connector module by running finger across length of cap.

**Step 75—Placing Cap (Contd)**

2. Seat the cap on the connector module using the cutter-presser as previously described for cutting the conductors and seating the connector module, by pressing five times across the length of the cap.

   ***Note:*** To prevent cap from rising during seating operation, it is suggested that one end of cap be pressed, then position tool at opposite end and press cap, then make the intermediate presses.



**Step 76—Removing Completed Module**

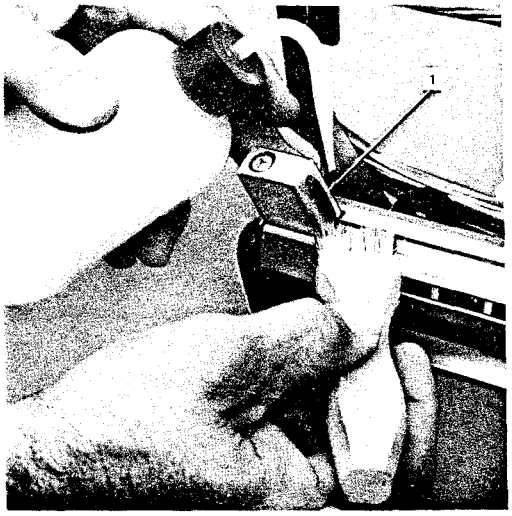
1. Push button to release L-spring and remove completed module from 836A tool. Identify spliced unit by marking with felt marker or by using a binder group identification tie.

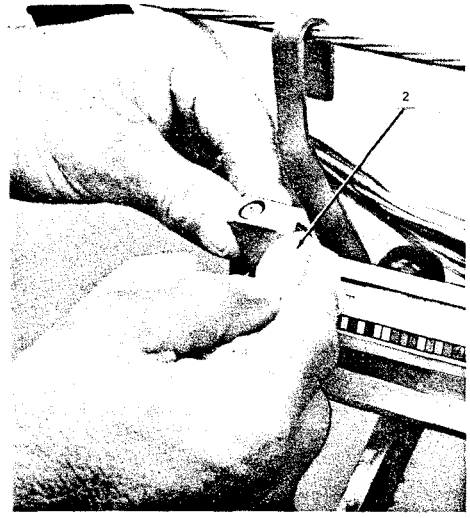
2. Repeat Steps 63 through 76 until cable is completely spliced.

**C. Maintenance**

**Cleaning**

**4.40** Cleaning of the 836A tool as outlined in Steps 77 and 78 may be required, especially when splicing with filled connectors.




**Step 77—Cleaning End Springs**

1. Spray and brush the end springs at each side post of the base with KS-21446 solvent or KS-7860 petroleum spirits. Work the solvent into end spring to assure the end springs are thoroughly cleaned. Problems are caused by buildup behind the end springs.

2. With a cloth, depress the end spring several times to loosen the buildup, then clean and dry.

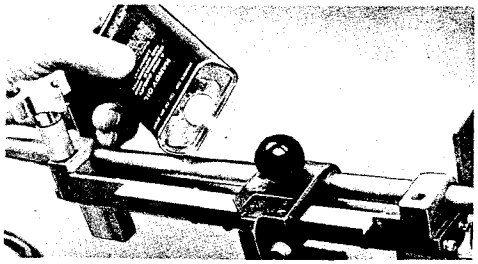
***WARNING: Do not use B cleaning fluid or other unapproved solvents to clean the tool. The B cleaning fluid leaves a residue that damages the connectors and cutting blade.***

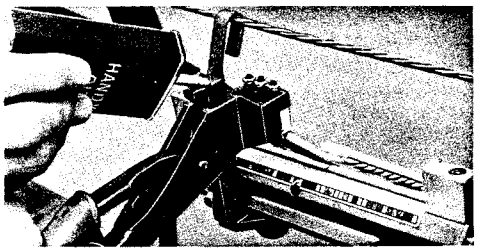


**Step 78—Cleaning Knife Blade**

1. Using KS-21446 solvent, spray the knife blade and guide area.
2. Brush the guide thoroughly clean; then using a cloth, clean and dry.

***Danger: Extreme caution must be exercised when cleaning and drying knife blade as the blade is very sharp.***





**Step 79—Lubricating Tool**

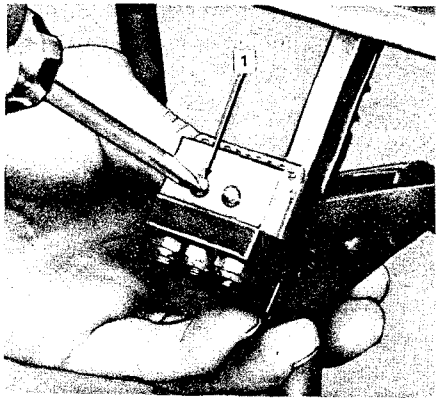
1. Using a lightweight oil, lubricate all moving parts of tool.

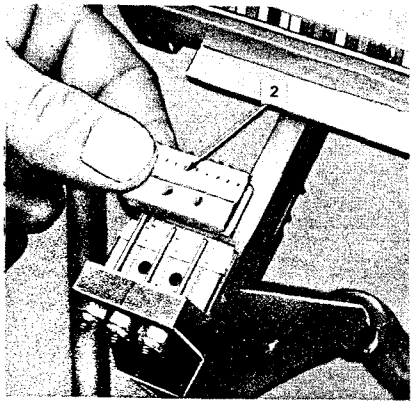
**4.41** Knife blades should be replaced when they become dull or damaged and will not cut the conductors during splicing.

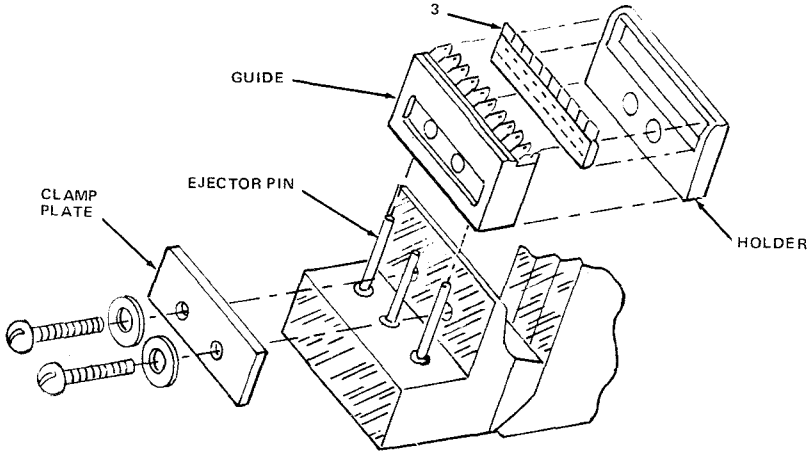
> ***Note:*** A sharp blade may not cut all the way through the bottom of the insulation. ***Unless the conductors show ragged cutting, the blade does not need replacing.***

**Knife Blade Replacement**

**4.42** The procedures for replacing knife blade are outlined in Steps 80 and 81.




**Step 80—Replacing Knife Blade**

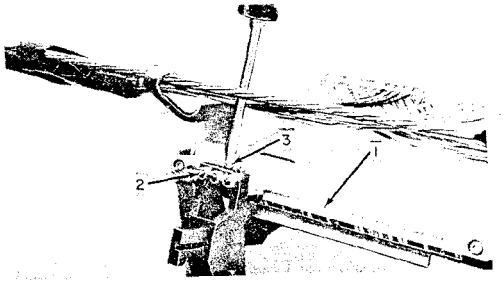
***Danger: Exercise care when handling knife as blade is very sharp.***

1. Loosen and remove two screws, two washers, and clamp plate from front of cutter-presser while holding the guide and knife blade support in place.

2. Remove guide and knife blade holder from ejector pins.

3. Remove knife blade from holder.

4. Place new knife blade in holder and reassemble. ***Only hand tighten screws securing clamp plate.***




**Step 81—Aligning Blade**

1. Insert index strip into cutter-presser holder with arched wire grips facing the cutter-presser. Assure the index strip is secured beneath the L-spring in the center of the holder.

2. Position cutter-presser over index strip and squeeze handles.

3. While squeezing handles tighten screws.

4. Release handle and raise cutter-presser, then check index strip to ensure a knife cut is visible.

## 945A TOOL—DESCRIPTION

**4.43** The 945A tool (Fig. 36) is a manually operated tool to assemble the 25-pair or 5-pair 710 connector module. Five cut/press positions are provided along the length of the 25-pair module holder to allow positioning of the presser to press and cut five pairs at a time throughout the length of the module. The tool is equipped with a mounting rod for aerial mounting or it can be used with any of the other tool mounts similar to the tools mounted in Fig. 14, 15, and 16.

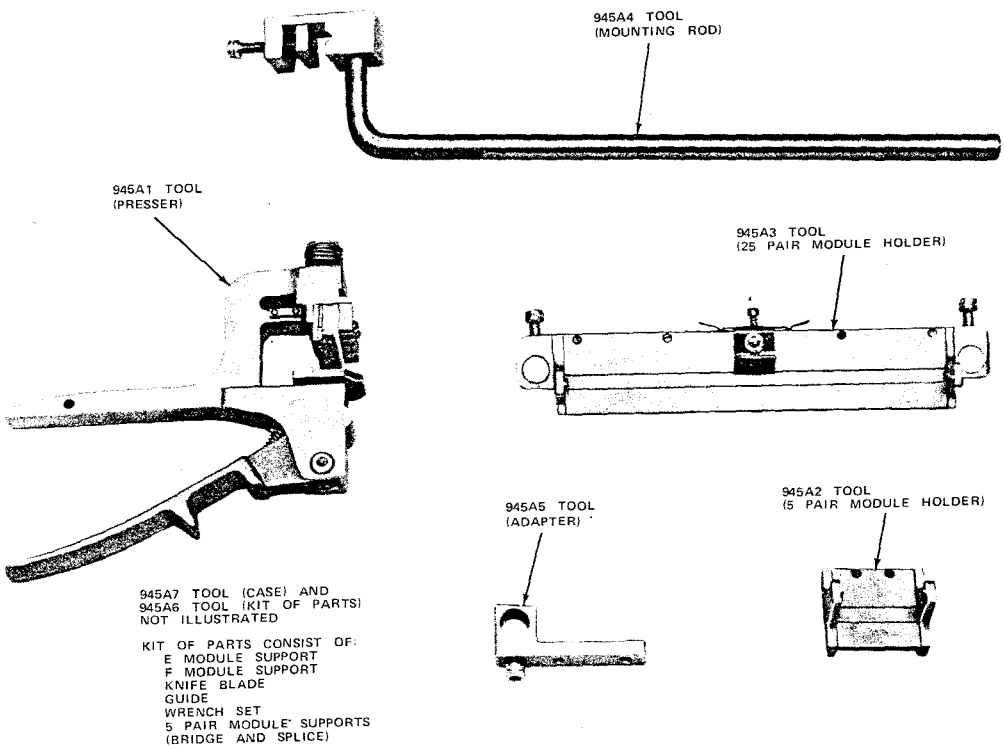



Fig. 36—945A Tool

**4.44** The 5-pair module holder allows the positioning of the 5-pair connector for splicing 5 pair.

**A. Installation**

**4.45** Installation of 25-pair and 5-pair module holder on a strand for splicing 25 and 5 pair are shown in Fig. 37 and 38, respectively. The 5-pair module holder can also be held in the hand as shown in Fig. 39. The 945A tool can also be mounted on the B support frame with press clamp assembly or 710A tool mounting as previously illustrated for the other tools.

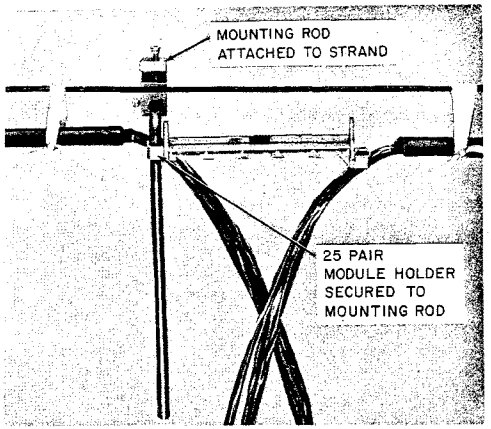



**Fig. 37—25-Pair Module Holder Mounted on Strand**

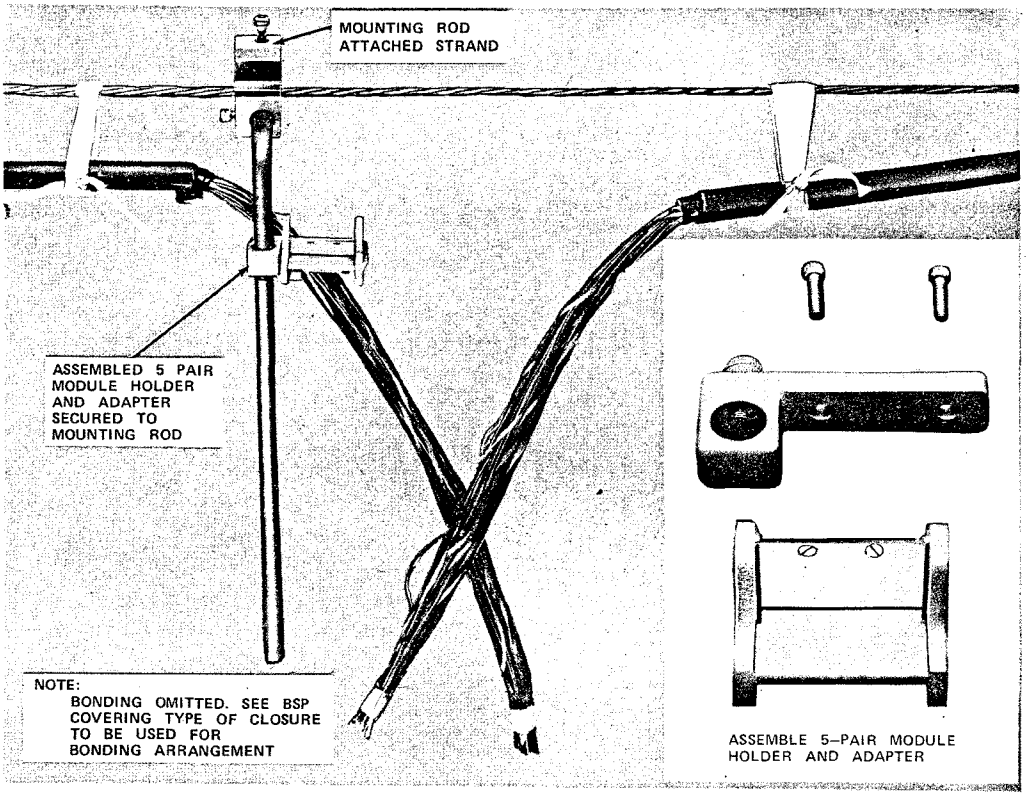



**Fig. 38—5-Pair Module Holder Mounted on Strand**

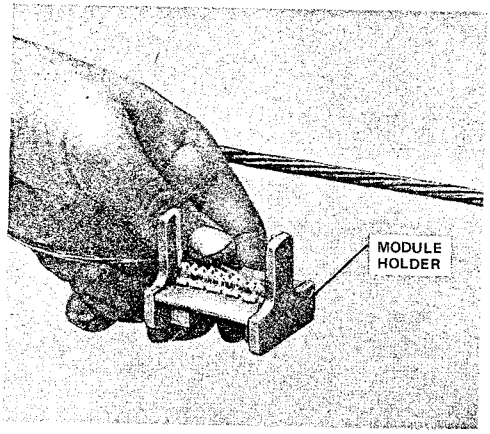
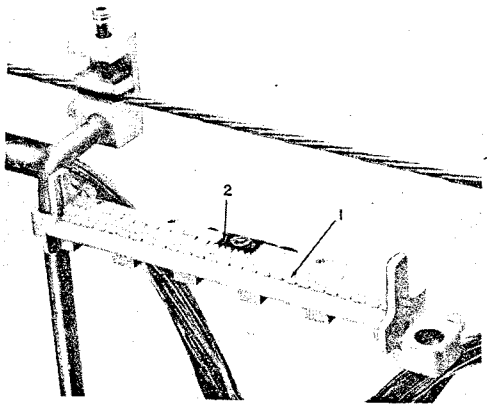



Fig. 39—5-Pair Module Holder Held in Hand

B. Use

4.46 The use of the 945A tool to assemble the 25-pair 710 connector module is covered in Steps 82 through Step 91. The use of the 5-pair module holder to assemble the 5-pair 710 connector is similar to procedure outlined in Steps 82 through 91 except only one press is required for 5 pair.

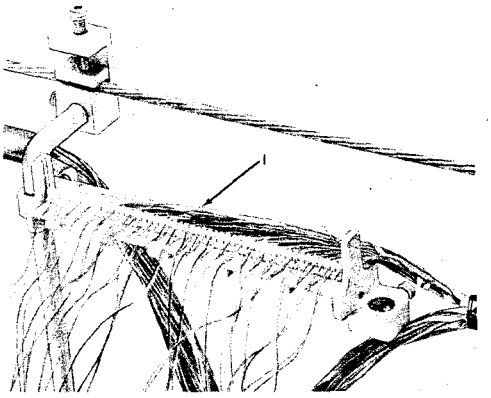
*Note:* Exercise caution when pressing and cutting if holding module holder in hand.




Step 82—Placing Index Strip

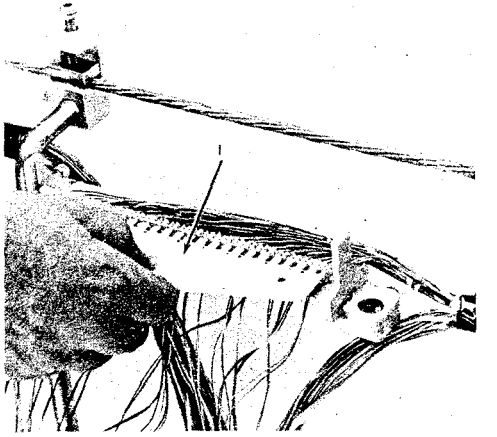
1. With the arched wire grips of index strip facing the front of module holder place the index strip into the module holder. Assure ends of index strips are keyed into the side posts.

2. Push down on center of index strip to secure index strip underneath the spring located on back of 25-pair module holder. Assure L-spring has latched-over groove provided in index strip.



**Step 83—Conductors Placed Into Index Strip**

1. Using the thumb and forefinger of each hand, grasp a pair from the binder group. Separate the tip and ring conductor on the colored peaked (Λ) projections of the index strip, tip side to the left and ring side to the right. Dress the conductors into the wire grips leaving approximately 3/8-inch slack behind index strip. ***In dressing pulp and noncolor-coded PIC conductors, select the pairs at random and place them into the index strip starting at end of tool nearest the cable being placed. In dressing PIC, select the pairs at random and place them into the index strip in proper color code sequence using color strip and colored peak projections as a guide.***

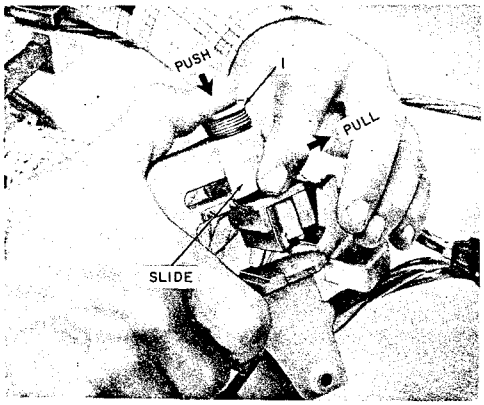


**Step 84—Checking Placed Conductors**

1. Use the error-tector to check for splicing errors, such as two conductors in one slot, vacant slots, tip and ring reversals, or transposed pairs as follows:

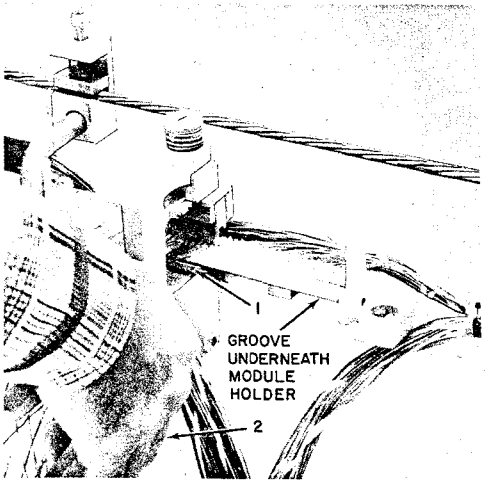
   (a) Place the error-tector over the index strip and slide to the left—only the tip conductors should show. Slide the error-tector to the right—only ring conductors should show.

   (b) If an error is found, make the correction and check the conductors again with error-tector.




**Step 85—Adjusting Tool for Seating and Cutting Conductors From Index Strip**

1. Push button and pull height adjustment slide forward.



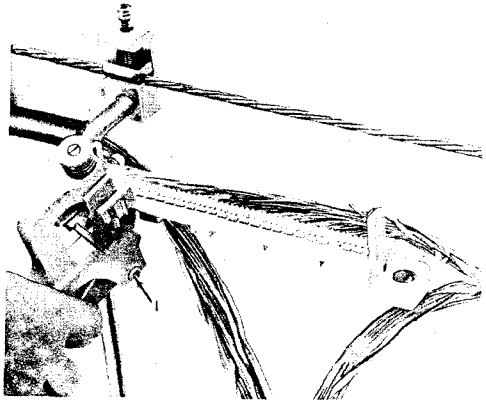

**Step 86—Cutting Conductors From Index Strip**

1. Position tool in groove underneath module holder and slide forward until it hits stop.
2. Press handle to seat and cut conductors.

**Step 86—Cutting Conductors From Index Strip (Contd)**

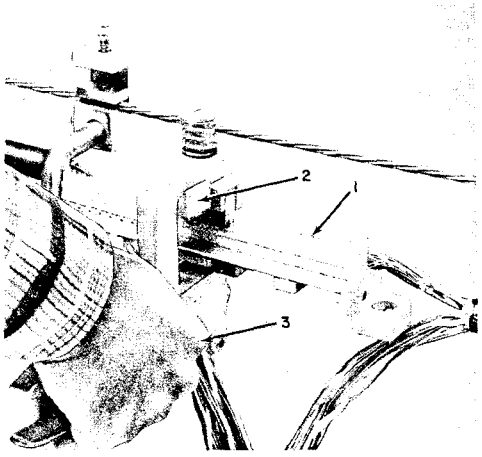
3. Release handle and remove tool from module holder and repeat 1 and 2 above until all conductors are cut.

   ***Note:*** There is no set sequence of cutting and pressing conductors.



**Step 87—Cut Conductors**

1. After cutting all conductors, remove tool from module holder.



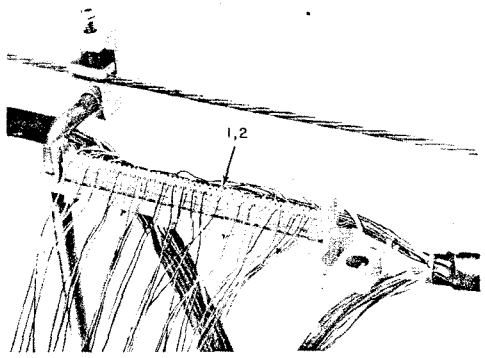

**Step 88—Place Connector Module**

1. Place a connector module between the end keys of the base with the arched wire grip facing front of module holder. ***Guide the module down the end springs keeping it parallel to the index strip.***

   ***WARNING: If connector module not lowered parallel to index strip it may be damaged causing open, shorts, or crosses in end pairs 1, 2, or 24, 25.***

2. Pull slide back to raise head of presser.

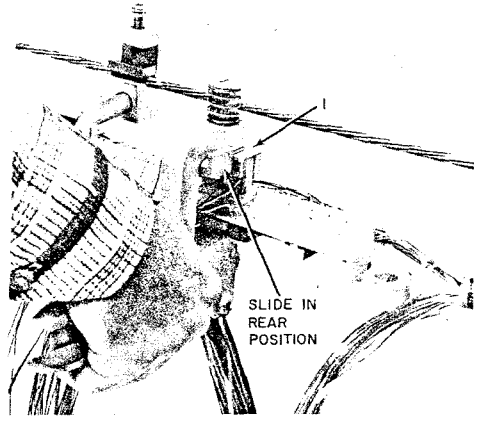
3. Seat the connector module on the index strip by indexing across for five presses following the same procedures used for cutting conductors from index strip except slide remain in back position (Step 86).




**Step 89—Conductors Placed in Connector Module**

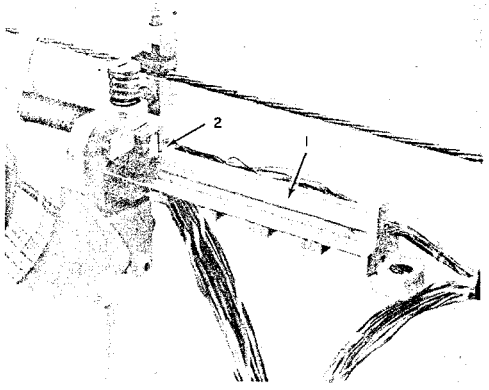
1. Place the conductors from the matching binder group of the second cable into the slots of the connector module.

2. Using the error-tector as shown in Step 84, check the placed conductors.




**Step 90—Seating and Cutting Conductors**

1. Seat and cut conductors following the same procedures used in cutting the conductors as outlined in Step 86. Keep height adjustment slide in rear position.

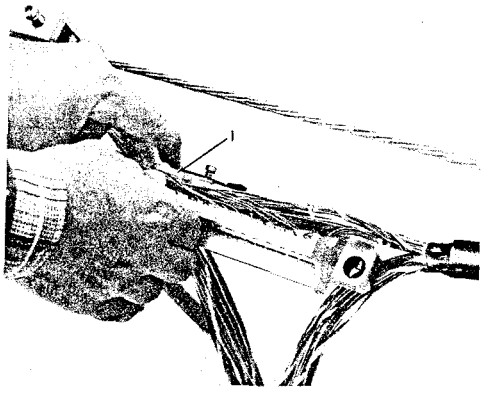



**Step 91—Placing Cap**

1. With latches of cap facing tool, place cap on connector module. Using finger, partially seat cap on connector module by running finger across length of cap.

2. Seat the cap on the connector module by pressing five times across the length of the cap. The tool is not required to be inserted fully into the module holder to seat cap.

   *Note:* To prevent cap from rising during seating operation, it is suggested that one end of cap be pressed; position tool at opposite end and press cap, then make the intermediate presses.




**Step 92—Removing Completed Module**

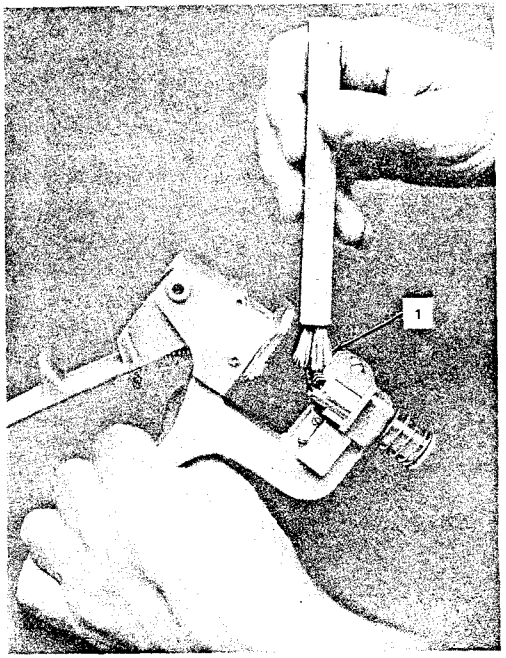
1. Push spring to release module and remove completed module. Identify spliced unit by marking with felt marker or by using a binder group identification tie.

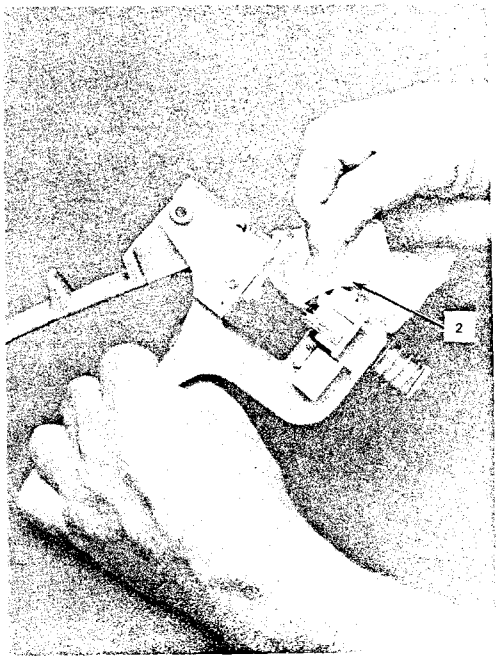
2. Repeat Steps 82 through 92 until cable is completely spliced.

**C. Maintenance**

**Cleaning**

**4.47** Cleaning of the 945A tool as outlined in Step 94 may be required especially when splicing with filled connector.



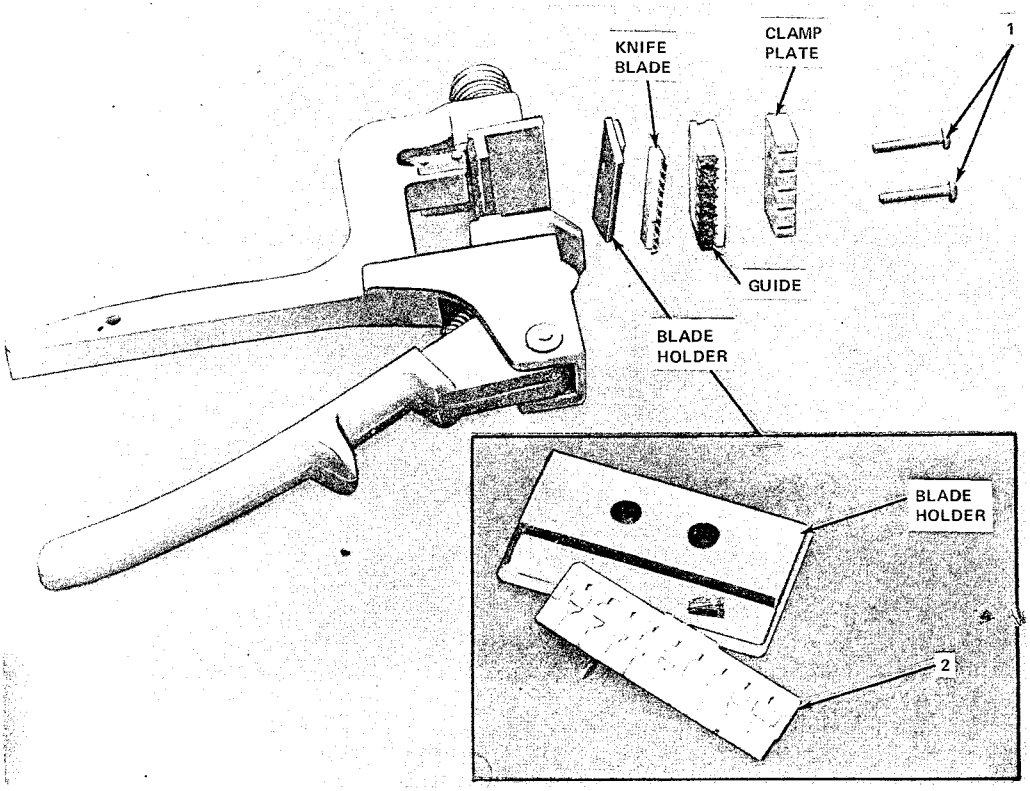

**Step 93—Cleaning Knife Blade**

1. Using KS-21446 solvent spray the knife blade and guide area, then brush the guide thoroughly clean.
2. Using a cloth, clean and dry the knife blade and guide area.

***Danger: Extreme caution must be exercised when cleaning and drying knife blade as the blade is very sharp.***

**Knife Blade Replacement**

**4.48** Knife blades should be replaced as outlined in Step 94 when they become dull.




**Step 94—Knife Blade Replacement**

***Danger: Exercise care when handling knife as blade is very sharp.***

1. Loosen and remove two screws and remove clamp plate, guide, knife blade and knife blade holder.
2. Place new knife blade in holder an reassemble.

## HAND TOOLS AND ACCESSORIES

**4.49** The following hand tools and accessories (Fig. 40) are also used in conjunction with 710 system.

(a) ***C Insertion Cutting Tool***—Used for seating and cutting a single pair of conductors (cannot be used on index strip and connector with 1 or L as third digit of code (Mfr Disc.).

(b) ***D Insertion Cutting Tool***—Similar to C insertion cutting tool except can be used for ***all*** connectors. If used to make a splice or half tap, it will be necessary to make 25 presses across connector module to assure connection to every pair in index strip.

(c) ***B Bridge Removal Tool*** (Mfr Disc.) Used for removing bridge modules from 710 connector module not designed to be used to remove bridge from a connector composed of the WHIS/BSM combination (Wire Holding Index Strip/Bottomless Splice Module Connectorized exchange cable).

(d) ***C Bridge Removal Tool***—Similar to B Bridge Removal Tool—Must be used to remove bridge module from all connectors.

(e) ***J Connector Presser***—Used for joining preterminated bridge module in preterminated connector module (Mfr Disc.).

(f) ***K Connector Presser***—Used for joining preterminated 710 connector modules (Mfr Disc.).

(g) ***L Connector Presser***—Used for joining preterminated 710 connector modules.

(h) ***F Module Support***—Used to protect contacts on 25-pair connector module when preterminating a stub cable.

(i) ***710-CM5 Module Support***—Used to protect contacts on 5-pair connector module when preterminating a stub cable (not illustrated).

(j) ***E Module Support***—Used to protect contacts on bridge module when preterminating stub cable

(k) ***710-BM5 Module Support***—Used to protect contacts on 5-pair bridge module when preterminating a stub cable (not illustrated).

(l) ***B Tagging Tape***—For recording identification number of pulp insulated conductors in connector

(m) ***Male Contact Cover***—Protective cover for preterminated bridge module, Comcode 842931271 (order from Dandee Plastics).

(n) ***Connector Module Contact Cover***—Protective cover for pretermination bottomless splice module, Comcode 842209215 (order from Dandee Plastics).

(o) ***Close Cutting Insulated Pliers***—Cutting out working pairs that have been half tapped (Proto 453, Ecelite GC-73, or equivalent)

(p) ***840A Tool***—Cutting out working pairs that have been half tapped

(q) ***710B1 Cover***—Used to protect exposed conductors remaining in half-tap connector after cutoff.

(r) ***55A Group Slack Holder***—Optional tool that can be added to D, E, or F cutter-presser and 835-type tool to secure binder group in position for in-line splicing. A group slack holder is a component of 890A tool.

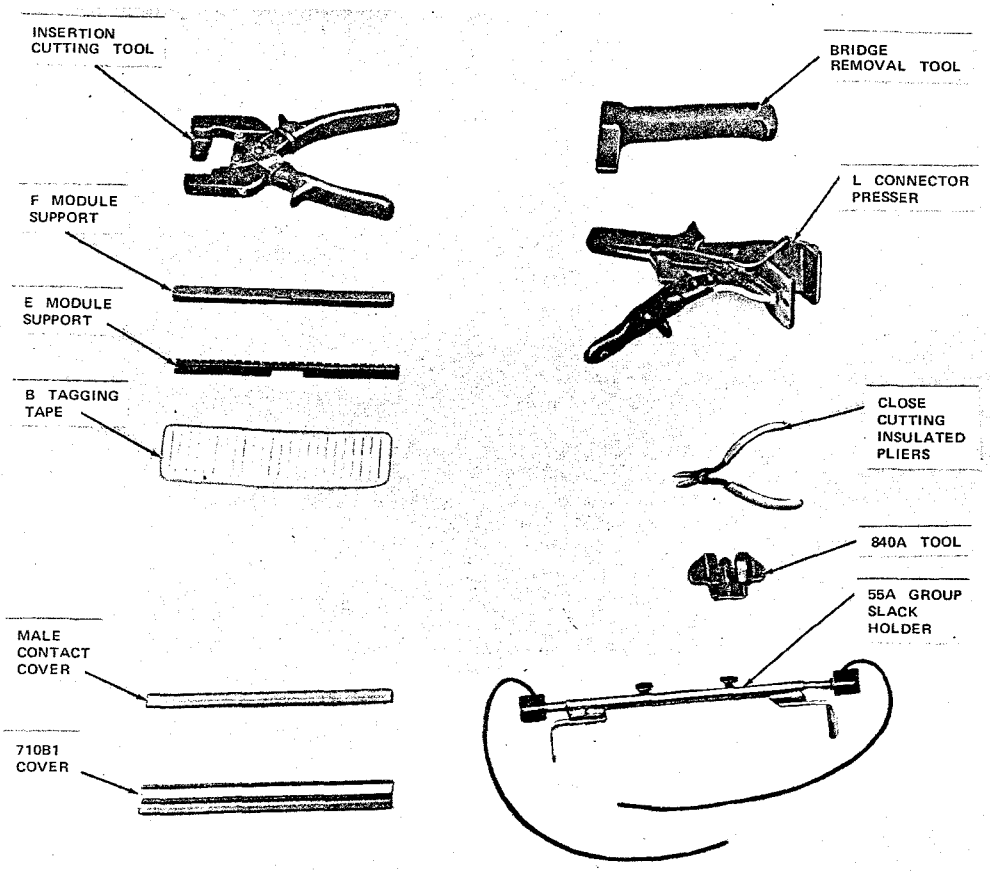



Fig. 40—Hand Tools and Accessories

## 5. SPLICE TESTING

### TEST EQUIPMENT

**5.01** The 152A test set covered in Section 634-400-530 used in conjunction with the D, E, or F cutter-presser or 835A and 890A tool will automatically test 25 cable pairs, accessed through the tool as they are spliced, and will identify splicing errors or cable faults such as opens, shorts, crosses, grounds, splits, and splice backs. Refer to Section 632-020-200 for method of handling defective pairs.

### SETUP AND USE

**5.02** Clear the ends of the cables to be spliced per Section 634-020-200.

*Note:* Ends on CONECS ends are automatically cleared.

**5.03** Check the test set for proper operation in accordance with decal on inside of cover.

**5.04** Connect the test cord from test set to connector located on T-bar of cutter-presser. Connect ground lead from test set to cable sheath (Fig. 41).

*Note:* Assure bond has been placed across sheath opening.

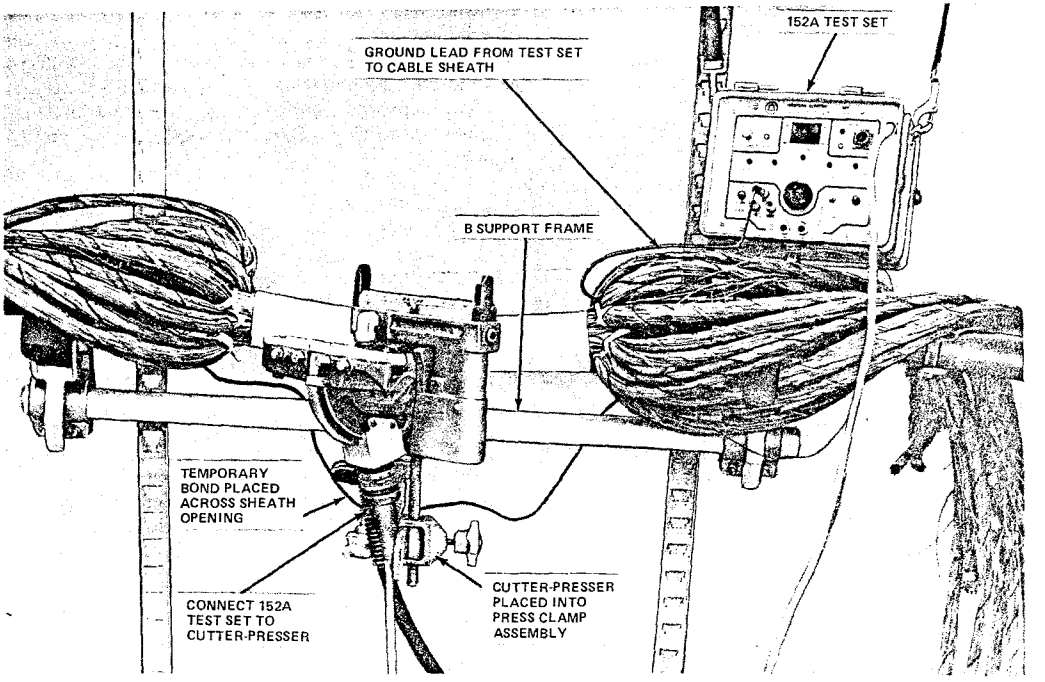



Fig. 41—Setting Up 152A Test Set

**5.05** Position the switches as follows (Fig. 42):

(a) The PIC-PULP switch for the type of insulation being spliced.

(b) The 5-REF-22 switch to either 5 or 22.

(c) The PAIR ACCESS switch to the SCAN mode.

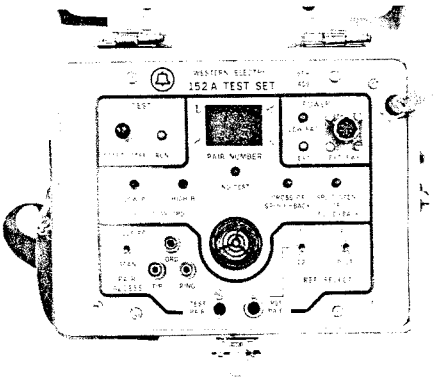



Fig. 42—152A Test Set

**5.06** Place 25 pair from the ***shortest section of cable*** into the index strip of the 710 connector. Check the wire placement with the error-tector before cutting wires as the test set does not detect reversals or transpositions.

> ***Note:*** The shortest section of cable should be placed in the index strip first; otherwise, some faults may be missed when testing. ***Do not use the test set on working pairs.*** Do not test through more than one load coil. ***Do not test directly on index strip except when using 890 tool as outlined in Step 8.***

Place the connector module over the index strip and press in place ***leaving the T-bar*** in the DOWN POSITION to test the first 25 pair.

**5.07** Depress the START/STEP switch, some diagnostic lights may momentarily light but then go out. The RUN lamp will light and the PAIR NUMBER display readout will indicate which pair is being tested. When a defective pair is encountered, the scan will stop and the PAIR NUMBER readout will be displayed for two seconds, the audible alarm will sound and the appropriate fault indicator lamp will light. To verify defective pairs, reverse the 5-REF-22 switch and repeat the test. ***A PAIR MUST SHOW FAULTY AGAINST BOTH REFERENCE PAIRS (5 and 22) TO BE A TRUE FAULT.*** See troubleshooting chart, Table D. Where a voltage in excess of 3.5 volts is on the pair, the NO TEST lamp will light indicating a pair cannot be tested. Clear and correct faults as they are found by using spare pairs if available to substitute for faulty pair.

> ***Note:*** When the cable being tested is less than 200 feet in length, only the "left hand" diagnostic lights will indicate a real fault (short or ground). The "right hand" diagnostic lights (split, open, cross, splice-back) should be disregarded.

**5.08** Select 25 pair from the corresponding cable group in the other cable and place these pairs into the connector module. Check the placement of the pairs in the connector with the error-tector before cutting the wires. LEAVE THE T-BAR IN THE DOWN POSITION. Repeat the test procedures outlined in paragraphs 5.06 and 5.07 and see troubleshooting chart, Table D.

TABLE D

TROUBLE SHOOTING CHART

| PROBLEM | ACTION IF PAIRS DRESSED INTO INDEX STRIP (NOTE) | ACTION IF PAIRS DRESSED INTO CONNECTOR MODULE |
|---|---|---|
| Short or Ground | Access defective pair to determine if short or ground by using ohm meter at tip/ring/ground terminals. Remove defective pair; select and test spare pairs externally; splice spare pairs with external connectors. | Access defective pair to determine if short or ground by using ohm meter at tip/ring/ground terminals. Remove defective pair from module. Select and dress spare pair into module. Close T-bar and run the test again. |
| Cross | Visually check module to determine if spliceback or possible cross. If cross, remove defective pair. Select and test spare pair and splice externally. | Visually check module to determine if spliceback or possible cross. Remove defective pair, if cross, and replace with spare pair. Close T-bar and run test again. |
| Open | Visually check to determine if split, open, or spliceback. If open, remove defective pair, select and test spare pair, and splice externally. | Visually check to determine if split, open, or spliceback. If open, remove defective pair, replace with spare pair, close T-bar, and run the test again. |
| Split | Visually check to determine if split, open, or spliceback. If split, remove pairs and splice to pairs of other cable externally. | Visually check to determine if split, open, or spliceback. If split, remove pairs and redress in module. Run test again. |
| Spliceback | Visually check to determine if spliceback. Remove pairs and splice to pairs of other cable externally.<br><br>(When removing pairs from the index strip and splicing externally, remember to leave those pair positions vacant in the connector module.) | Visually check to determine if spliceback. Remove pairs and redress in module. Run the test again. |

***Note:*** When using 890A tool and testing on index strip, pairs that are indicated to be defective can be removed for single pair test and spare pair replacement.

### DEFECTIVE REFERENCE PAIRS

**5.09** Indication of a SHORT or GROUND on the ***selected*** reference pair means that the reference pair is defective and should be changed before using the test results on any other pair. When several or most pairs test defective, it suggests that reference pair may be bad, even though the test set does not indicate a fault on the reference pair. If this occurs, change to the alternate reference pair.

### CHANGING REFERENCE PAIRS

**5.10** To change the reference pair the first time, move the 5-REF-22 switch to its opposite position. For example, if reference 5 was being used, flip the switch to the reference 22 position. If it is believed that both reference pairs 5 and 22 are defective, an external reference pair must be used. The reference pair selected must be the same length as the pair being tested. Position the 5-REF-22 toggle switch to the REF PAIR (center) position. Insert the cord plug into the REF PAIR jack. Connect the cord to a good pair to be tested. The reference pair is now changed and testing may proceed.

### SINGLE PAIR TEST

**5.11** With the test set grounded to the cable sheath, select a reference pair with the same length as the pair to be tested. The reference pair may be pair 5 or 22 accessed through the cutter-presser head or any other pair which has been accessed through the REF PAIR jack. Insert a test cord into the TEST PAIR jack and connect the test cord to the pair to be tested. Depress the START/STEP switch. Some diagnostic lamps may light momentarily but will immediately go out which indicates the pair being tested is good. If the pair is defective, the appropriate diagnostic lamp will light and the audible alarm will sound for approximately two seconds, and then the set will turn off.

***Note:*** Remember that the diagnostic lamps may be incorrect if the reference pair is bad. ***The reference pair is not being tested.***

### PAIR ACCESS TO EXTERNAL TEST EQUIPMENT

**5.12** Ground the test set to the cable sheath. Place the 5-REF-22 switch to the center position. With the switch in the SCAN mode, depress the START/STEP switch. When the defective pair appears in the PAIR NUMBER display, flip the switch from the SCAN position to the ACCESS PR position. A pair may also be accessed by positioning the SCAN-ACCESS PR switch to the ACCESS PR position and then by pressing and releasing the START/STEP switch until the desired pair is displayed in the PAIR NUMBER display. Connect a volt-ohmmeter, 145A test set, or equivalent to the TIP and RING terminals on the test set to the pair. The pair is now connected to the external test equipment through the cutter-presser head and the TIP and RING terminals.

***Note: Do not apply breakdown voltage through these terminals. To conserve the battery, remove the test set from the access PR mode as soon as external testing is complete.***

### TWO-PERSON SPLICING—ONE 152A TEST SET

**5.13** Test set can be used with two cutter-pressers using W-100A cord (Y) as shown in Fig. 43. However, only one splice can be tested at a time. Both T-bars cannot be in down position when testing.

***Note:*** Refer to Section 634-400-530 and instruction book provided with 152A test set for in-dept details.

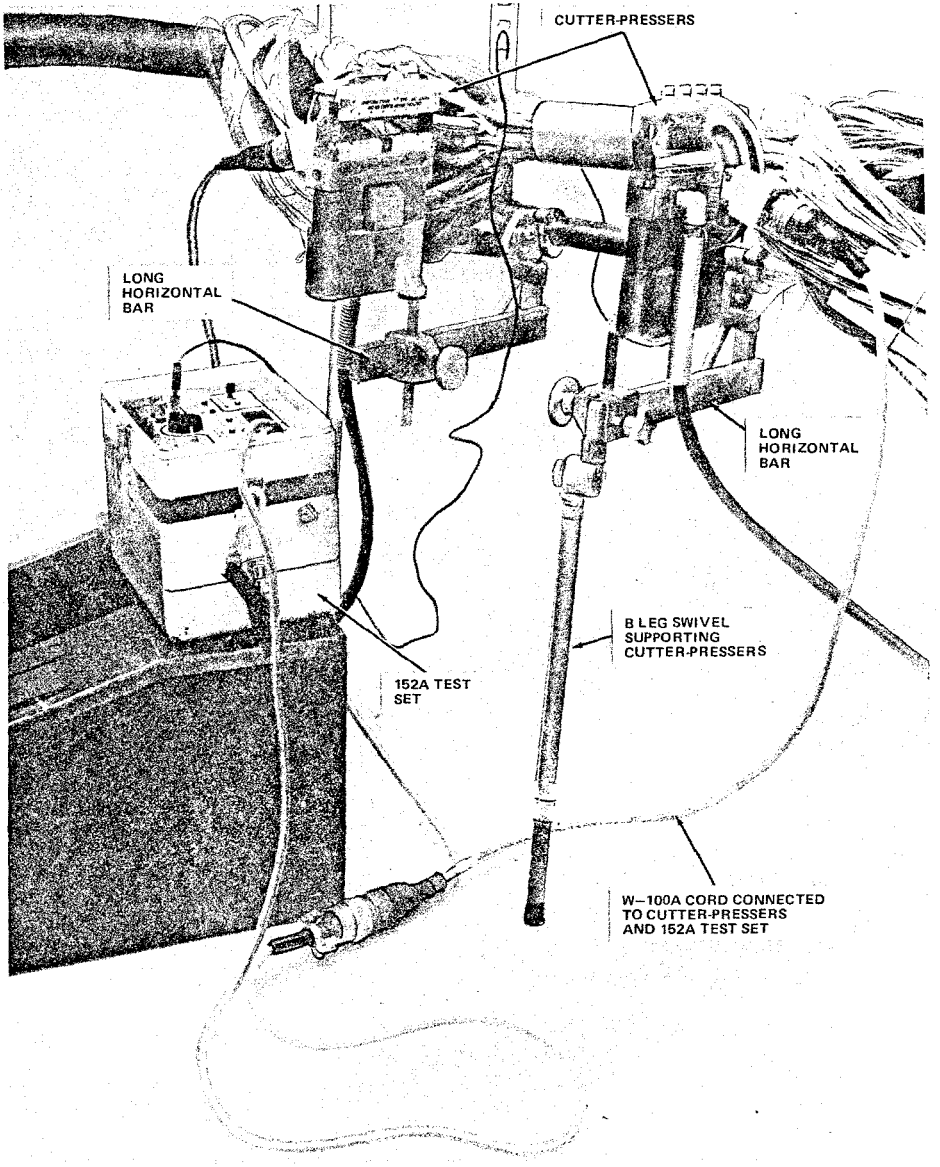



Fig. 43—2-Person Setup for Splicing and Testing

## 6. CABLE PREPARATION AND SPLICING

### FOLDBACK METHOD—STRAIGHT SPLICE

*Note:* Requirements for sheath opening, core preparation, and connector location are based on use of 2-type closure.

**6.01** Place tarpulin to protect work area from moisture, dirt, etc.

**6.02** Prepare the cable sheath and bond in accordance with type of closure to be used. It is important at this time to determine the number of banks of connectors required for splice before selecting closure. Refer to Section 633-506-201 for 2-type closure selection.

**6.03** Prepare the core of the splice (Fig. 44) align cable group by bringing the first unit from the right cable across the opening to the left cable. Match this unit with the first unit of the left cable and tie them together where they met. ***Keep the distance between the sheath and tie to 2 inches or less.***

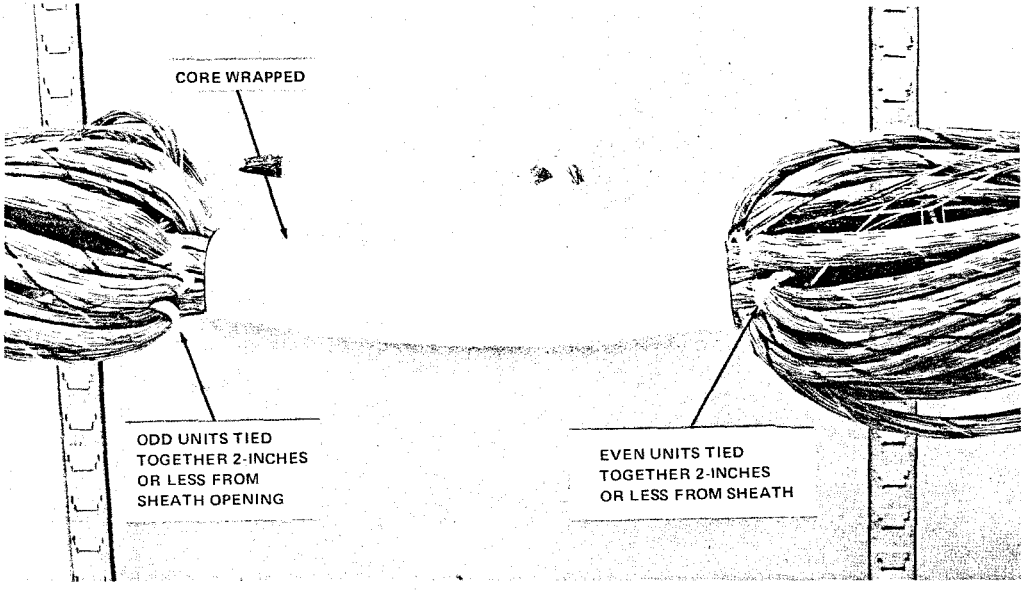



Fig. 44—Prepared Cable

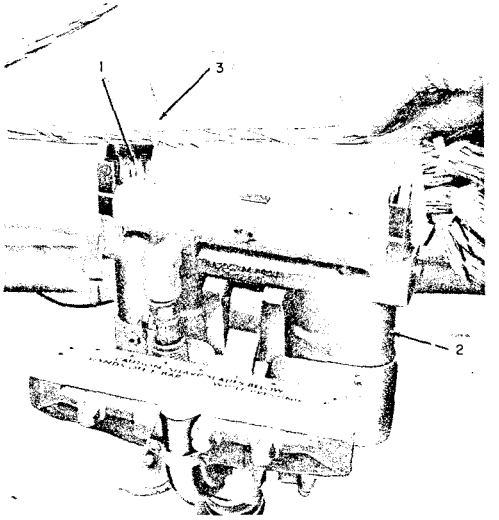
**6.04** Take the second unit from the left cable, move it back across the opening to the right cable; match this unit with the second unit of the right cable and tie them together where they meet.

**6.05** Repeat paragraphs 6.03 and 6.04 for each unit tying the odd number units on the left side of the sheath opening and the even number units on the right side until the core is complete.

**6.06** Wrap the cable core with the same material as used for the completed splice. ***Do not wrap core of waterproof cable.***

**A. Marking Core and Splicing Using Two Banks of Connectors**

**6.07** Mark cable core and splice using two banks of connectors as outlined in Steps 95 through 98.



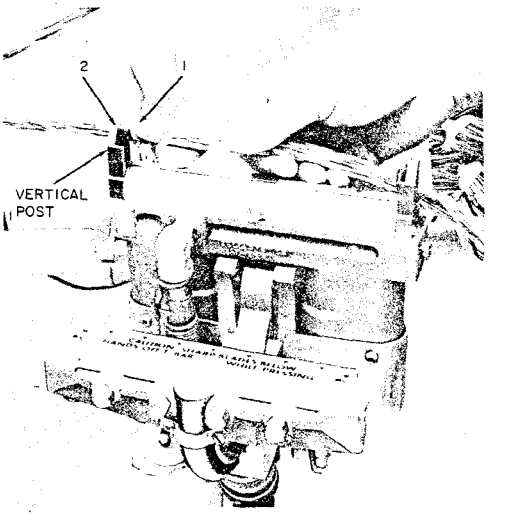

**Step 95—Marking Unit to be Spliced**

1. Measure across the sheath opening (sheath to sheath) to find center of the core. Mark this spot and center one-inch wide vinyl tape over this mark. This tape will be used to position each module.

**Step 95—Marking Unit To Be Spliced (Contd)**

2. Install splicing tool to be used as outlined in Part 4. (See Fig. 43, page 107. for setting up tools for two-person splicing operation.) Position cutter-presser on right-hand side of cable.

3. Take the first cable unit from the left side of the opening and lay it along the core; then using a piece of wire, mark the unit at a point on the opposite edge of the vinyl tape. ***This is important so that the modules do not overlap in the center of the splice.***




**Step 96—Align Tool**

1. Move the cutter-presser so that:

   (a) Wire marker aligns with the inside edge of the vertical post.

   (b) Cutter-presser is ***in alignment with the unit*** to be spliced.

   (c) Index strip is 1-1/2 inches above the level of the unit to be spliced.

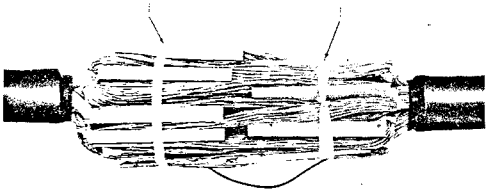
2. Secure the unit binders near the end post and tie off as outlined in paragraph 1.05. Splice the 25-pair unit as outlined in Part 4 for splicing tool being used.

**Step 96—Align Tool (Contd)**

3. Repeat 1 and 2 for each unit on the left-hand side of the cable, then move cutter-presser to left-hand side of cable to splice right-hand units. ***It is recommended that you begin with the lower rear units and work up and to the front to avoid having to work around already completed modules.***

**Step 97—Folding Units Into Core**

1. After all the units have been spliced, fold the units into the core.

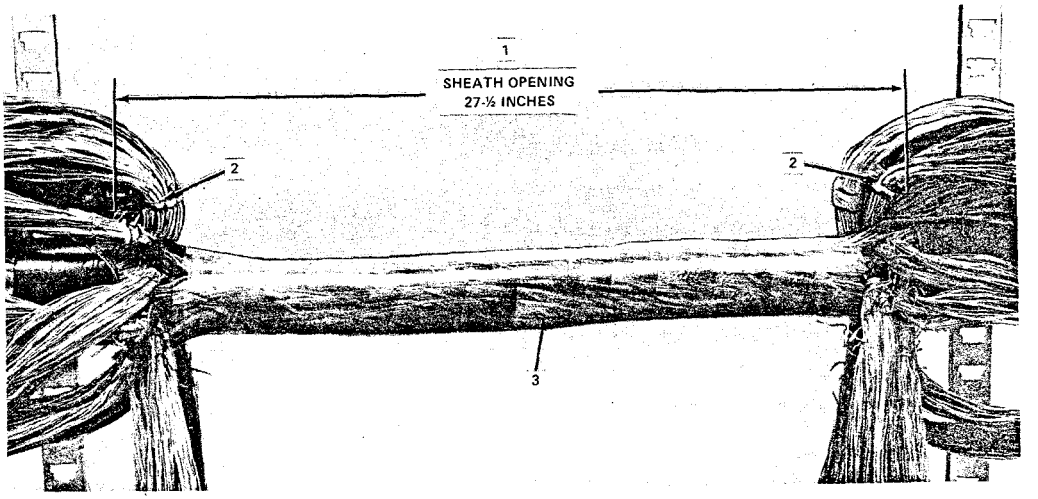


**Step 98—Completed Splice**

1. Tie units to core.
2. Wrap splice as outlined in Section 632-490-200 and enclose using appropriate closure.

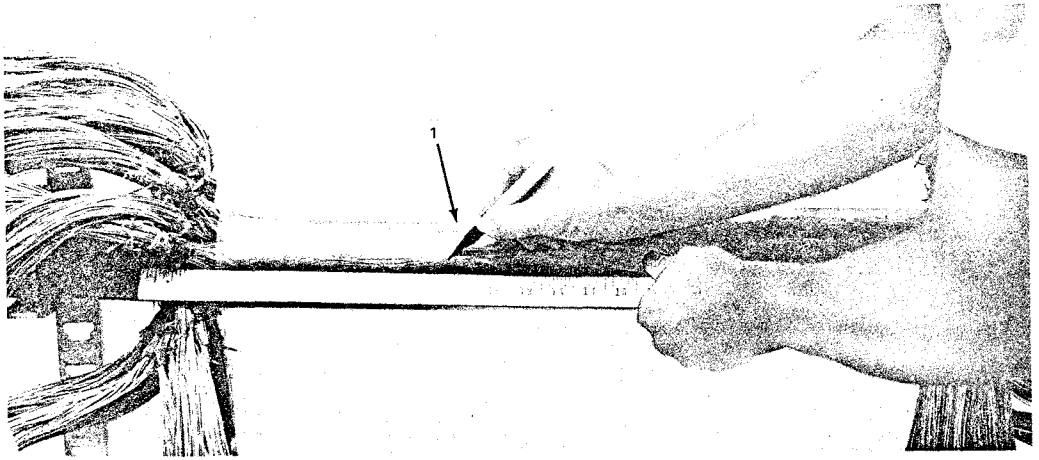
**B. Marking Core and Splicing Using Three Banks of Connectors**

**6.08** Make cable core and splice using three banks of connectors as outlined in Step 99 through 109.



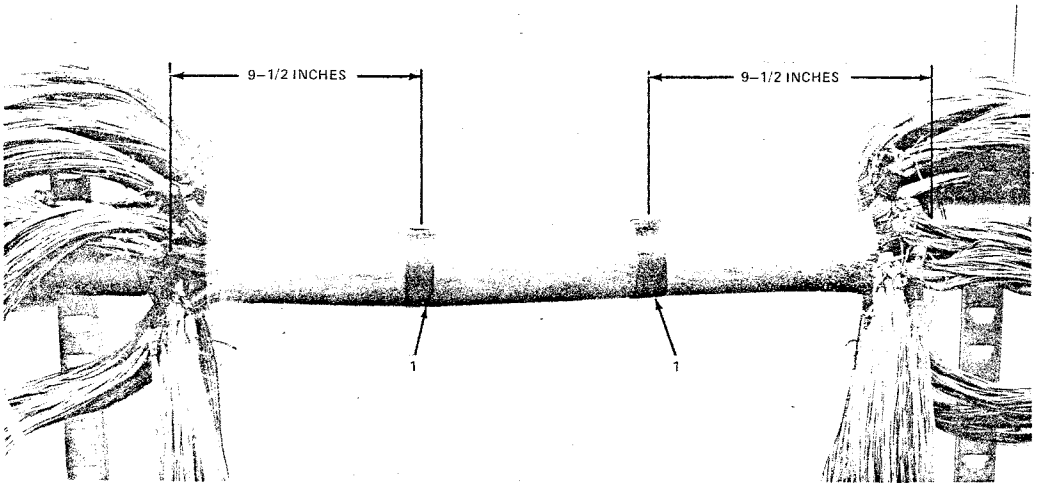

**Step 99—Cable Prepared for Three Banks of Connectors**

1. Prepare cable for sheath opening of 27-1/2 inches for B length 2-type closure or lead sleeve.
2. Tie off the units with even units on the right side and the odd units on the left side as outlined in paragraphs 6.03, 6.04, and 6.05.
3. Wrap the cable core as outlined in paragraph 6.06.



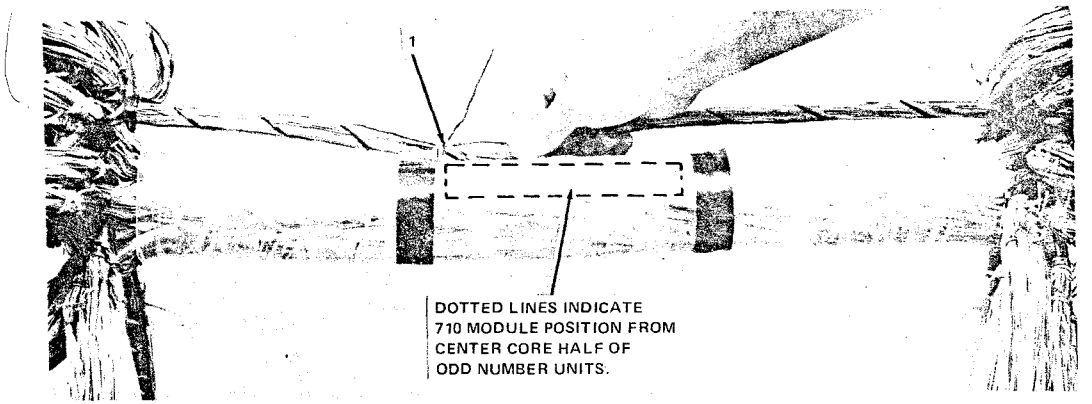

**Step 100—Sheath Prepared for Three Bank Splice**

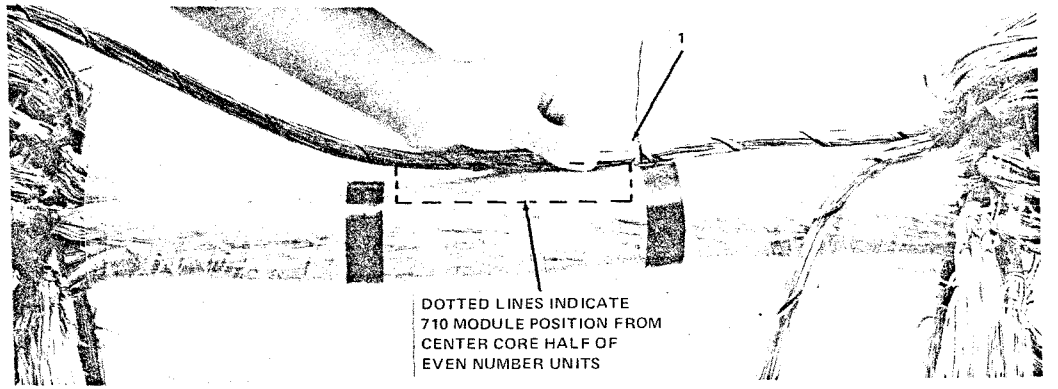
1. Mark the cable core 9-1/2 inches from each side of the sheath opening.




**Step 101—Tape Markers Placed on Cable Core**

1. Place one turn of 1-inch wide vinyl tape around the core. ***Tape should be centered on mark.***



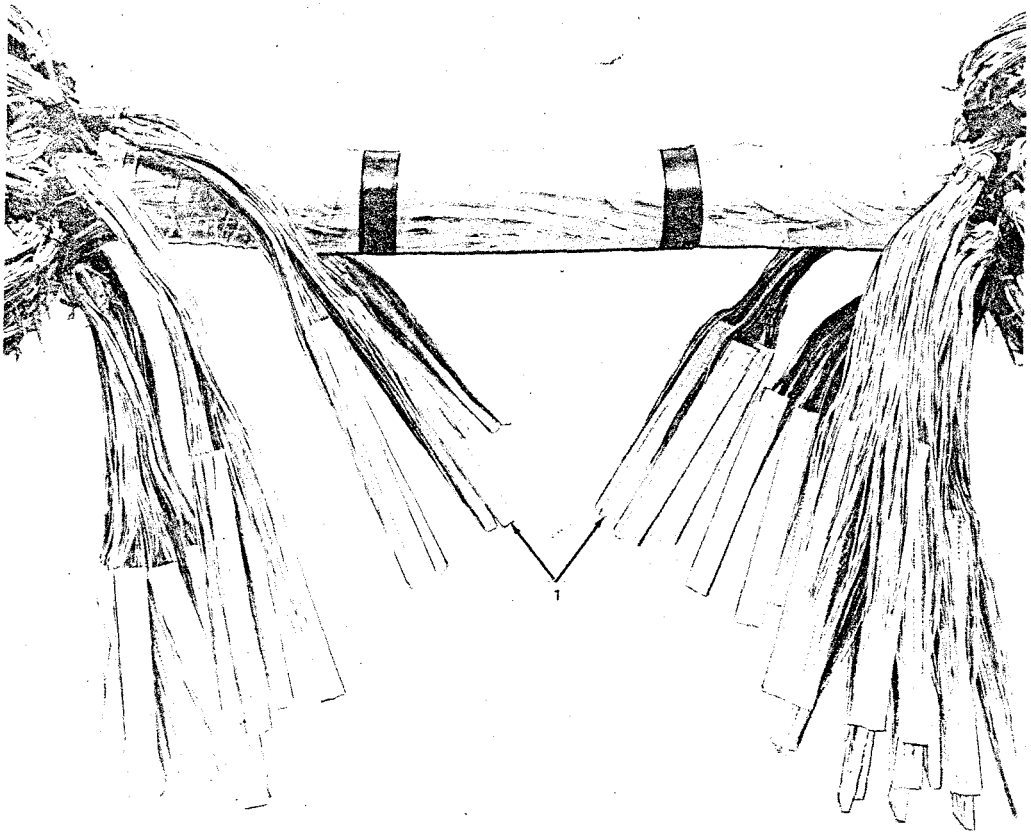

**Step 102—Marking Cable Units for Three-Bank Splice**

1. Using a piece of wire, mark the units for center bank of connectors. The units for center bank are listed in Table E.

**TABLE E**

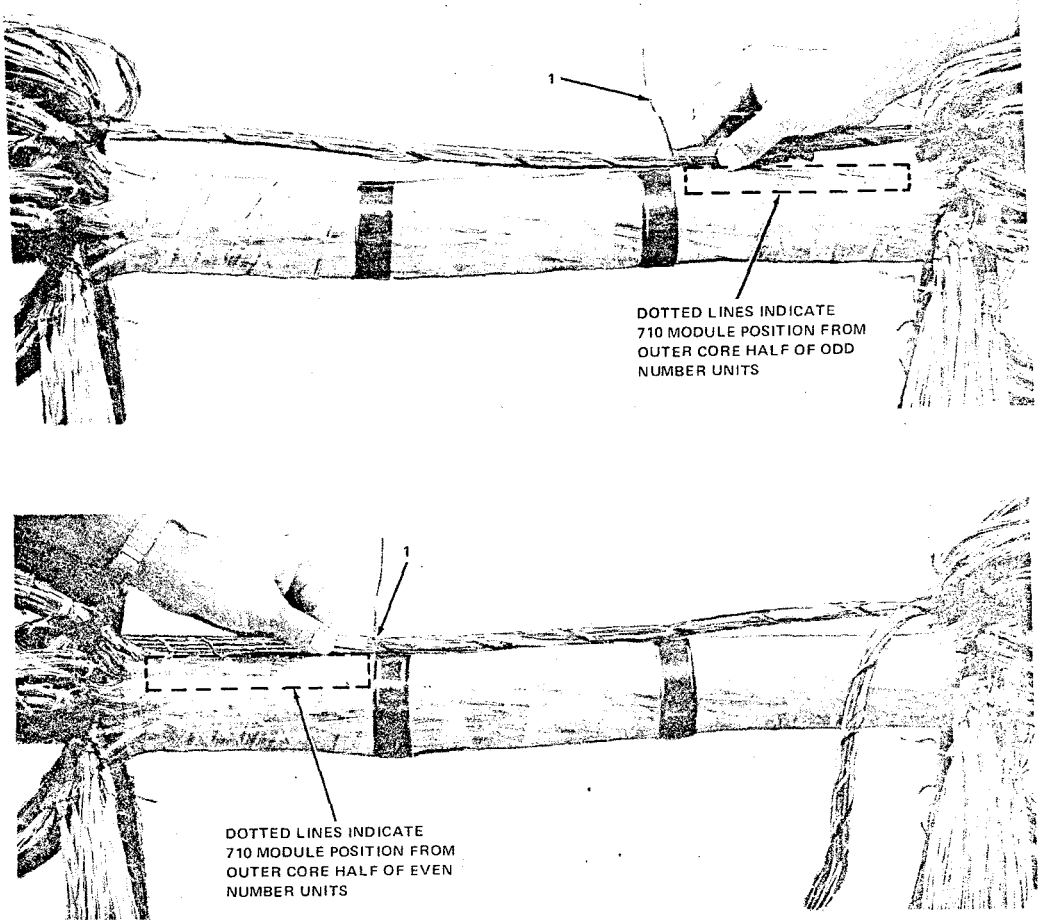
**CENTER BANK MULTIUNITS FOR THREE-BANK SPLICE**

| CABLE SIZE | EVEN MULTIUNITS | ODD MULTIUNITS |
|---|---|---|
| 2400 | 2, 8, 22, 24 | 1, 7, 9, 23 |
| 2700 | 2, 10, 12, 20 | 1, 3, 7, 15, 25 |
| 3000 | 2, 10, 12, 28, 30 | 1, 9, 11, 27, 29 |
| 3600 | 2, 4, 14, 16, 34, 36 | 1, 3, 13, 15, 33, 35 |
| 4200 | 2, 4 | 1, 3 |



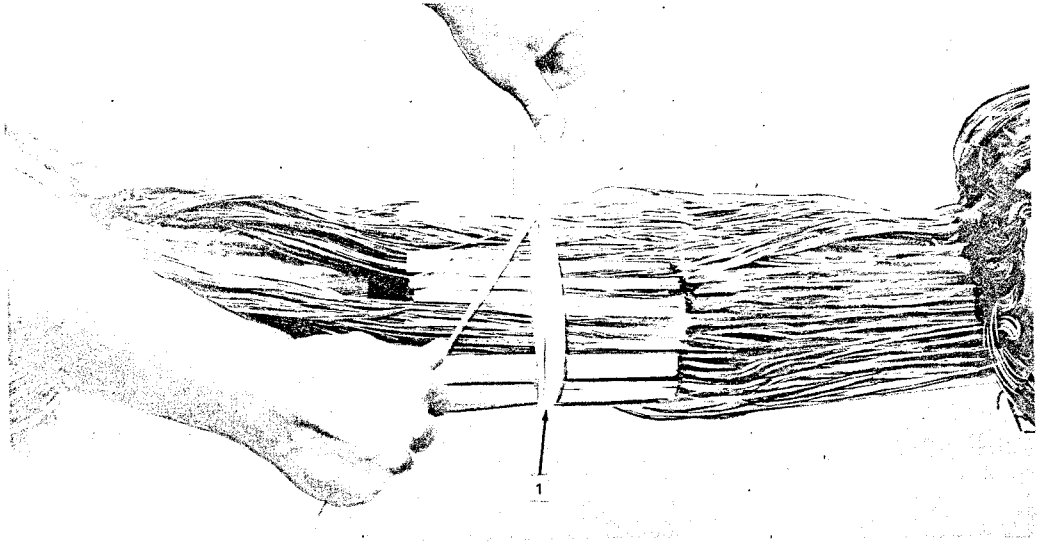

**Step 103—Spliced Center Bank**

1. Set up cutter-presser, align as outlined in Step 96, and splice all units to be located in center bank as outlined in Part 4. Lay the center bank units back to the side from which they came.



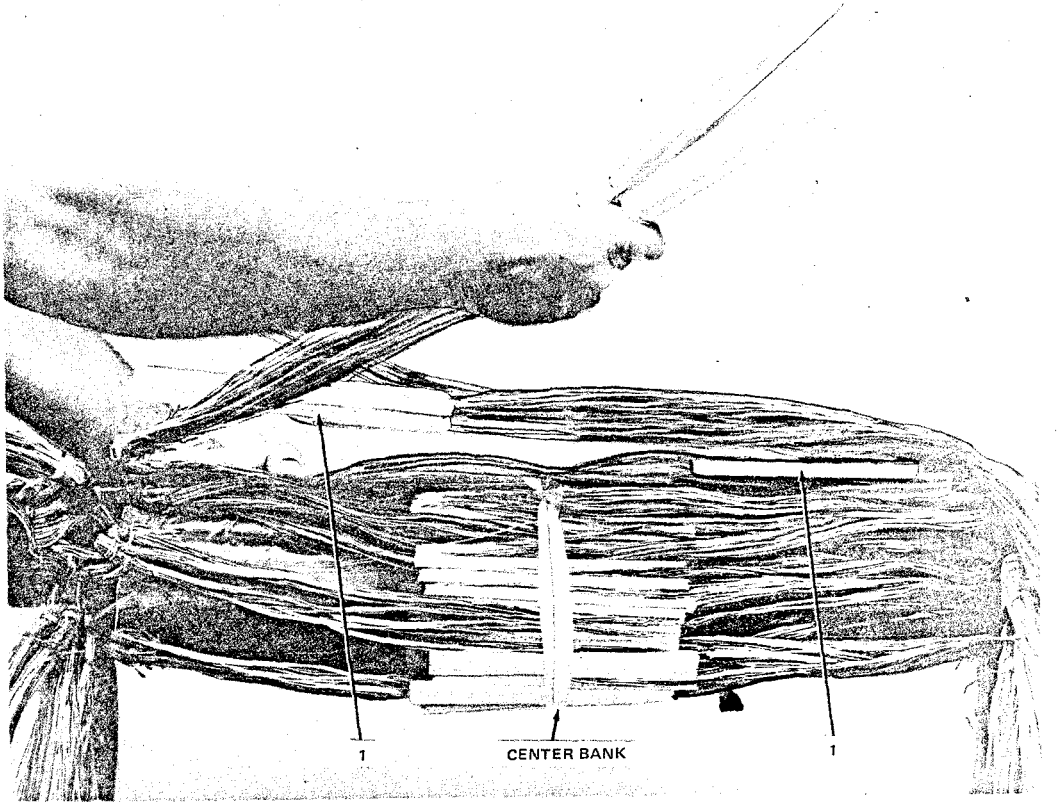

**Step 104—Marking Outer Banks**

1. Measure and mark the outer units, then splice the units as outlined in Part 4. One side of the outer bank of modules should be completely spliced before moving to the other side.




**Step 105—Tying Center Back to Core of Cable**

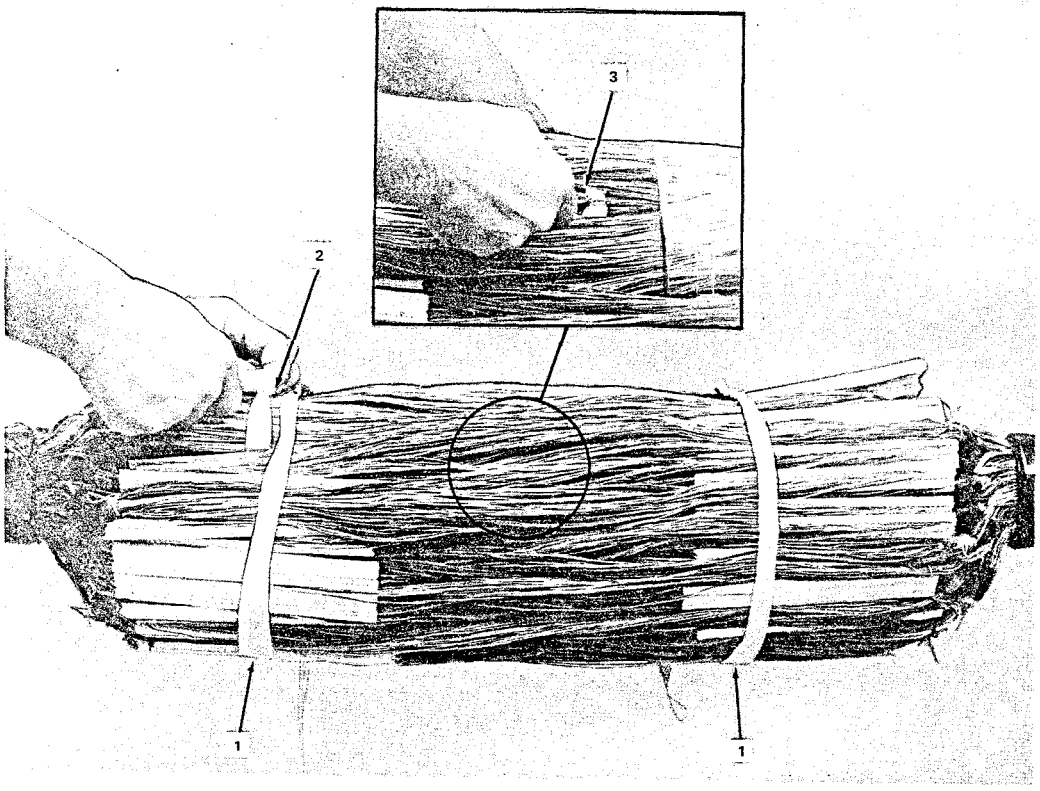
1. Lay up and tie center bank of connectors to cable core.




**Step 106—Laying Up Outer Bank**

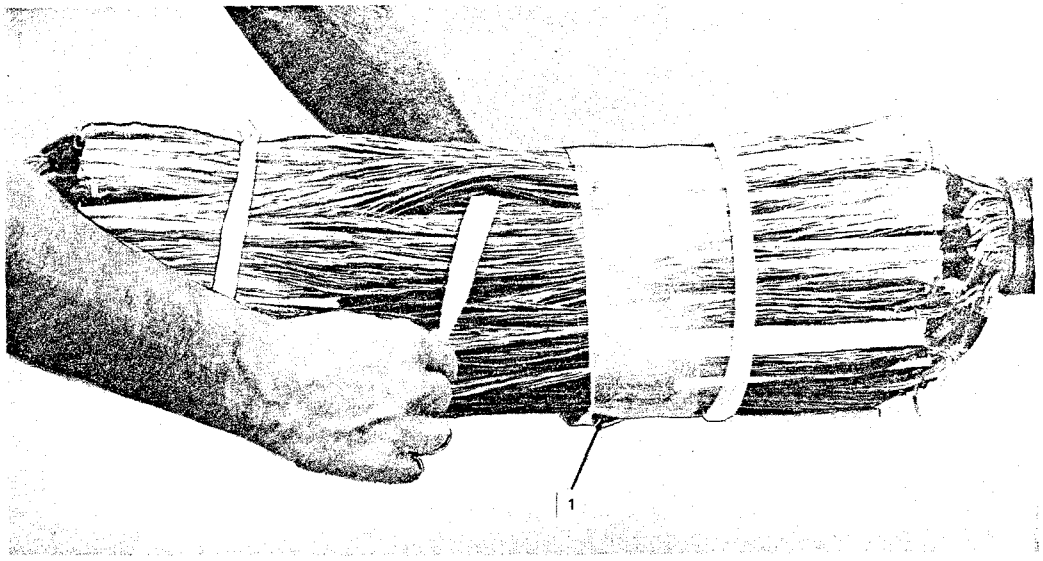
1. Lay the outer bank of connectors on each side of the center bank.

   ***Note:*** It may be necessary to temporarily tie small groups of connectors to cable core as laying up progresses to facilitate handling of groups.



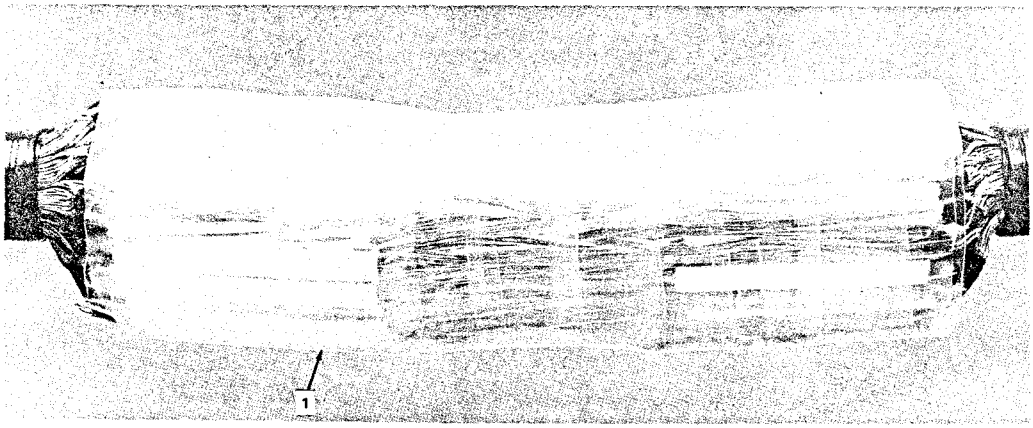

**Step 107—Tied Splice Bundle**

1. Place outer temporary tie around splice bundle.
2. Cut and remove all temporary ties from inside of bundle.
3. Cut and remove temporary tie securing center bank of connector to cable core.




**Step 108—Wrapping Splice**

1. Starting at the edge of the outer temporary tie, wrap splice as outlined in Section 632-490-200. As wrapping progresses, remove all temporary ties.

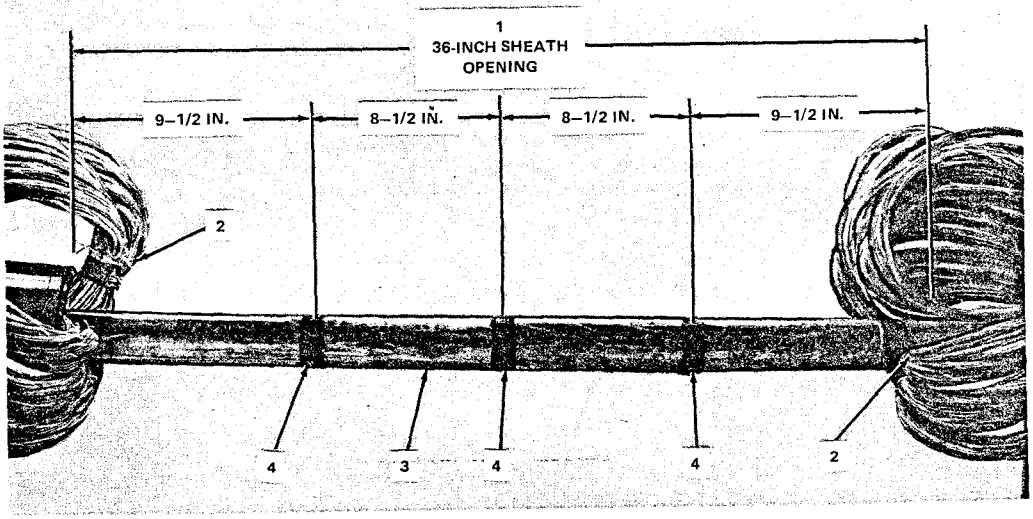



**Step 109—Completed Splice**

1. Enclose splice using methods prescribed for closure being used.

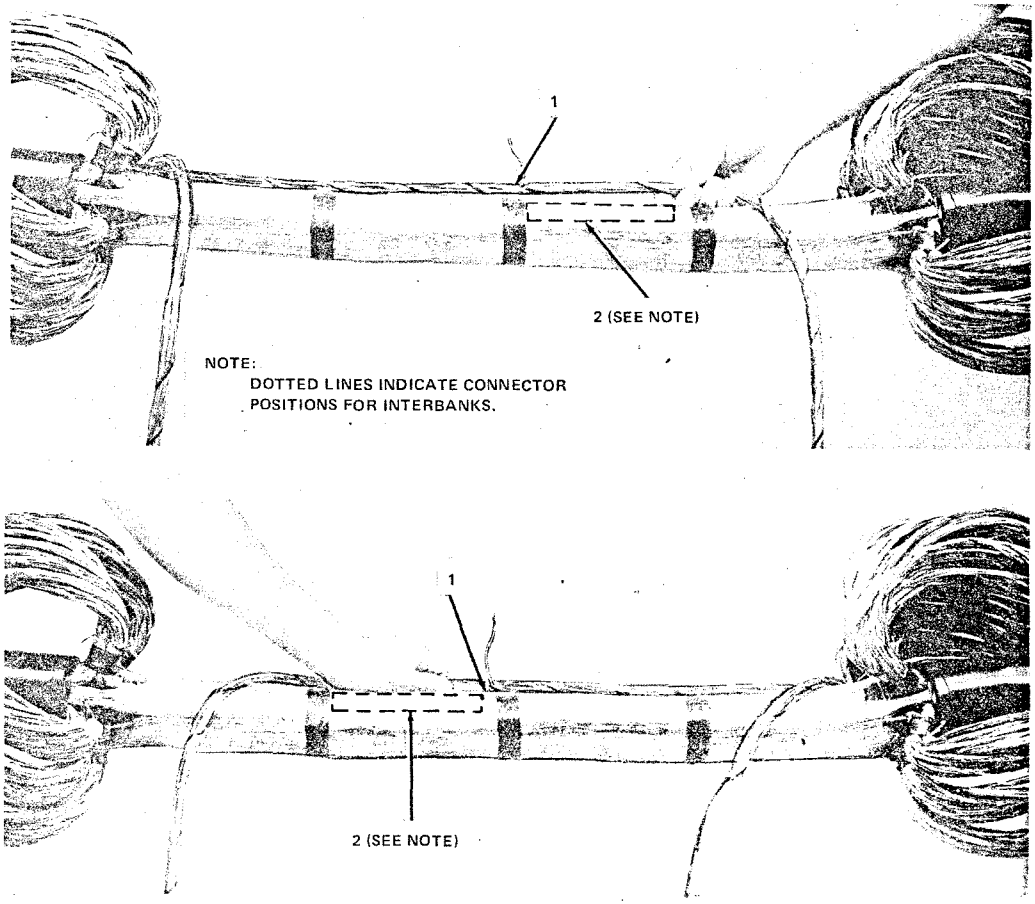
### C. Marking Core and Splicing Using Four Banks of Connectors

**6.09** Mark cable core and splice using four banks of connectors as outlined in Steps 110 through 117.




**Step 110—Cable Core Marked for Four Banks of Connectors**

1. Prepare cable for sheath opening of 36 inches for C length 2-type closure or lead sleeve.
2. Tie the units off with even units on the right side and odd units on the left side as outlined in paragraphs 6.03, 6.04, and 6.05.
3. Wrap the core as outlined in paragraph 6.06.
4. Mark the cable core and place one turn of 1-inch wide vinyl tape around the core at each mark. The tape should be centered on mark.

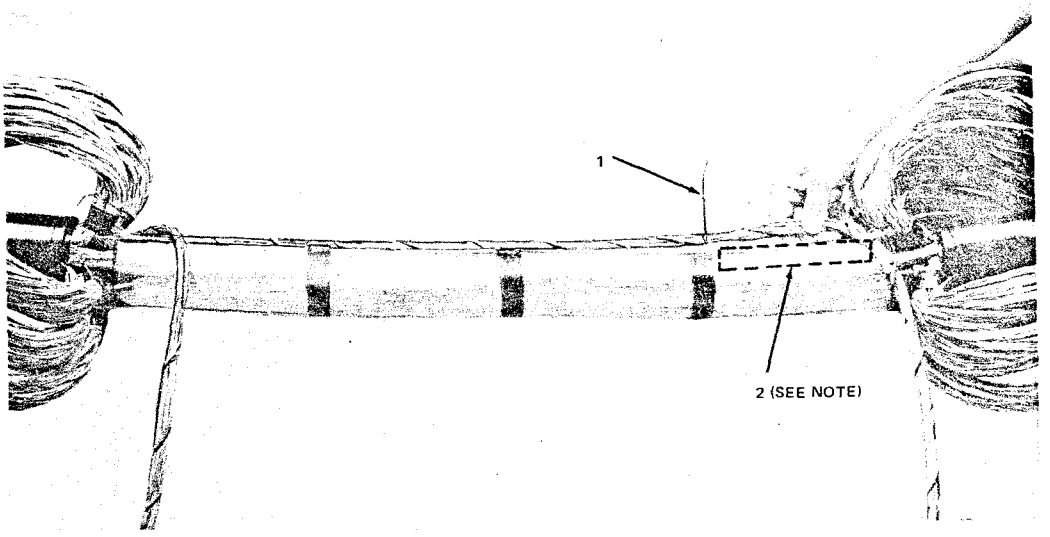



**Step 111—Marking Cable Center Units and Splicing Four Banks of Connectors**

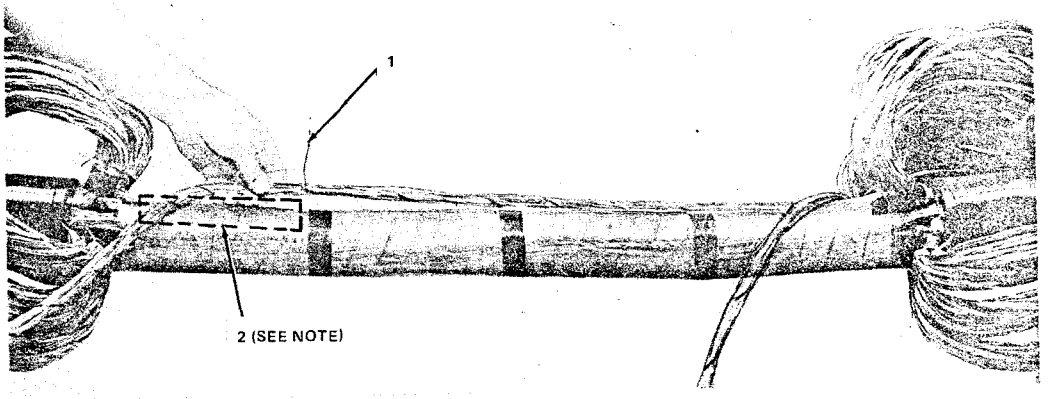
1. Using a piece of wire, mark the units for center banks of connectors at a point corresponding to edge of tape.

   ***Note: The same number of units are to be spliced in each bank and evenly distributed around the core. The units in the two center banks should come from the center core halves of the odd and even number units.***

2. Set up cutter-presser, align as outlined in Step 96, and splice all units to be located in the center banks as outlined in Part 4. Lay the center bank units back to the side from which they came.



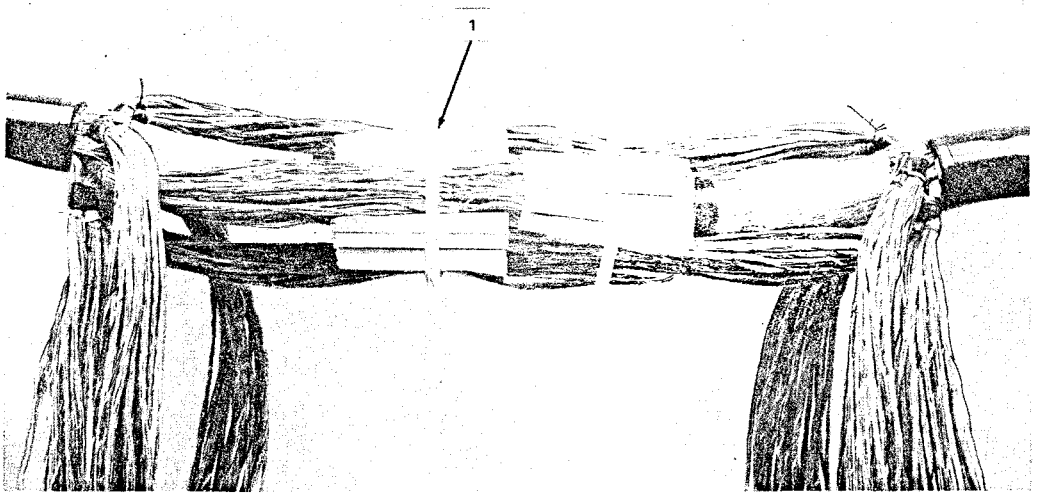

NOTE:
DOTTED LINES INDICATE CONNECTOR POSITIONS FOR OUTER BANKS OF CONNECTORS.




**Step 112—Measure, Mark, and Splice Cable Units for Outer Bank of Connectors**

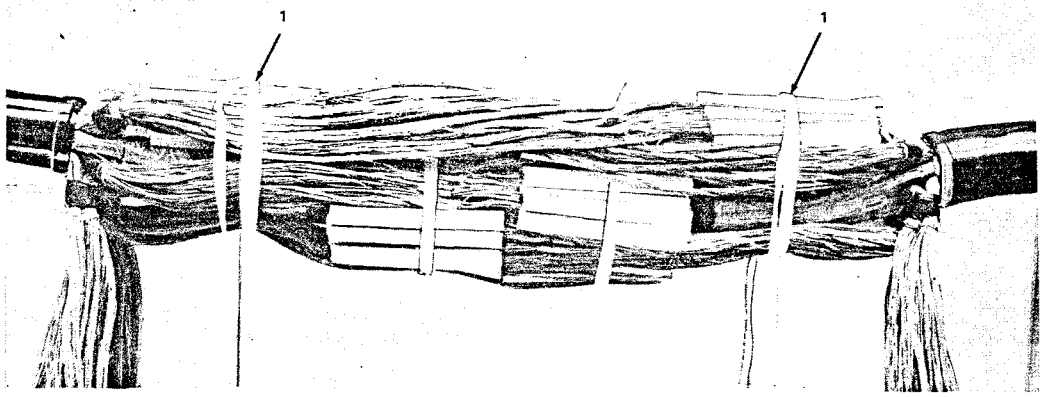
1. Mark the units for outer banks corresponding to edge of tape.

2. Align the cutter-presser as outlined in Step 96 and splice all units in one outer bank as outlined in Part 4, then move tool to other outer bank and splice completely.




**Step 113—Securing Center Banks of Connectors to Core of Cables**

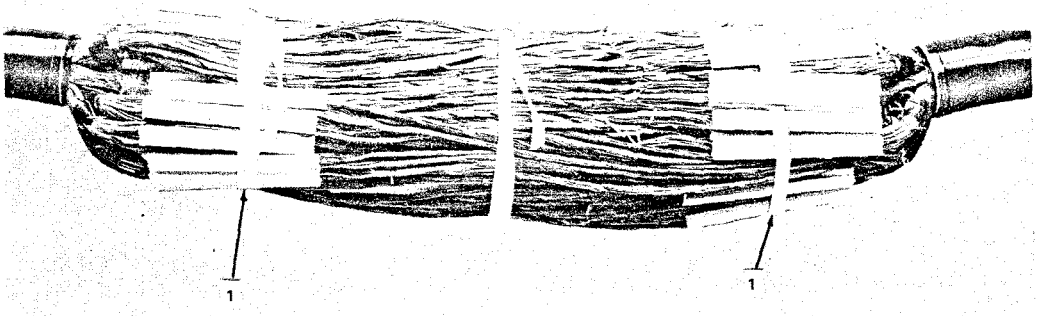
1. Fold the center banks of connectors around the core and temporarily tie in place.




**Step 114—Securing Outer Banks of Connectors to Core of Cables**

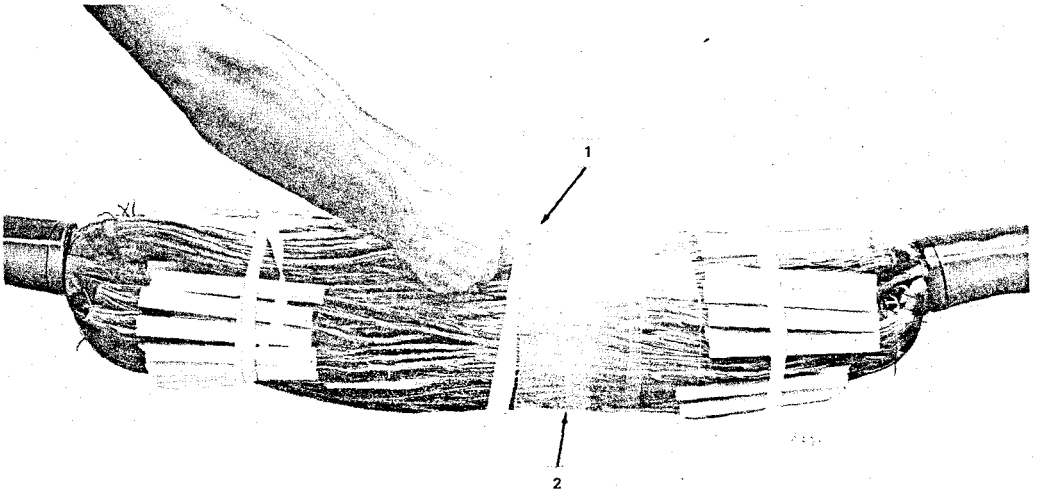
1. Fold the outer banks of connectors around the core and temporarily tie in place.

   ***Note:*** It may be necessary to temporarily tie small groups of connectors to cable core as laying up progresses to facilitate handling of groups.



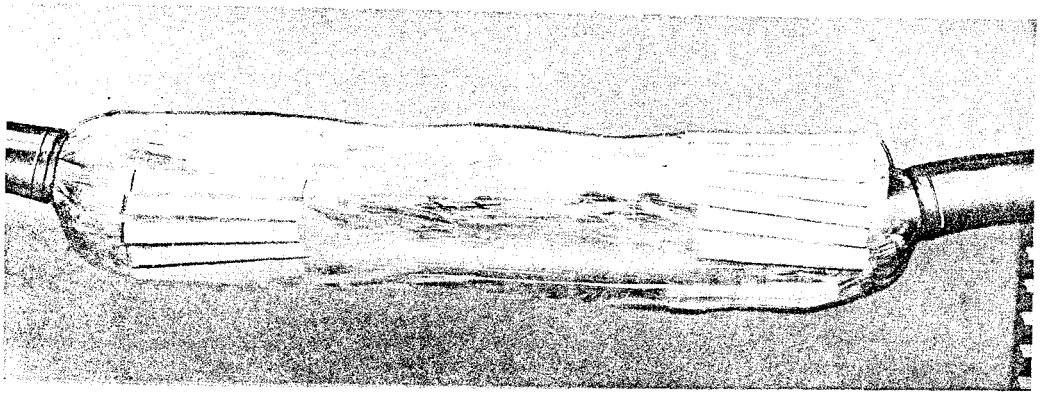

**Step 115—Secured Outer Banks of Connectors**

1. Form the four-banks of connectors around the core and temporarily tie them in place.




**Step 116—Wrapping Splice**

1. Remove temporary ties securing center banks of connector to cable core.
2. Wrap splice as outlined in Section 632-490-200. ***As the wrapping progresses, remove all temporary ties.***



**Step 117—Completed Splice**

1. Enclose splice using method prescribed for closure being used.

**IN-LINE METHOD—STRAIGHT SPLICE**

*Note:* Requirements for sheath opening, core preparation, and connector location are based on use of a 2-type closure.

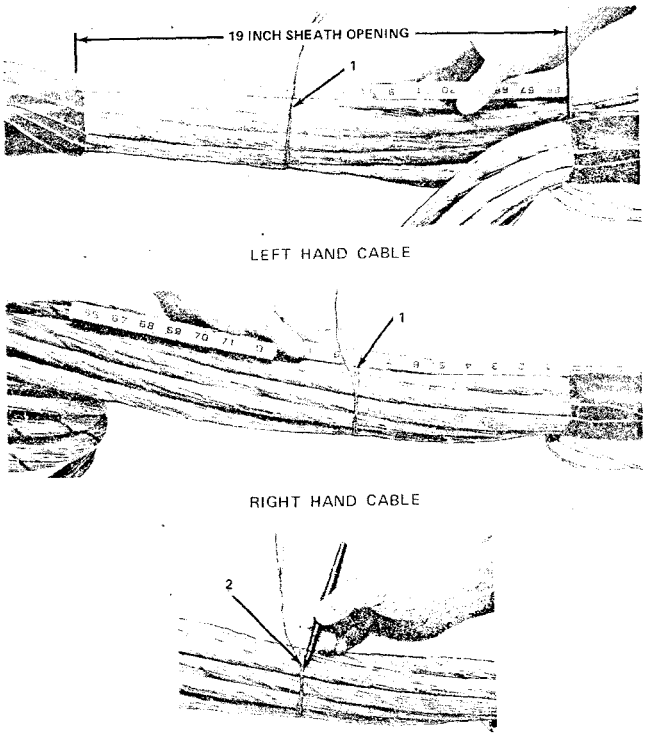
**6.10** Place tarpaulins to protect work area from moisture, dirt, etc.

**6.11** Prepare the cable sheath, align cable groups and bond in accordance with type of closure to be used. It is important at this time to determine the number of banks of connectors required for splice before selecting closure.

**6.12** Steps 118 and 119 outline the procedures for marking the inner and outer layers of cable for single bank in-line splice. An alternate method of setting up and positioning tool for splicing a single bank in-line splice when the sheath opening is equal to or less than 19 inches is illustrated in Step 121.

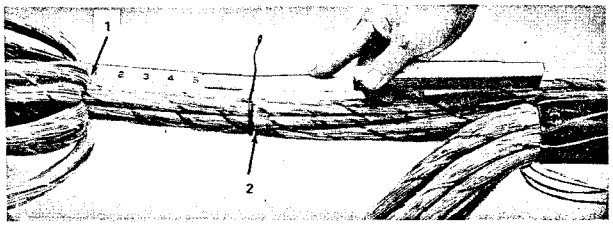
**6.13** Identify the cable units.

**A. One-Bank In-Line Splice—Cable Layout**

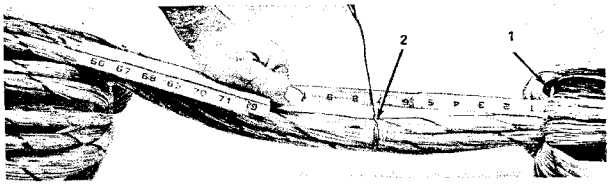



**Step 118—Marking Outer Layer for Single-Bank In-Line Splice**

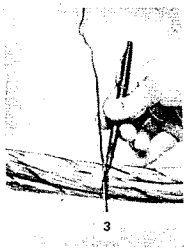
1. Wrap a length of scrap wire around each cable at a point 8 inches from butt of cable.
2. Using the wire wrap as a guide, mark each unit in the outer layer, then remove wire wrap.




LEFT HAND CABLE



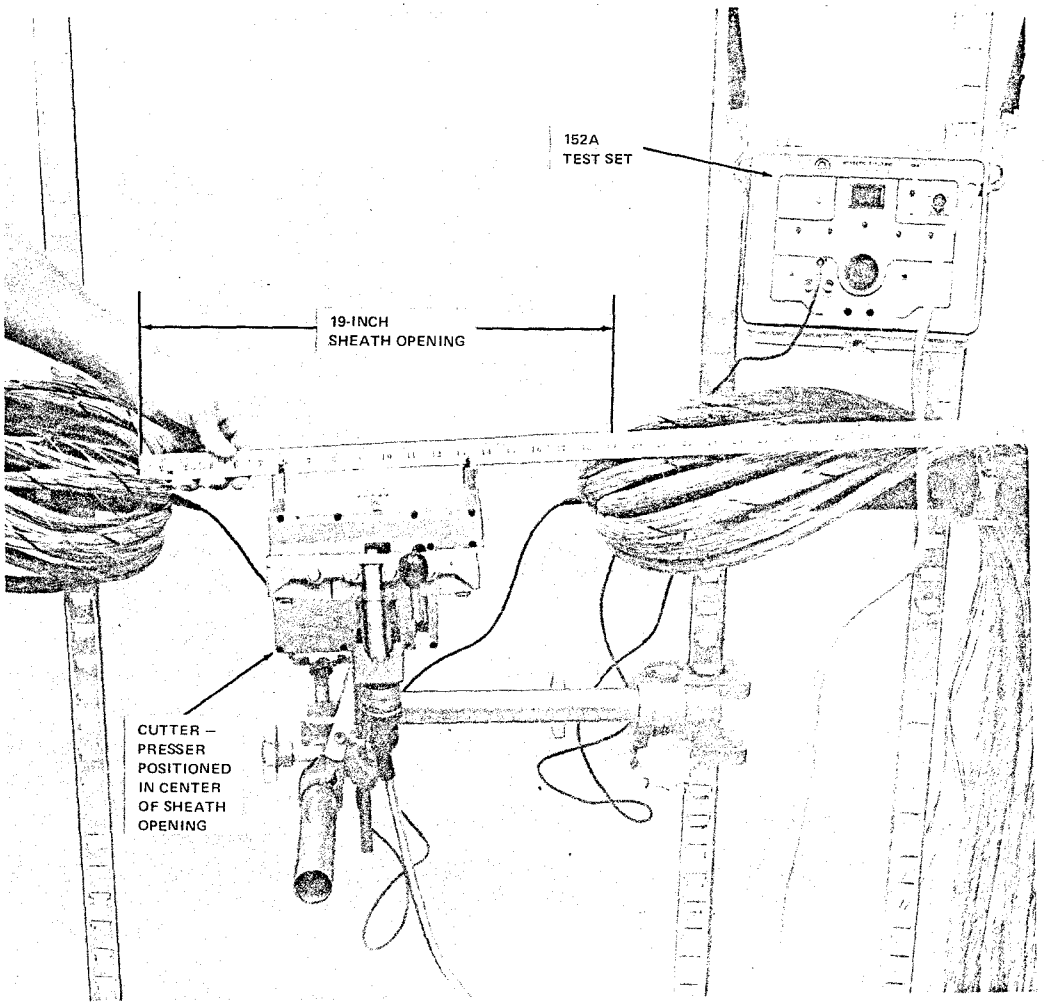

RIGHT HAND CABLE



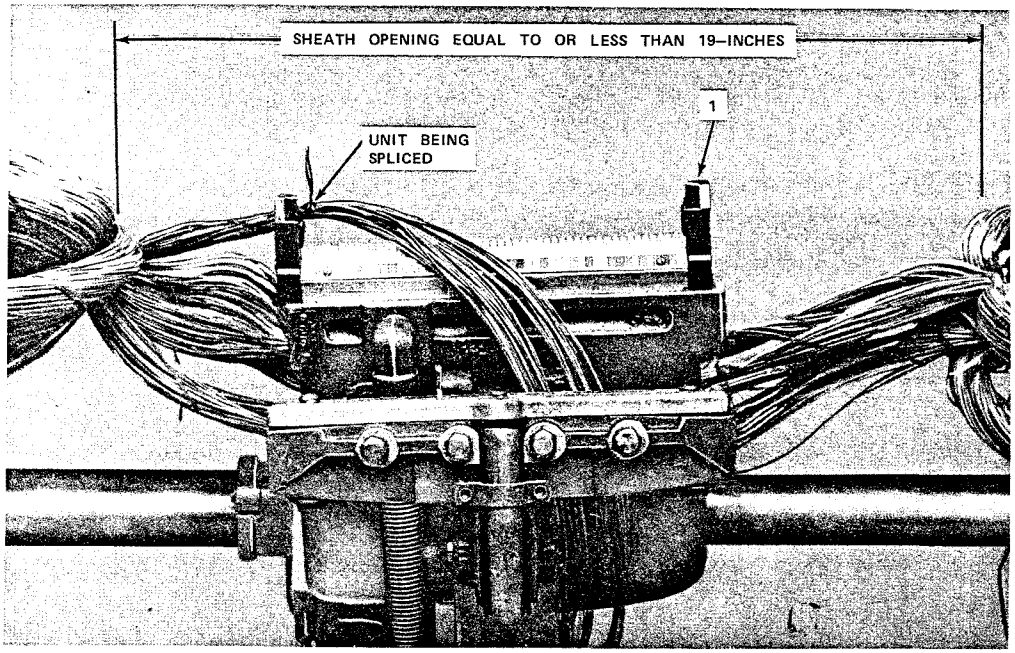

**Step 119—Marking Inner Layer(s) for Single-Bank In-Line Splice**

1. Fold the outer layer back over the cable sheath.
2. Wrap a length of scrap wire around each cable at a point 7 inches from butt of cable.
3. Using wire wrap as a guide, mark each unit in the inner layer(s), then remove wire wrap.

**6.14** Set up cutter-presser as shown in Step 120.




**Step 120—Cutter-Presser Set Up for In-Line Single-Bank Splice**



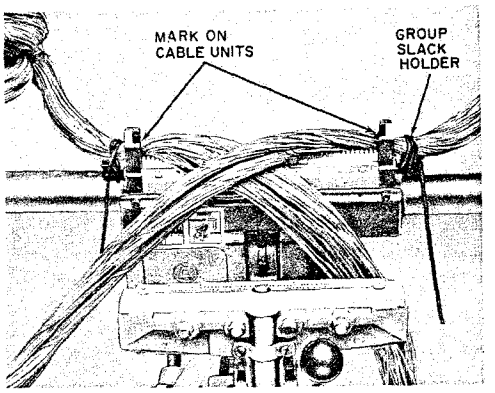

**Step 121—Setup for Splicing Single-Bank In-Line Splice When Sheath Opening Equal To Or Less Than 19 Inches**

1. Position tool in center of sheath opening 1 inch in front of cable sheath and 1-1/2 inches above unit being spliced.

2. Start splice at bottom and work to top in rear of sheath opening.

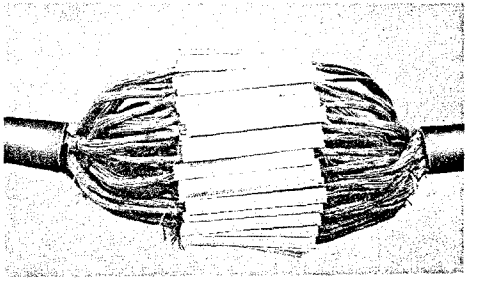
3. For units in the center of cable, move the tool away from sheath approximately the distance of unit diameter (approximately 1/2 inch).

4. For the front outer layer units, move the tool out and repeat 3 above.

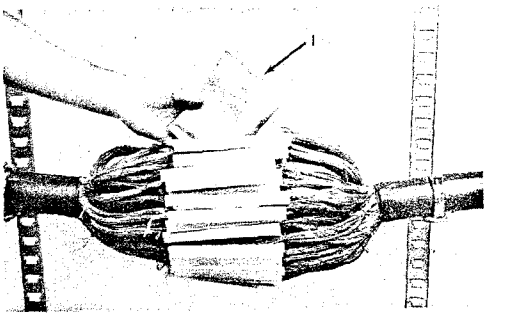



**Step 122—Position Tool for Splicing**

1. Position splicing tool so that marks on cable units are on inside of each end post. Remove the unit binders and tie off as outlined in paragraph 1.05, then splice the units, starting at the lower rear unit and working toward the front as outlined in Part 4. ***Use 55A group slack holder.***

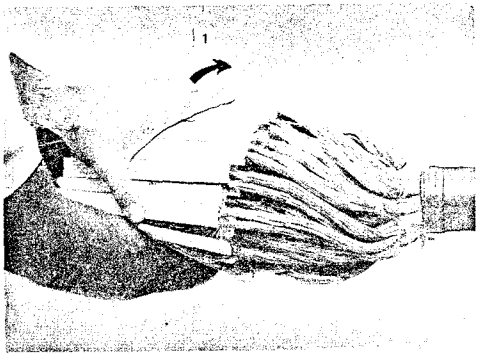


**Step 123—Completed Splice**



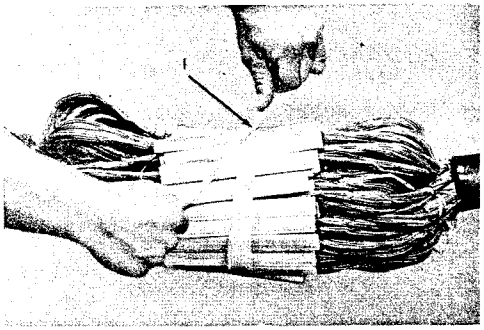

**Step 124—Placing Bag of Desiccant**

1. Place bags of C desiccant in paper or pulp cable splice.



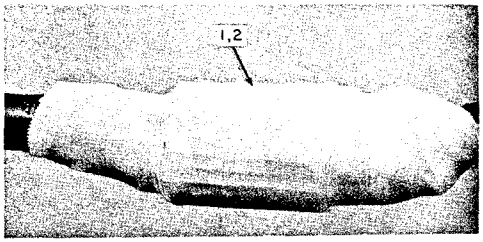

**Step 125—Rotating Splice**

1. When necessary rotate splice to reduce amount of slack.




**Step 126—Tie Splice Bundle**

1. Tie splice bundle.

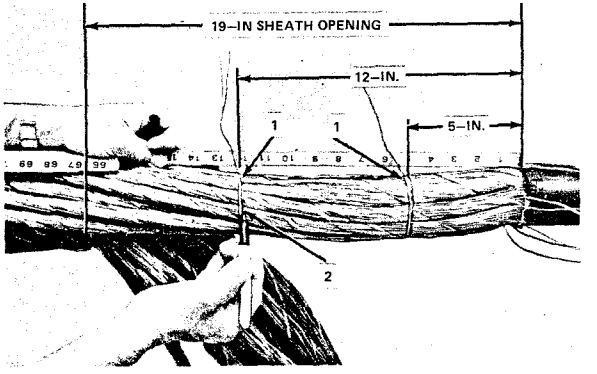



**Step 127—Wrapped Splice**

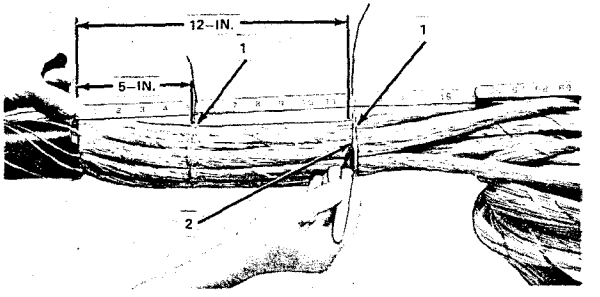
1. Wrap splice as outlined in Section 632-490-200.
2. Enclose splice using method prescribed for closure being used.

### B. Two-Bank In-Line Splice—Cable Layout

**6.15** Steps 128 through 132 illustrate marking outer and inner layers of cable and positioning tool for making two-bank in-line splice.




MARKING RIGHT HAND CABLE



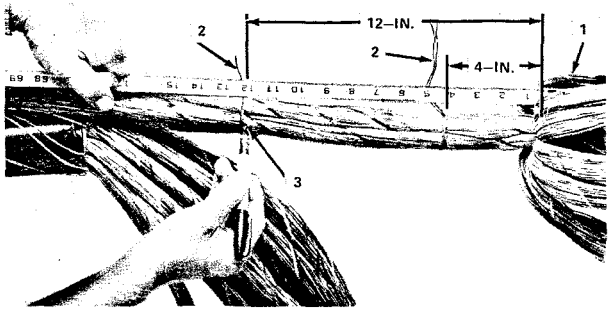

MARKING LEFT HAND CABLE

#### Step 128—Marking OUTER Layer for Two-Bank In-Line Splice

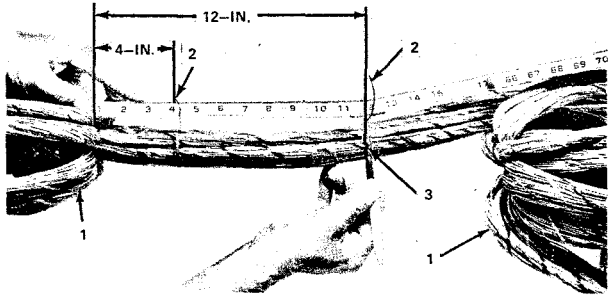
1. Wrap a length of scrap wire around each cable at locations 5 and 12 inches from the butt of the cable.

2. Using the wire wrap as a guide, mark each unit in the outer layer at the 5- and 12-inch location. Remove wire wraps from cable.

   ***Note:*** On waterproof cable, wire ties may be used to mark cable.




MARKING RIGHT CABLE



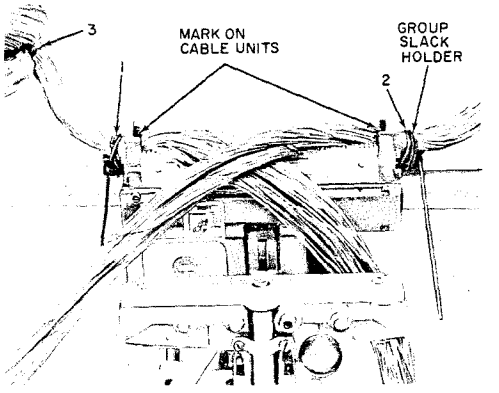

MARKING LEFT CABLE

**Step 129—Marking INNER Layer(s) for Two-Bank In-Line Splice**

1. Fold the outer layer back over the cable sheath.

2. Wrap a length of scrap wire around each cable at locations 4 and 12 inches from the butt of each cable.

3. Using wire wrap as a guide, mark each unit in the inner layer(s) at the 4- and 12-inch location. Remove wire wrap from cable.

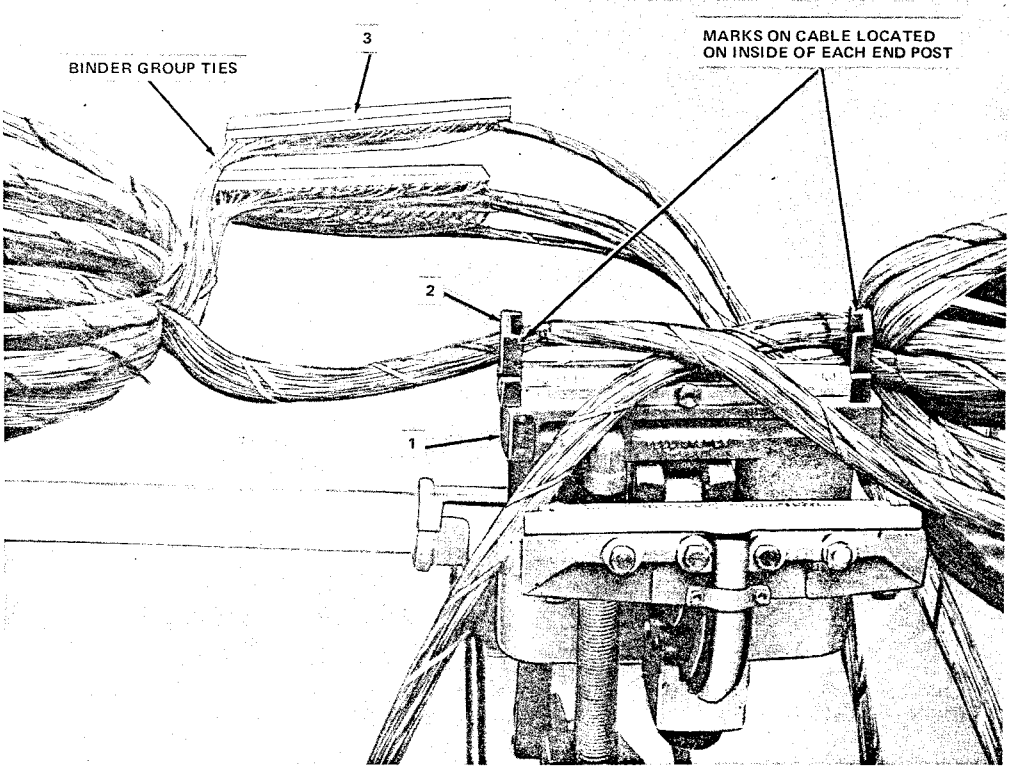



**Step 130—Position Tool for Splicing**

1. Set up tool and position so that slack length mark on cable unit is on inside of end post. Secure in slack group holder.

2. Position long cable unit so that mark is on inside of the other end post. Secure this unit in place with group slack holder or hold in place until several pairs are dressed into place.

3. Secure the unit binders as outlined in paragraph 1.05.




**Step 131—Tool Moved to Opposite Side of Sheath Opening**

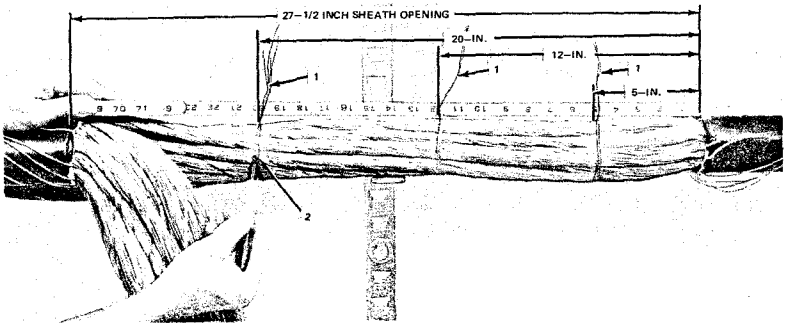
1. After a multiunit has been spliced, move the tool to the opposite side of the sheath opening.

2. Position tool so that marks on cables are on inside of each end post as outlined in Step 130. Remove the unit binder and tie off primary unit binders at the mark near the end post, then splice the units starting at the lower rear unit and working toward the front as outlined in Part 4, keeping the mark on the unit next to the end post at all times.

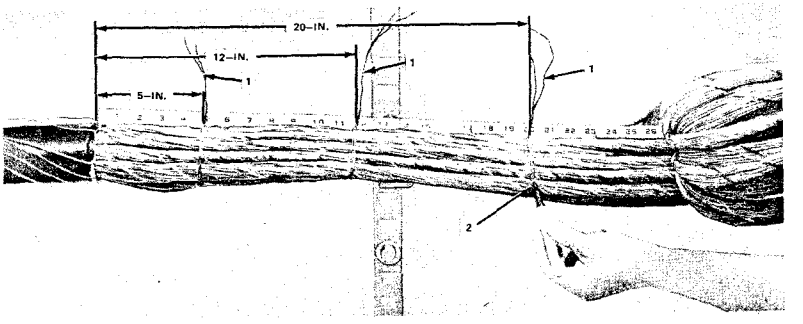
3. Repeat 1 and 2 above until all units are spliced, then wrap splice and enclose as outlined in Steps 124, 125, 126, and 127.

### C. Three-Bank In-Line Splice—Cable Layout

**6.16** Steps 132 through 134 illustrate marking outer and inner layers of cable and positioning tool for making a three-bank in-line splice.




MARKING RIGHT HAND CABLE



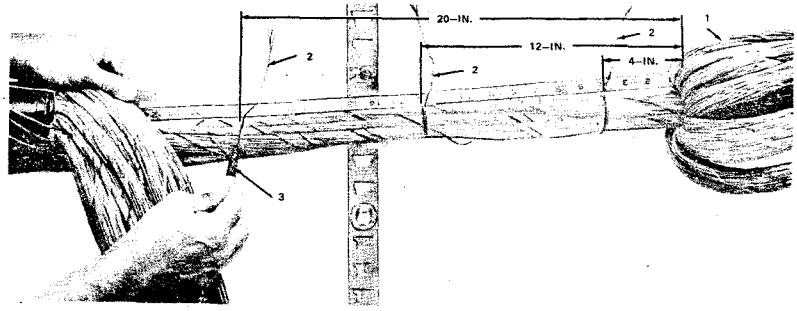

MARKING LEFT HAND CABLE

#### Step 132—Marking OUTER Layer for Three-Bank In-Line Splice

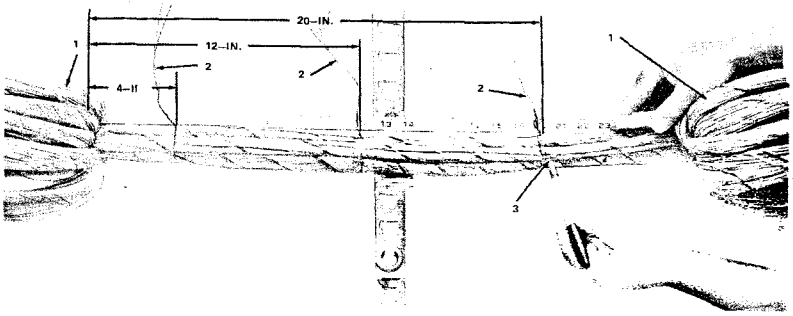
1. Wrap a length of scrap wire around each cable, a location 5, 12, and 20 inches from the butt of the cable.

2. Using the wire wrap as a guide, mark each unit in the outer layer at the 5-, 12-, and 20-inch location. Remove wire wrap from cable.

   ***Note:*** On Waterproof cable, wire ties may be used to mark cables.




MARKING RIGHT HAND CABLE



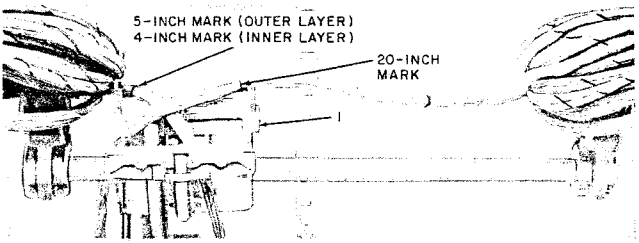

MARKING LEFT HAND CABLE

**Step 133—Marking INNER Layer(s) for Three-Bank In-Line Splice**

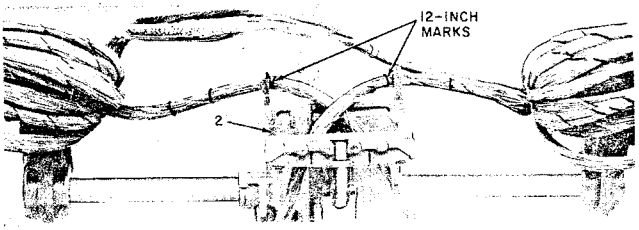
1. Fold the outer layer back over the cable sheath.

2. Wrap a length of scrap wire around each cable at location 4, 12, and 20 inches from the butt of the cable.

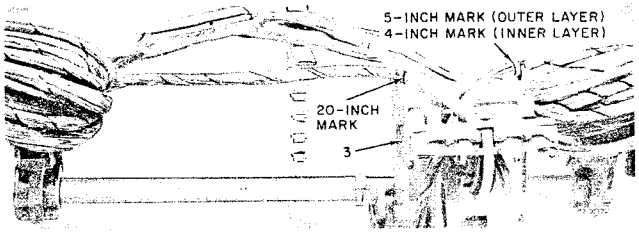
3. Using wire wrap as a guide, mark each unit at the 4-, 12-, and 20-inch location. Remove wire wrap from cable.




POSITION OF TOOL FOR SPLICING LEFT BANK




POSITION OF TOOL FOR SPLICING CENTER BANK




POSITION OF TOOL FOR SPLICING RIGHT BANK

**Step 134—Positions of Tool for Splicing (Three Banks)**

1. Set up tool and position so that marks on cables are on inside of each end post as outlined in Step 130. Remove the unit binders and tie off primary unit binders at the mark near the end post, then splice the units starting at the lower rear unit and working toward the front as outlined in Part 4, keeping the mark on each unit next to the end post at all times.

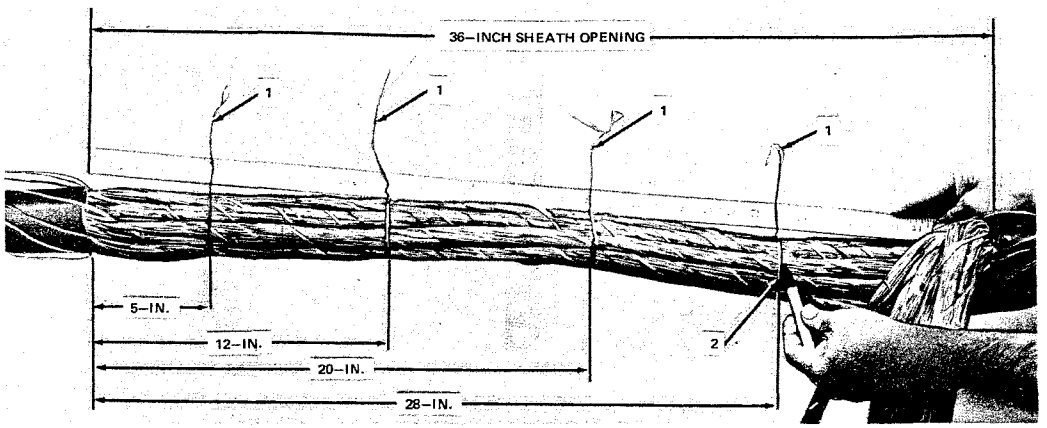
2. After multiunit has been spliced, move the tool to splice the center bank of connectors and repeat 1 above.

3. After multiunit has been spliced in the center bank, move the tool to splice the outer bank and repeat 1 above.

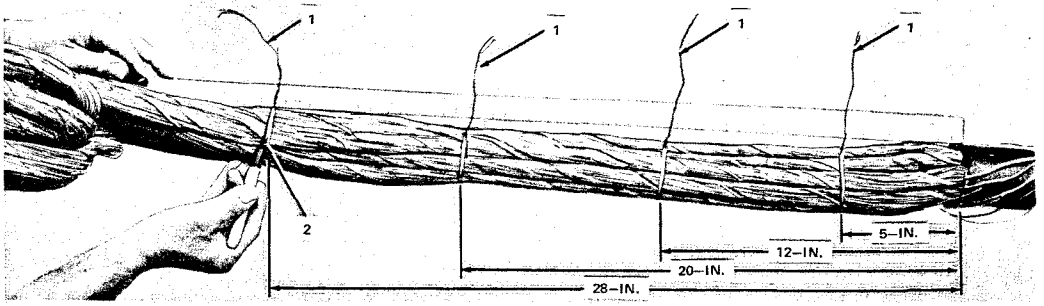
4. Repeat 1, 2, and 3 above until all units are spliced, then wrap splice and enclose as outlined in Steps 124, 125, 126, and 127.

### D. Four-Bank In-Line Splice—Cable Layout

**6.17** Steps 135 through 137 illustrate marking outer and inner layer of cables and positioning tool for making a four-bank in-line splice.




MARKING LEFT HAND CABLE



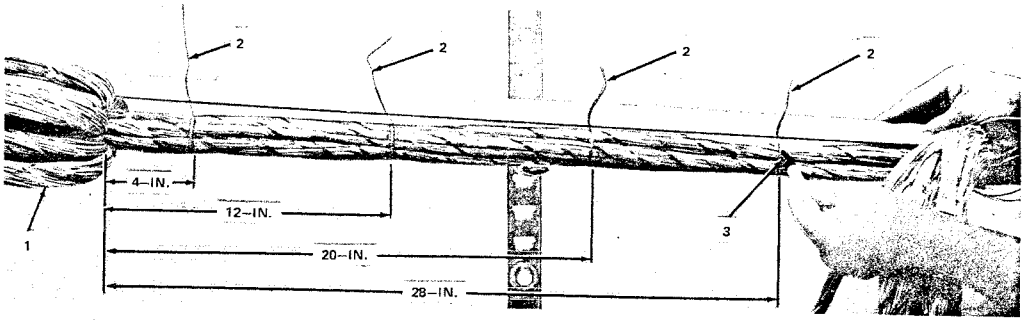

MARKING RIGHT HAND CABLE

#### Step 135—Marking OUTER Layer for Four-Bank In-Line Splice

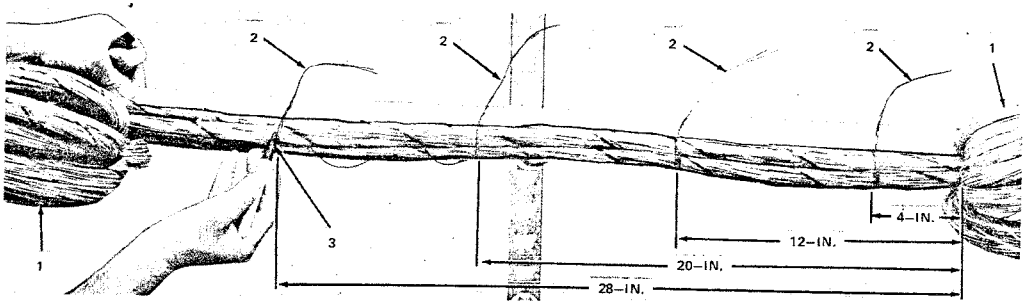
1. Wrap a length of scrap wire around each cable, a location 5, 12, 20, and 28 inches from the butt of the cable.

2. Using the wire wrap as a guide, mark each unit in the outer layer at the 5, 12, 20, and 28 inch location. Remove wire wrap from cable.

   ***Note:*** On waterproof cable, wire ties may be used to mark cable.




MARKING LEFT HAND CABLE



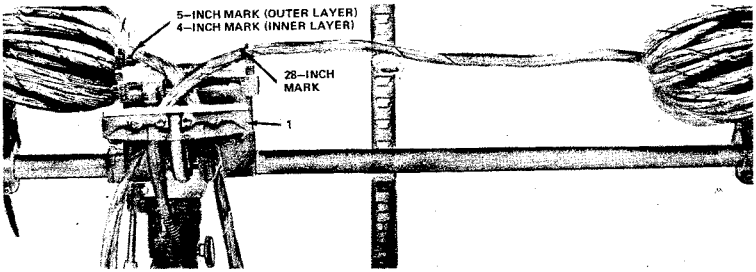

MARKING RIGHT HAND CABLE

**Step 136—Marking INNER Layer(s) for Four-Bank In-Line Splice**

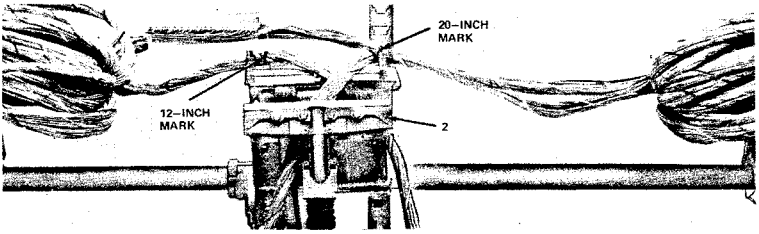
1. Fold the outer layer back over the cable sheath.

2. Wrap a length of scrap wire around each cable at location 4, 12, 20 and 28 inches from the butt of the cable.

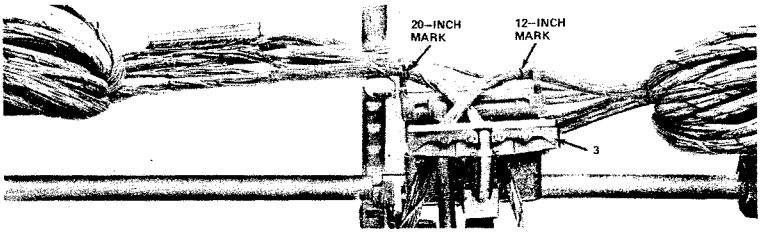
3. Using wire wrap as a guide, mark each unit at the 4-, 12-, 20-, and 28-inch location. Remove wire wrap from cable.



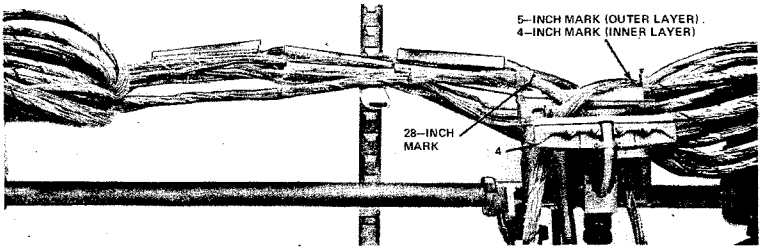

POSITION OF TOOL FOR SPLICING LEFT BANK




POSITION OF TOOL FOR SPLICING LEFT CENTER BANK




POSITION OF TOOL FOR SPLICING RIGHT CENTER BANK




POSITION OF TOOL FOR SPLICING RIGHT BANK

**Step 137—Positions of Tool for Splicing (Four Bank)**

1. Set up tool and position so that marks on cable are on inside of each end post as outlined in Step 130. Remove the unit binders and tie off primary unit binders at the mark near the end post, then splice the units starting at the lower rear unit and working toward the front as outlined in Part 4, keeping the mark on each unit next to the end post at all times.

**Step 137—Positions of Tool for Splicing (Four Bank) (Contd)**

2. After multiunit has been spliced, move the tool to splice the left center bank of connectors and repeat 1 above.

3. After multiunit has been spliced in the left center bank, move the tool to splice the right center bank of connector and repeat 1 above.

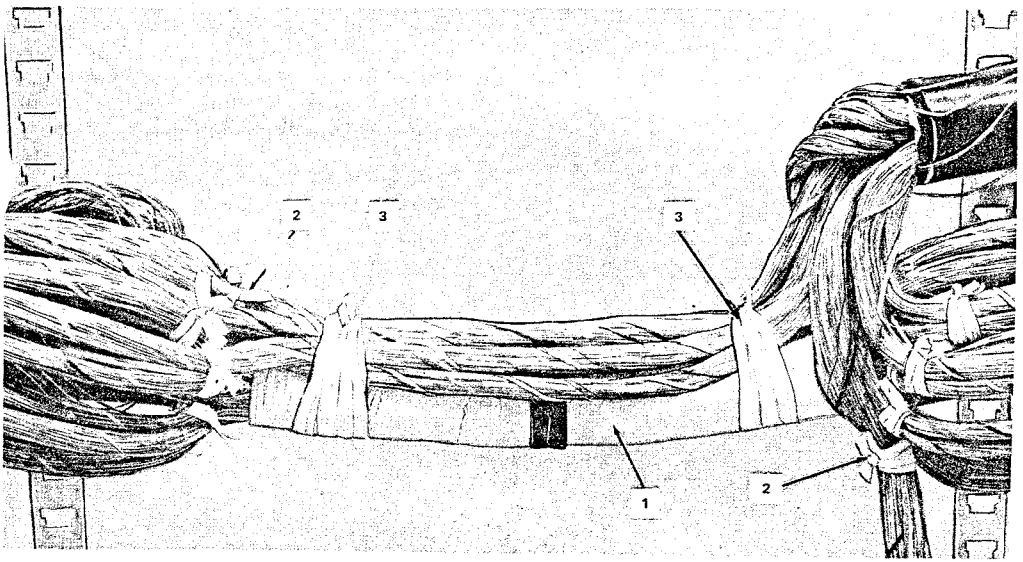
4. After multiunit has been spliced in the right center bank, move the tool to splice the right bank of connection and repeat 1 above.

5. Repeat 1, 2, 3, and 4 above until all units are spliced, then wrap splice and enclose as outlined in Steps 124, 125, 126, and 127.

## STRAIGHT SPLICE WITH MULTIPLE

### A. Foldback Splice With Branch Cable

**6.18** Prepare the cable sheath and bond in accordance with type of closure to be used.




**Step 138—Cable Prepared for Straight With Multiple Using Foldback Method**

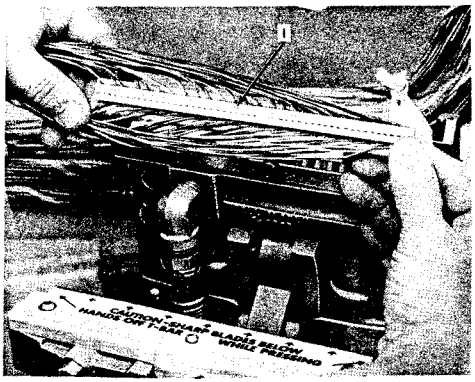
1. Prepare the core of the splice for the through cable as outlined in paragraphs 6.02 through 6.09.

2. Tie the branch cable unit to the matching unit of the through cable.

   *Note:* When splicing a PIC branch cable stub to a pulp cable, the pulp cable pairs must be identified.

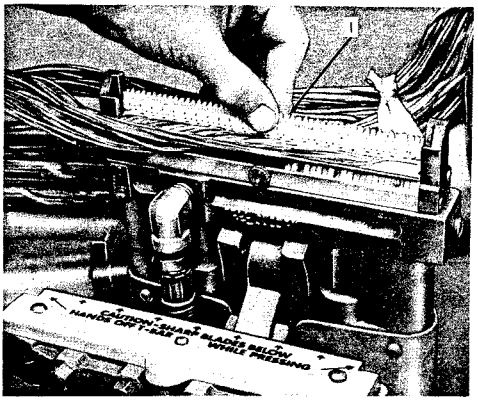
3. Tie the branch cable unit to the prepared core of the through cable

**6.19** Set up the splicing tools and splice the through cable pairs as outlined in Part 4. Bridge the branch cable to the through cable as outlined in Steps 139 through 142.



**Step 139—Through-Cable Splice Removed From Splicing Tool**

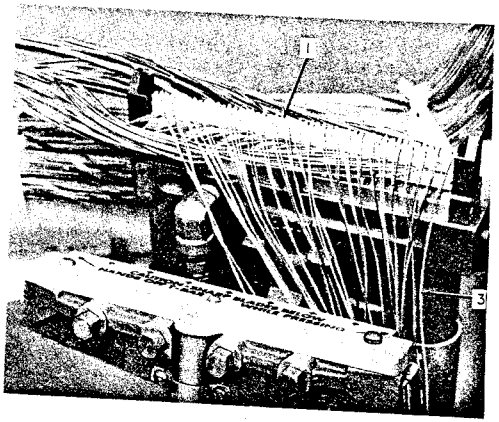
1. Remove through-cable module from splicing tool and rotate the assembled connector so the bridge slots are facing upward.



**Step 140—Inserting Bridge Module Into Connector Module**

1. ***Clear the wires out of the bridge slot area and with arched wire grips facing T-bar*** insert a bridge module into cutter-presser so the contacts on bridge module enter the bridge slots on the connector.

2. Operate the tool to seat the bridge module into connector module.



**Step 141—25 Pairs From Cable Placed in Bridge Module**

1. Dress 25 pairs from the branch cable unit into the bridge module.

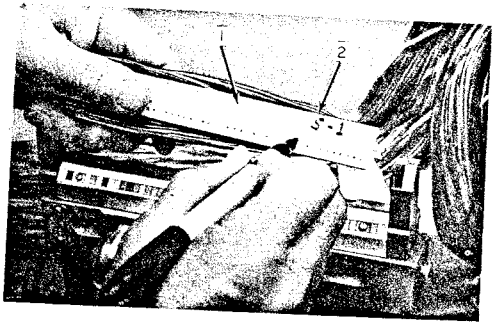
   - When adding a pulp or noncolor-coded PIC branch to pulp through cables, identify units and dress the pairs randomly starting at the side of the cutter-presser nearest the stub unit.

   - When adding a PIC branch to PIC through cables, identify units and select the pairs at random and dress them into the module in their proper color code sequence.

   - If the branch unit is PIC and the through cable units are pulp, before dressing the branch unit, (a) First place B tagging tape on connector and identify the pulp pairs. The PIC pairs are then dressed into the bridge module ***not*** in color code sequence...but according to the numbers called for on the tagging tape. Place the numbered tagging tape over the color coded strip or on connector cap. (b) Identify the pulp pairs and place in tag board, then splice in numerical sequence.

2. Using error-tector as shown in Step 3, check the placed conductors.

3. Gently dress conductors to side of T-bar, then position T-bar over bridge module and cut conductors. With T-bar in down position, test pairs using 152A test set as outlined in Part 5.



**Step 142—Completed Straight with Multiple**

1. Place and seat cap on bridge module.

2. Remove completed bridge from splicing tool. Identify unit number. If tagging tape was placed on tool, remove and place on connector.

3. Repeat Steps 139, 140, 141, and 1 and 2 above until all units have been bridged.

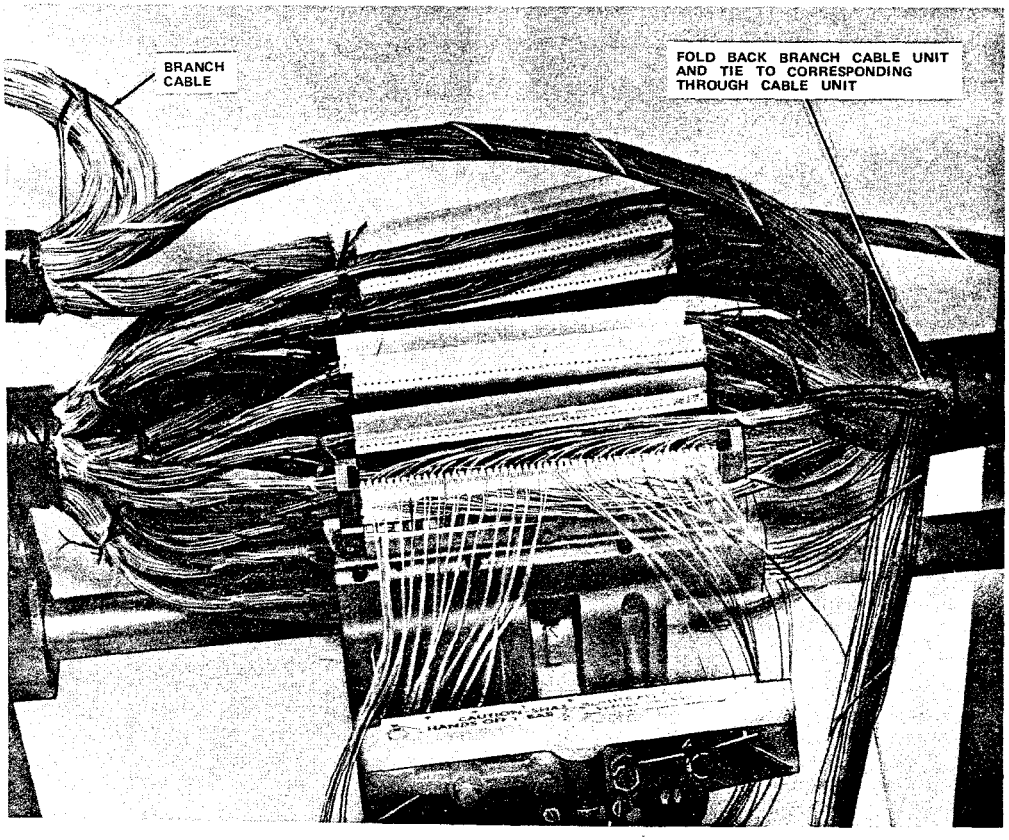
4. Fold the units into the core and tie them in place.

5. Wrap splice as outlined in Section 632-490-200.

6. Install closure using method prescribed for closure being used.

**B. In-Line Splice With Branch Cable**

**6.20** Follow the same procedures outlined in paragraphs 6.10 through 6.14 and 6.15 except the stub cable is folded back and tied off to the corresponding through-cable unit (Step 143).




**Step 143—Setup for In-Line Splice With Branch Cable**

**C. Addition of Branch Cable to New or Existing Splice (Pretermination Method)**

*Note:* Recommended when through cable is spliced using in-line method.

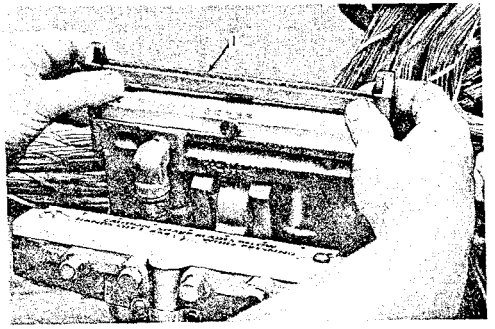
**6.21** Open the cable sheath or splice and if the main cable is pulp and the branch cable is colored coded, identify the pairs of the through cable that will be involved in the splice on B tagging tape.

**6.22** Set up a splicing tool (cutter-presser) as outlined in Part 4 to perform Steps 144, 145, 146, and 147.

> ***Note:*** The splicing tool will be used only for preterminating bridge modules on the units of stub cable. The bridge module will be seated in the through connector by hand. This eliminates rearranging existing splice to obtain enough slack for use of splicing tool. For the existing splices, the tool must be set up so that bridge module when inserted into connector module matches Tip-Ring and pair orientation.

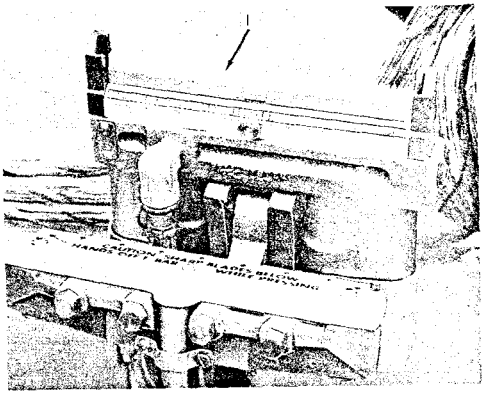
**6.23** Tie off the branch cable unit into a foldback configuration. Position the cutter-presser so that the unit length will fold back to first bank of connector module. This will allow preterminated bridge module to be inserted into the splice connector.

**6.24** Install E module support into the cutter-presser and secure underneath L spring to protect the contacts on the bridge module while the wires are being dressed and seated as outlined in Steps 144, 145, 146, and 147. If cutter-presser is not used, proceed to Step 149.



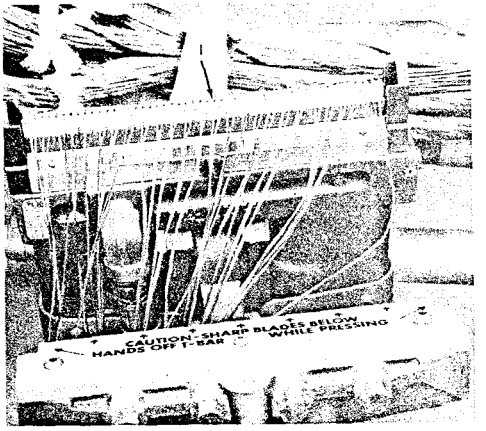
**Step 144—Installing E Module Support Into Cutter-Presser**

1. Insert E module support into the splicing tool with the word "FRONT" facing T-bar.



**Step 145—Insert Bridge Module Into E Module Support**

1. Insert bridge module into module support. Be sure bridge module is seated by hand into module support. It is not necessary to seat with cutter-presser.




**Step 146—Dress Conductors Into Bridge Module**

1. Dress 25 pairs of the branch unit into the bridge module.

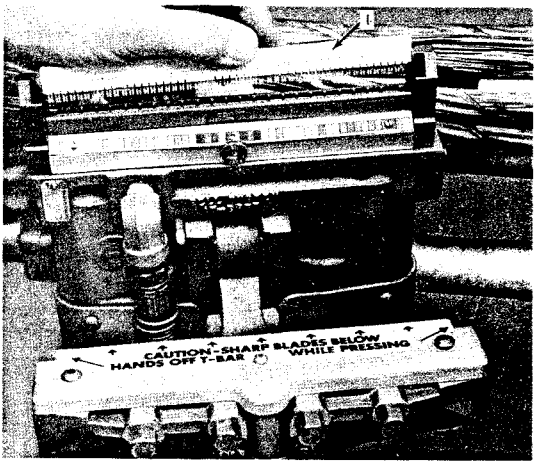
   - When adding a pulp or noncolor-coded PIC branch to pulp through cables, identify units and dress the pairs randomly starting at the side of the cutter-presser nearest the branch unit.

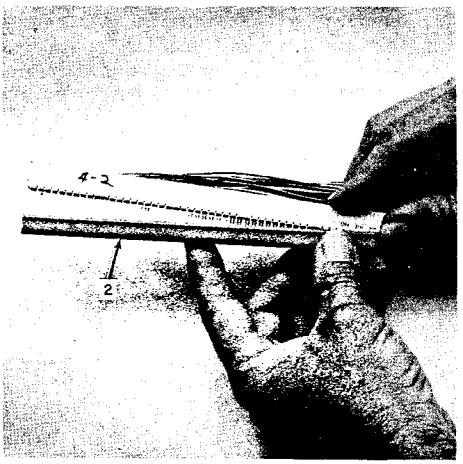
**Step 146—Dress Conductors Into Bridge Module (Contd)**

- When adding a PIC branch to PIC through cables, identify units and select the pairs at random and dress them into the module in their proper color code sequence.

- If the branch unit is PIC and the through cable units are pulp, before dressing the branch unit, you must first identify the pulp pairs on tagging tape. The PIC pairs are then dressed into the bridge module ***not*** in color code sequence, but according to the numbers called for on the tagging tape. Place the numbered tagging tape over the color code strip or on the connector module.

2. Use error-tector to check for placement errors as shown in Step 3. Then seat and cut the conductors.



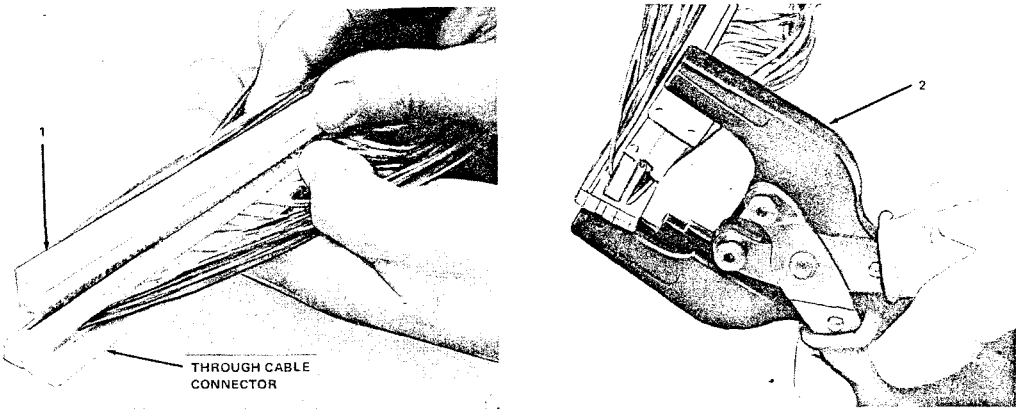




**Step 147—Preterminated Stub Cable Unit**

1. Place and seat a cap on the bridge module, then remove preterminated branch cable unit from cutter-presser.

2. When preterminating all units of stub cable prior to insertion of bridge module into splicing connector, protect the bridge module contacts with a male contact cover.

3. Repeat Steps 144 through 147 for all remaining units in the branch cable.




**Step 148—Inserting Bridge Module Into Through-Cable Connector**

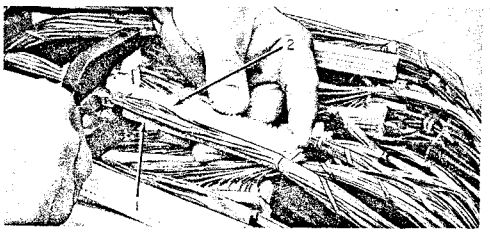
1. Clear the through cable pairs from bridge area of the through cable splice connector. Carefully insert the bridge module into designated through-cable connector. ***The latches of the connector cap should face the cap of the through-cable connector. This should assure that date stamp on connector module and bridge module are on same end. Do not force the bridge module into through-cable connector. If resistance is felt, remove the module and check the contacts. If contacts are bent or broken, replace module.***

2. With the D insertion-cutting tool or L connector presser, seat the bridge module, working across the module from one end to the other, pressing in about six places.

3. Repeat Steps 144, 145, 146, 147, and 148 for each branch cable unit.

**D. Addition of Branch Cable to Existing Splice (Hand Tool Method)**

**6.25** Steps 149 through 151 illustrate the procedure for adding a branch cable to an existing splice using D insertion-cutting tool.

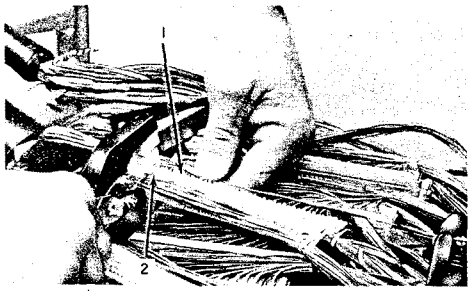



**Step 149—Branch Splice Using D Inserting-Cutting Tool**

**Step 149—Branch Splice Using D Insertion-Cutting Tool**

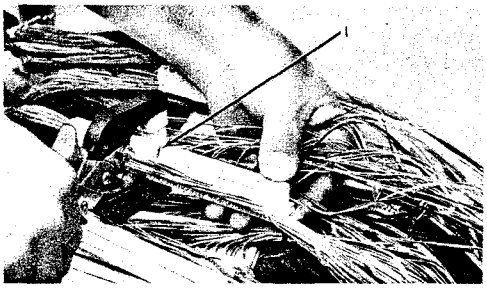
1. Open splice and if the main cable is pulp and the branch cable is color coded, identify the pairs of the through cable that will be involved in the splice on B tagging tape.

2. Using D insertion-cutting tool, seat the bridge module in the through-cable connector. Keep the tool perpendicular to the connector and ***bring the peaked projection of the module up to the tool cutting head and press in about 5 or 6 places.***




**Step 150—Dressing Branch Cable Pairs Into Bridge Module**

1. Dress the branch pairs into bridge module.
2. Seat and cut the conductors with the D insertion-cutting tool.




**Step 151—Placing Cap on Bridge Module**

1. Place and seat a cap on the bridge module using the D insertion-cutting tool.

**CREATING JUNCTION SPLICE**

*Note:* Junction splices must be identified on Engineering Work Print.

**6.26** The block diagram in Fig. 45 illustrates location for installing splice connector on central office (CO) side of cable using the dimensions in the appropriate steps as outlined in Part 6 (Steps 128 through 136).

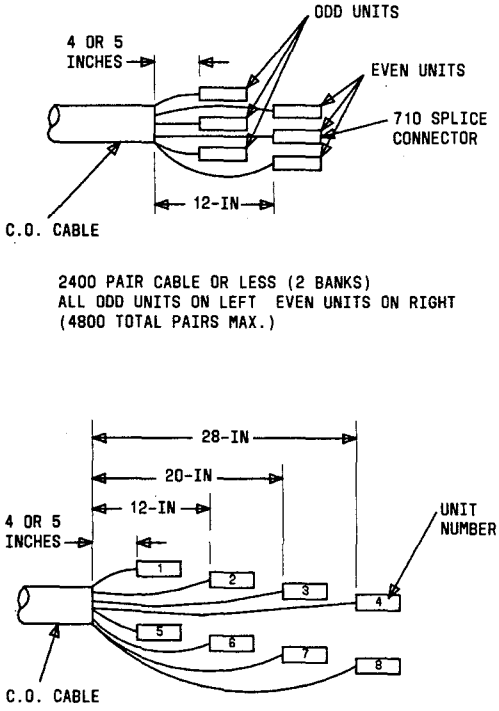
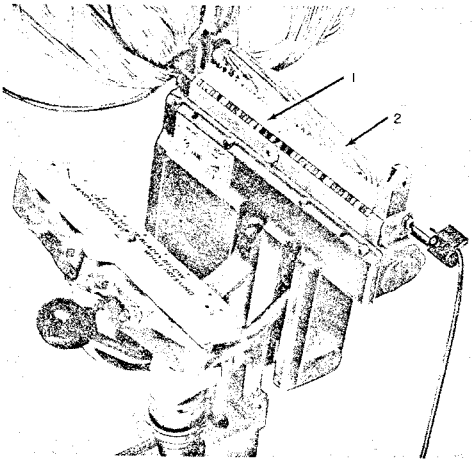


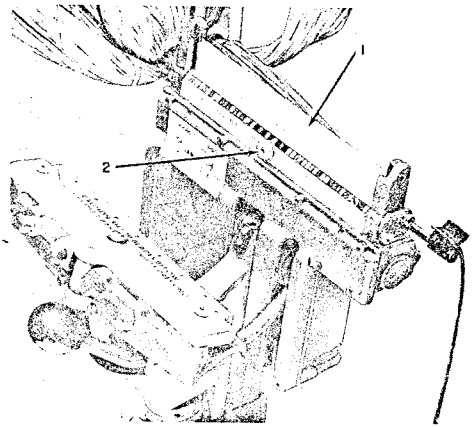

**Fig. 45—Block Diagram for Installing Splice Connector on CO Cable**

**6.27** Step 152 and 153 illustrate the procedure for installation of splice connector on CO side of cable at junction splice.




**Step 152—Conductor Placed Into Index Strip**

1. Place index strip in head of tool.
2. Place conductors in index strip and cut as outlined in Part 4.

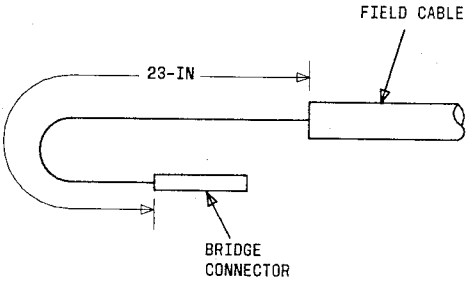



**Step 153—Completed Splice Connectors**

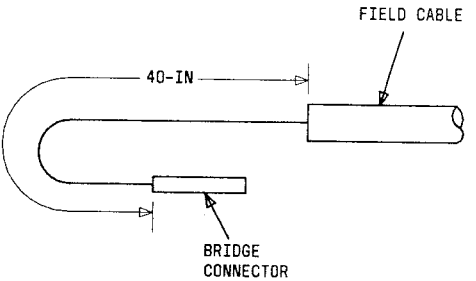
**Step 153—Completed Splice Connector**

1. Seat connector module on index strip, then place and seat cap on connector module as outlined in Part 4.
2. Push button and remove completed splice connector from tool.

**6.28** The block diagram in Fig. 46 illustrates location for installing unilength foldback bridge connector on field side of cable for connection to CO cable.



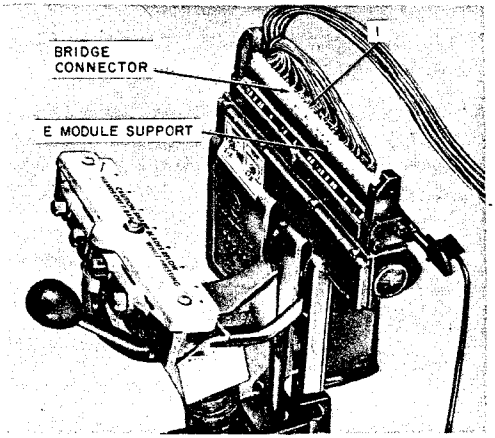

FOR 2-BANK SPLICE




FOR 4-BANK SPLICE

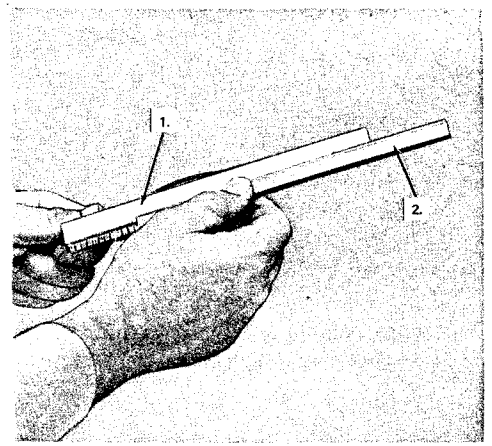
**Fig. 46—Block Diagram Showing Location of Bridge Connector on Field Cable**

**6.29** Steps 154 and 155 illustrate the procedures for installation of bridge connector on field side.




**Step 154—Conductor Placed in Bridge Connector**

1. Set binder group in foldback configuraton.
2. Place E module support and bridge connector in tool as outlined in Steps 144 and 145, then dress conductors into bridge connector and cut as outlined in Step 146.




**Step 155—Completed Male Module**

**Step 155—Completed Male Module**

1. Remove completed bridge connector from tool.
2. Place a 710 male contact cover over each module to protect contacts until mating of bridge/splice connectors.

**6.30** Using D insertion-cutting tool or L connector presser, connect the bridge/splice connectors at the junction splice as outlined in Step 148. A block diagram showing routing of unilength preterminated bridge modules to splice module is shown in Fig. 47.

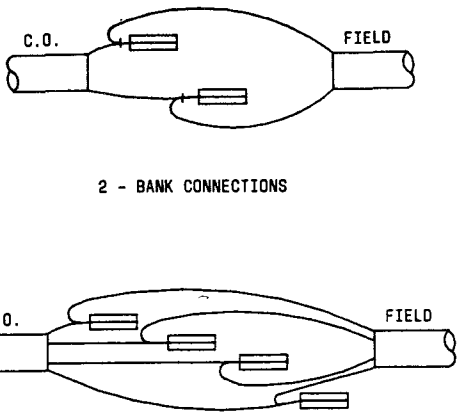



**Fig. 47—Routing Unilength Bridge Connector to Splice Connector**

## CREATING FACILITY SPLICE (RICS)

**6.31** The facility splice (Fig. 48) is constructed similarly to the junction splice with in-line splicing connectors on the CO side, and unilength foldback with bridge connector on the field side. ***When a noncolor-coded PIC 12-type stub enters the facility splice, the unit count must be determined, and the pairs placed into the index strip in numerical sequence (1-25; 26-50; 101-125; etc).***

**6.32** A 10- or 12-type PIC stub cable is intended to be used between a multiple straight splice and a facility splice. The 12-type stub is a dual sheath stub treated as a single sheath cable.

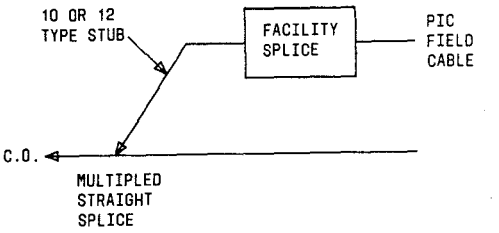



**Fig. 48—Block Diagram Showing Facility Splice**

## LOADING AND UNLOADING USING SHUNT

**6.33** Block diagram for loading and unloading procedures are illustrated in Fig. 49.

**6.34** Prepare cables and set up splicing tool.

**6.35** Procedures for loading and unloading as shown in block diagram in Fig. 49 are outlined in Steps 156 through 161. In order to load a cable using two connectors to take advantage of the "SHUNT" method of unloading and to use the 152A test set to the best of its capabilities, the following procedures should be followed:

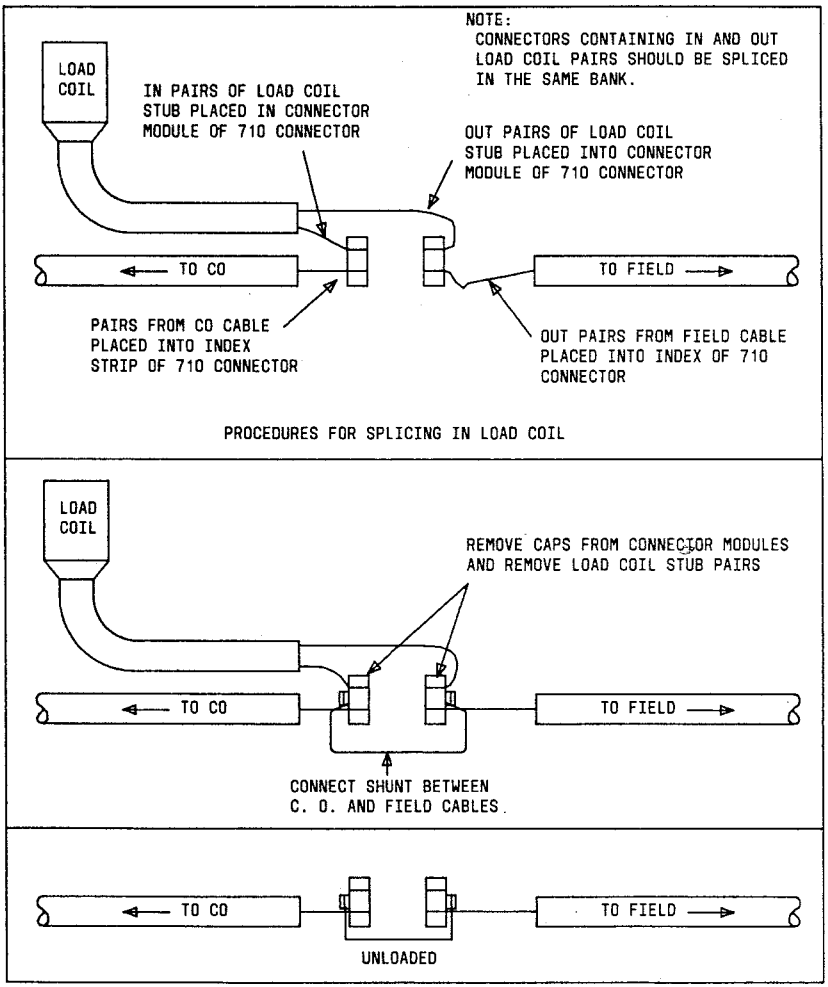
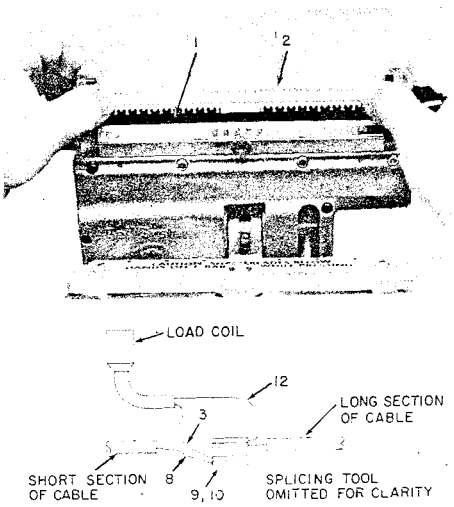



Fig. 49—Loading and Unloading Using Two Connectors and a Shunt




**Step 156—Loading Using Two Connectors**

1. Place F module support in the holder of splicing tool.

2. Place connector module in the F module support.

3. Select the load coil pairs to be spliced to the ***shortest*** section of cable, then place these pairs in the connector module as outlined in Part 4.

4. Check placed conductors with error-tector as outlined in Step 3.

**Step 156—Loading Using Two Connectors (Contd)**

5. Seat and cut the load coil conductors, with the T-bar in down position, operate the 152A test set as covered in Part 5 to test the conductors. Release pressure and pull T-bar back to its original position. ***Do not place cap on connector module at this time.***

6. Remove the connector module and the F module support from splicing tool.

7. Place an index strip in the holder of splicing tool as outlined in Part 4.

8. Place the pairs from the ***shortest*** section of cable into the index strip, then check placed pairs with error-tector as outlined in Step 3. Seat and cut the conductors.

9. Place the connector module containing the load coil pairs on the index strip and seat with T-bar. While T-bar is in down position, operate the 152A test set as covered in Part 5 to test the conductors. Release pressure and pull T-bar back to its original position.

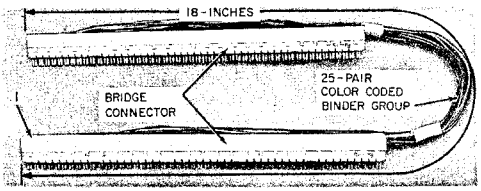
10. Place cap on connector module, and seat with T-bar as outlind in Part 4.

11. Repeat 1 through 10 until all load coil pairs and ***short*** section of cable pairs have been spliced.

12. Repeat 1 through 10 for the other load coil pair and the ***long*** section of cable. Remember load coil pairs are placed in the connector module and cable pairs are placed in index strips.

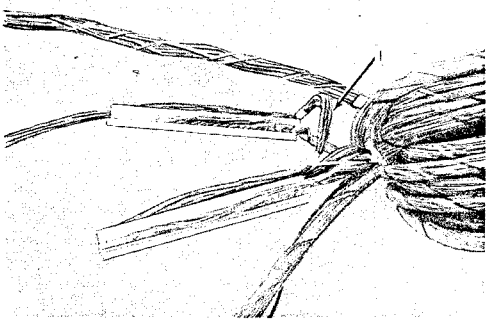
## UNLOADING USING SHUNT

**6.36** Preparation of shunt should be prepared when unloading a 25-pair complement. When unloading less than 25-pair complement, select the modules containing the pairs to be unloaded and install bridge connector and shunt conductors in these modules as outlined in Steps 149, 150, and 151, except the branch pairs are shunt pairs.




**Step 157—Preparation of Shunt**

1. Using two bridge connectors and length of a 25-pair PIC cable, prepare a shunt using foldback configuration.

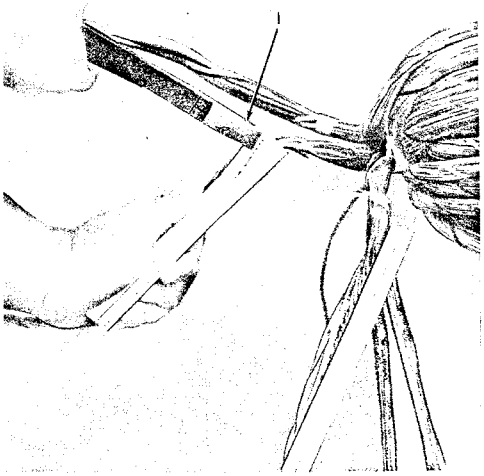


**Step 158—Installed Shunt**

1. Install shunt between the CO cable and the field cable and seat with D insertion-cutting tool or L connector presser.

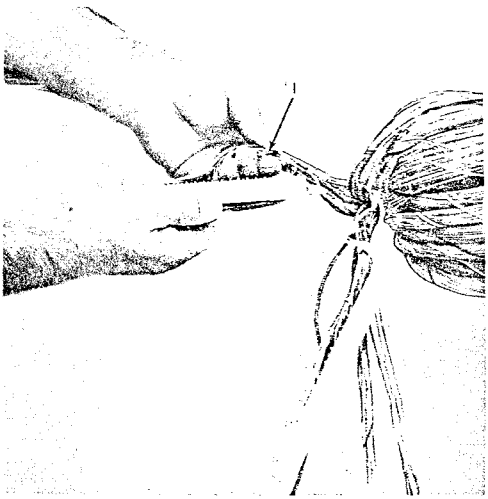
2. Once the shunt is installed, it is not necessary to remove load coil pairs.

**6.37** Procedures for removing ***IN*** and ***OUT*** load coil stub pairs are outlined in Steps 159 through 160. This procedure is only required when removing ***all*** of load coil.



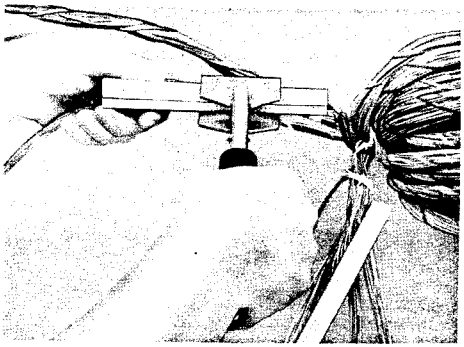
**Step 159—Removing Cap From Connector Module**

1. Using lineman's pliers, remove caps from connector modules containing IN and OUT groups from load coil stub.



**Step 160—Removing Load Coil Conductors From Connector Module**

1. Pull load coil conductors from connector module.



**Step 161—Install New Cap on Connector Module**

1. Install new cap on connector module and seat using L connector presser.

**LOADING AND UNLOADING USING PLUG/UNPLUG METHOD**

**6.38** The method of loading and unloading as illustrated by block diagram in Fig. 50 uses two splicing connectors and two bridge connectors. Bridge splices are used both on the CO and field side of the cable. This method facilitates unloading by unplugging the load coil module and replugging the field module into the office cable module. However, the disadvantages of this method are:

(1) By using extra bridge connector, the splice is larger.

(2) The line is temporarily out of service when unloading.

*Note:* A temporary shunt for working pairs can be constructed from top of connector module to top of connector module.

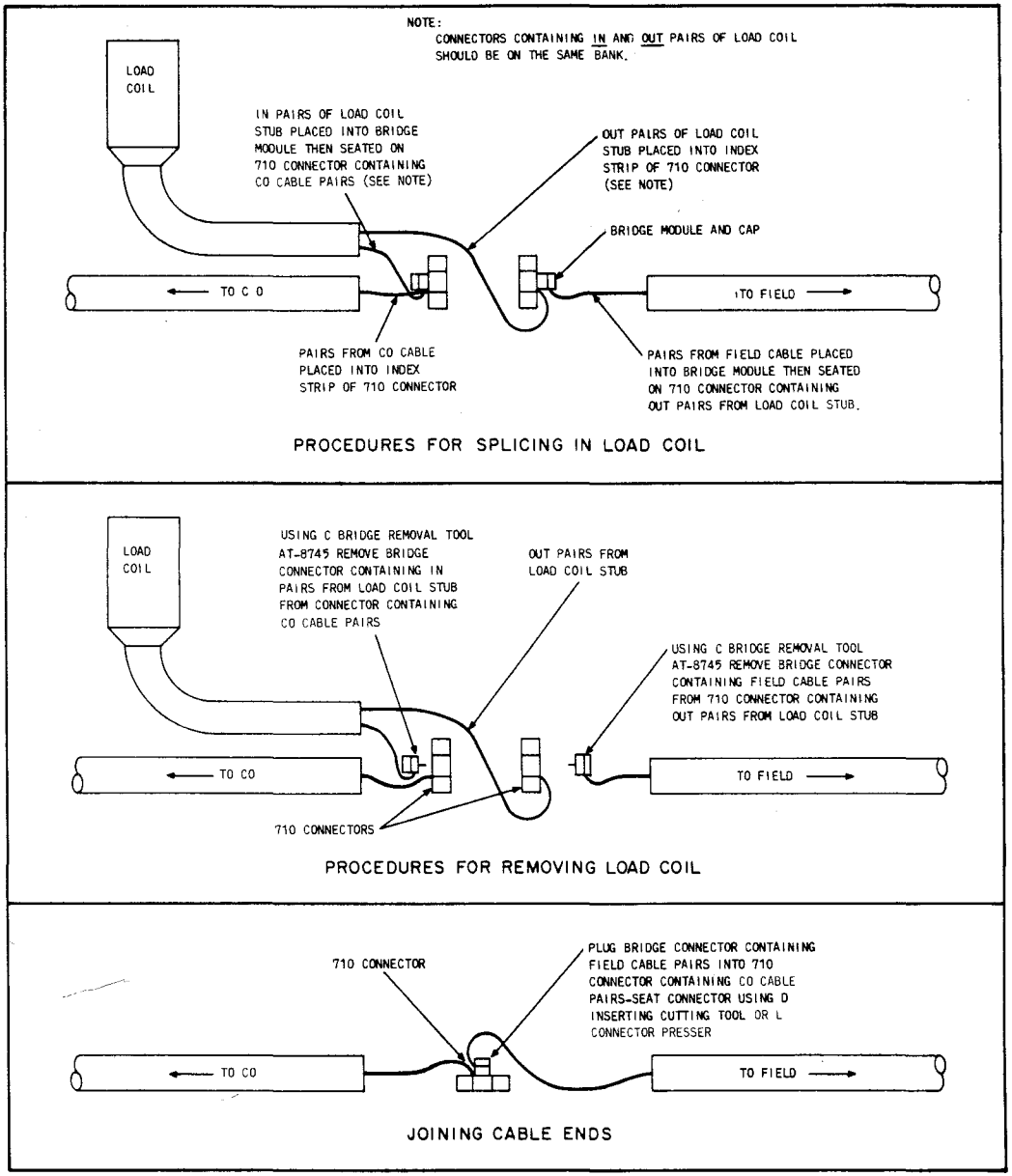
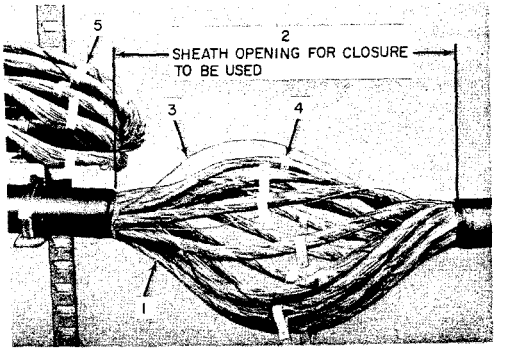



**Fig. 50—Loading and Unloading Using Two Splice Connectors and Two Bridge Connectors**

## HALF-TAPPING UNIT OR MULTIUNIT CABLE FOR CUTOVER

**6.39** Prepare cable sheath and half-tap stub cable as outlined in Steps 162 through 168.




**Step 162—Cable Prepared for Half-Tap Splicing of Unit of Multiunit Cable**

1. Remove cable sheath in accordance with type of closure to be used and remove additional sheath for slack required.

   ***Note:*** Slack developed in the through-cable unit or multiunit should be enough to permit dressing through-cable group into the cutter-presser. Guidelines for slack are:

   Cables less than 900 pairs—5 inches

   900 to 1800 pairs—5 to 7 inches

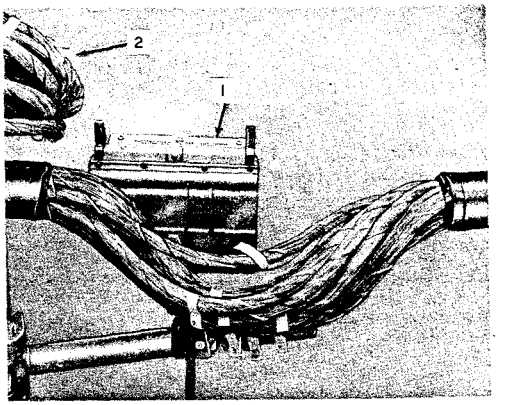
   More than 1800 pairs—7 to 9 inches

2. Pull in slack until sheath opening is for closure to be used.

3. Install temporary bond to maintain sheath continuity across sheath opening.

4. Identify and tag all cable units; attach tag loosely so that it may be easily repositioned later.

5. Prepare stub cable to be bridge. ***The far end of cable has to be cleared.***

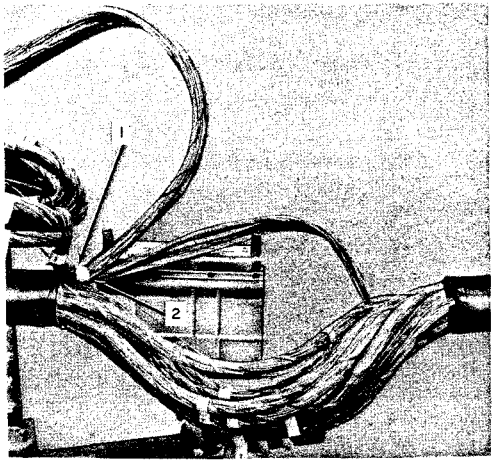



**Step 163—Splicing Tool Installed in Rear of Sheath Opening for Half-Tap Splicing**

1. Install splicing tool at the back of cable sheath opening on the stub cable side as outlined in Part 4.

   ***Note:*** It may be necessary to install longer cable hooks so that cable can be moved forward to provide space for mounting tool in back of cable. Once a fourth of the modules are completed on the stub side, move the tool to the other side for a fourth of the splice, then progress to the front of the cable on the stub side and then to the other side.

2. Identify cable units for half-tapping.

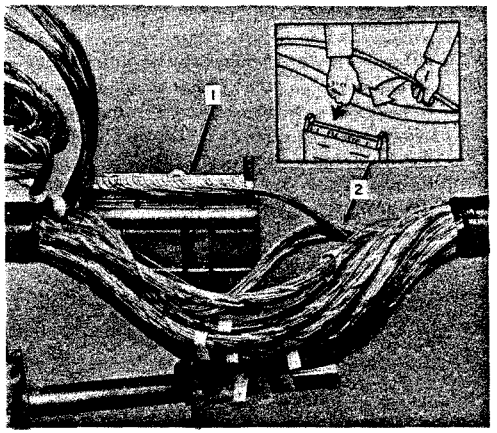


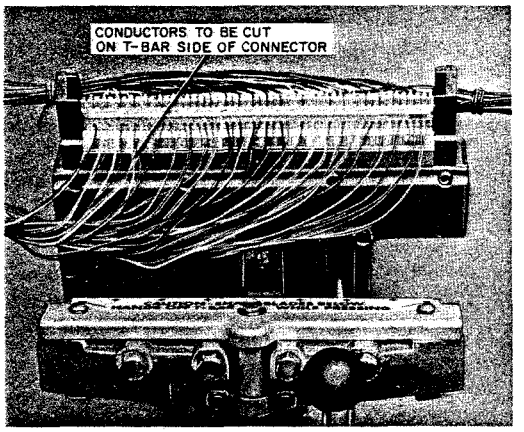

**Step 164—Tying Stub Cable Unit to Through-Cable Unit**

1. Select the topmost multiunit of through cable nearest the splicing tool, and push the rest of the multiunits out of the working area.

2. Match the stub cable multiunit with the through-cable multiunit and tie loosely together.

**Step 164—Tying Stub Cable Unit to Through-Cable Unit**




**Step 165—Through-Cable Unit Placed Into Index Strip**

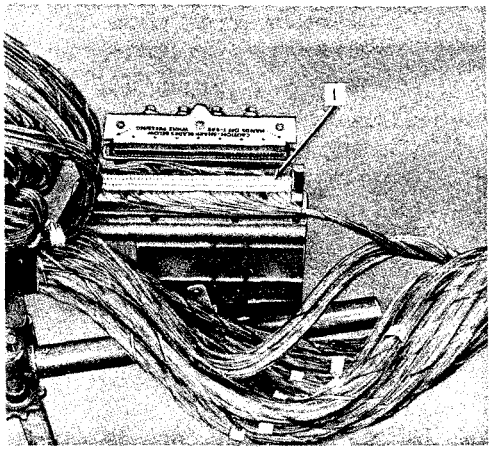
1. Place index strip in splicing tool ***with arched wire grips facing the T-bar.***

2. Select the first 25 pairs from the rear of the group (25 pairs away from cutter-presser). Push the remaining pairs down next to the tool and pull the 25 pairs to be spliced over the top of the remaining pairs and place into index strip. ***Tip conductor*** to the left and ring conductor to the right ***as viewed from the T-bar.*** Check conductor placement with error-tector (Step 3).

**Step 165—Through-Cable Unit Placed Into Index Strip (Contd)**

***WARNING: Do not seat and cut conductors.***

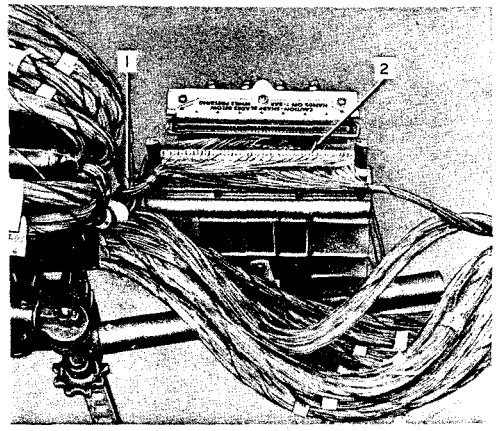
***Note:*** Once the stub cable is added, one side of the through cable will be cut out. The cable to be cut out must be on the arched wire grip side of the connector. When assembled, this side of the connector is flat and lends itself to easy cutting. The back side of the connector has the bridge rails and does not lend itself to easy cutting.




**Step 166—Placing Half-Tap Module**

1. Place half-tap connector module on index strip with arched wire grips facing T-bar, then seat the half-tap connector module with T-bar.

   ***Note:*** If using D insertion-cutting tool for half-tapping operation, ***25 presses are required*** to seat half-tap module on index strip prior to adding the conductors to top of module.



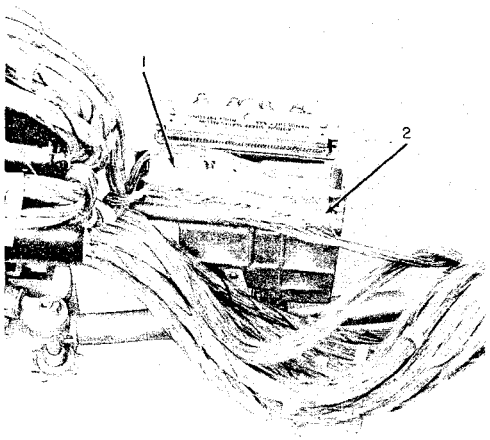

**Step 167—Selecting 25 Pair From Rear of Stub Cable Multiunit**

1. Select 25 pairs from rear of the multiunit of stub cable and bring them under the rest of the pairs. This will allow a clear working area.

2. Dress the 25 pairs from the stub cable into the top of the connector module, tip to left and ring to right ***as viewed from T-bar.*** Remember the pairs will be cut off on T-bar side.

3. Check placed conductor with error-tector (Step 3).

4. Seat and cut the conductors.




**Step 168—Completed Half-Tap**

1. Place a cap over the connector module and seat with splicing tool.

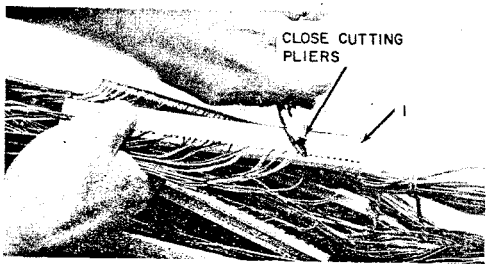
2. Remove the half-tap from splicing tool.

3. Mark the unit number on module.

4. Repeat Steps 165 through 168 until all pairs of the multiunit have been half-tapped, keeping in mind which side of the through-cable will be cut out.

5. Repeat Steps 164 through 168, ("4") above. When one-fourth of the modules are completed with stub side position, move the tool to the side opposite the stub and complete another one-fourth of the modules. Then reposition the tool in the front of the cables and complete one-fourth of the modules on the stub side and one-fourth of the modules on the side opposite the stub.

**6.40** Cut out the side of the cable that is no longer used as outlined in Steps 169 and 170.




USING CLOSE CUTTING PLIERS

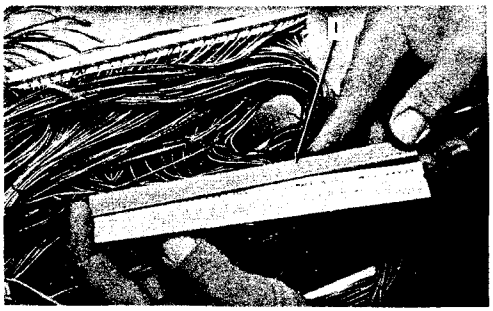

USING 840A TOOL

**Step 169—Cutting Conductors From Through-Cable That Are No Longer Needed**

1. Using close-cutting pliers or 840A tool, start at one end of the connector and cut conductors from the front side of half-tap module. With close cutting pliers, cut ***one*** conductor at a time being sure never to touch two conductors together with pliers. This would interrupt service.

   ***Note:*** If you are left handed, cut from right to left; if right handed, cut from left to right to reduce chance of shorting out the conductors.

2. When using 840A tool and cutting 26-gauge conductors, pull the tool opposite the direction of conductor (against the grain).




USING 710BI COVER

**Step 170—Protecting Exposed Conductor Ends**

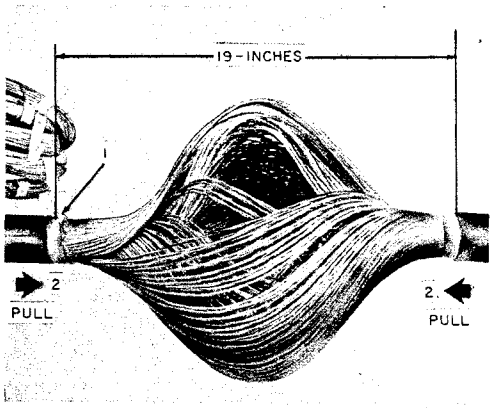
1. Place 710B1 cover on filled modules. This will prevent accidental crosses from occurring when the modules are enclosed in a splice closure. Add B sealant over exposed conductor ends and snap cover on connector.

2. For unfilled modules, place 710B1 cover without adding B sealant.

**HALF-TAPPING LAYERED CABLE FOR CUTOVER**

**6.41** Prepare cable sheath and half-tap layered cable as outlined in Steps 171 through 174.

***Note:*** If using D insertion-cutting tool for half-tapping operation, ***25 presses are required*** to seat half-tap module on index strip prior to adding the conductors into top of module.

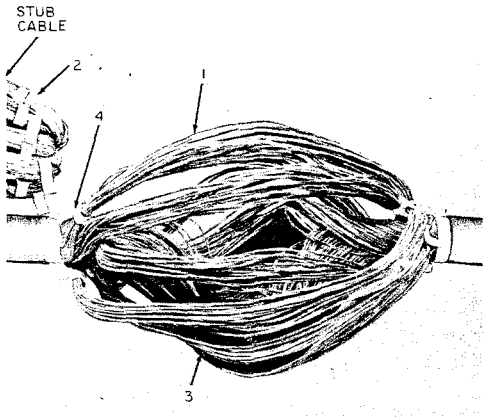


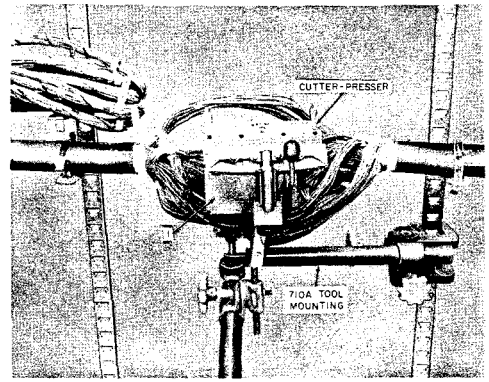

**Step 171—Preparing Layered Cable for Half-Tapping**

1. Remove sheath from cable.

   ***Note:*** In order to obtain enough slack in cable for half-tapping, it will be necessary to remove the standard sheath plus 1 inch for each 100 pairs within cable, eg, a 900-pair cable will require 28 inches of removed sheath (19 inches standard opening plus 1 inch for each 100 pairs = 19 + 9 = 28 inches).

2. Pull in slack until sheath opening is for closure to be used.




**Step 172—Preparing Cables for Splicing**

1. Divide each layer into 25-pair groups toward side of cable that will remain.

2. Divide the highest count unit of the stub cable into 25-pair groups and place approximately the same configuration as the multiunit cable.

3. Pull the twist out of the layered cable being sure to leave buildup on the side that will be cut off.

4. Place a loose tie around 25 pair from the layer.

**Step 173—Installed Splicing Tool**

1. Install splicing tool and half-tap as previously covered in Steps 165 through 168 except center tool in opening for single bank splice. Do half of splice with tool in back and half with tool in front.

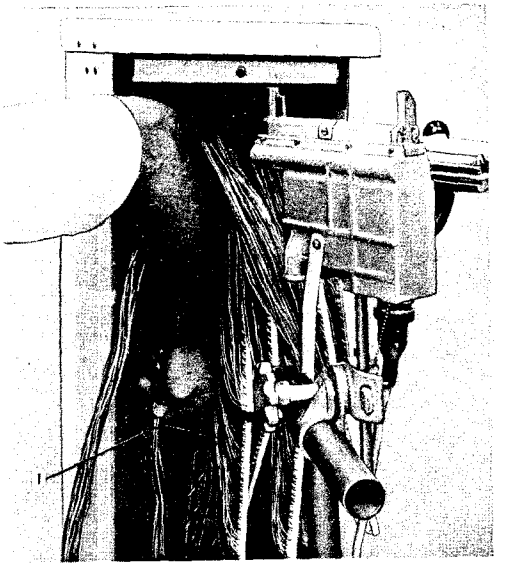
2. Cut conductors that are not needed as outlined in Steps 169 and 170.

**7. SPLICING IN PEDESTALS (BURIED PLANT)**

**7.01** Prepare cable sheath for splicing as outlined in the Bell System Practice covering the pedestal to be used.

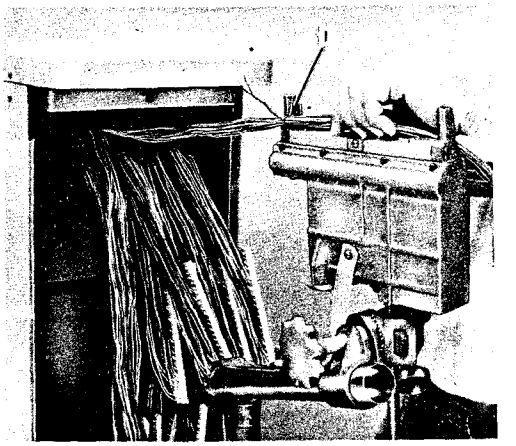
**7.02** Set up splicing tools at pedestal location as shown in Fig. 15.

**7.03** Mark cable unit for first bank of connectors as shown in Step 174.



**Step 174—Marking Cable Unit**

1. Mark binder group with wire marker along the bottom cross member of splicing ladder.

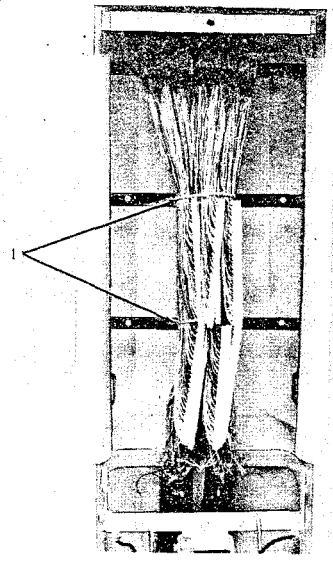


**Step 175—Position Splicing Tool**

1. Position splicing tool so that wire marker lines up with inside edge of end post.

2. Splice groups as outlined in Part 4 covering splicing tool used.

   ***Note:*** If splice requires more than one bank of connectors, mark the second bank similar to the first bank except use the middle cross member of splice support as a guide.




**Step 176—Completed Splice**

1. Secure each bundle to cross member of ladder with cable tie.

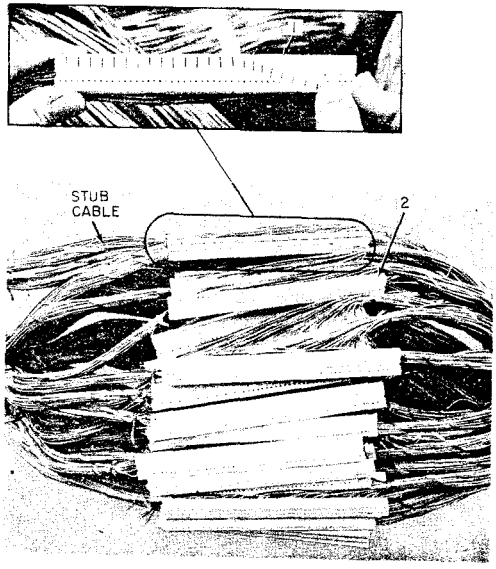
## 8. CABLE TRANSFERS

***Note:*** Follow the procedures as outlined in Section 620-050-020 for cable transfer administration plan.

### A. One Pair at a Time

**8.01** Remove splice closure and unwrap splice.

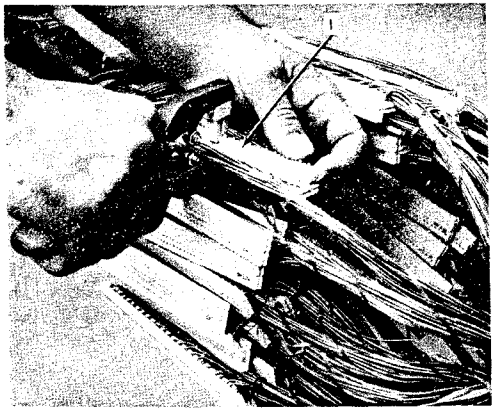
**8.02** Procedures for rearranging a pair at a time are outlined in Steps 177 through 181.




**Step 177—Tagging Units**

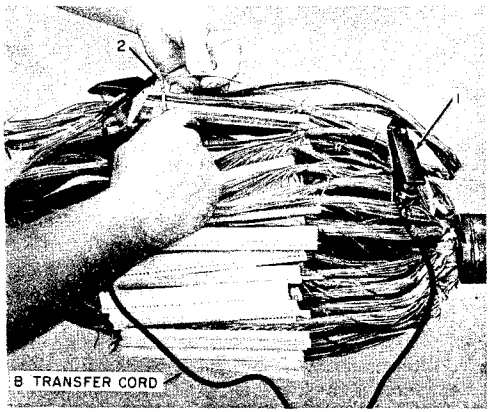
1. Locate connector module containing through-cable pairs to be identified (***to*** count). Attach a piece of B tagging tape to the front of this connector module, then identify the cable pair and record the pair number on the tagging tape.

2. Locate connector containing cable pairs of the stub cable to be identified (***from*** count). Attach a piece of B tagging tape to the front of this connector. Identify the cable pairs and mark the pair number on the tape.



**Step 178—Seating Bridge Module**

1. Insert a bridge module into the through-cable modules containing ***to*** count which transfer is to be made, then using a D insertion-cutting tool, seat the bridge module. ***Keep the D insertion-cutting tool perpendicular to the module. Place cutting head of the tool on peaked projection and press firmly. Make five or six presses along the module to properly seat.***

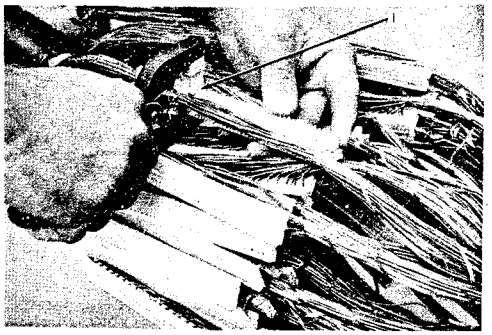



**Step 179—Removing Pair to be Rearranged**

1. Select pair from bridge module containing ***from*** count. Make a temporary bridge using B transfer cord or a cut-close test set, AT-8241.

**Step 179—Removing Pair To Be Rearranged (Contd)**

2. Cut the ***from*** count pair to be transferred from the bridge. Cut pair as close to the bridge module as possible to conserve conductor length.



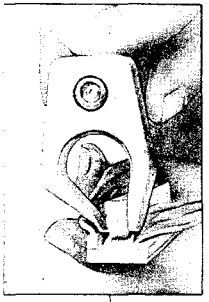
**Step 180—Seating Transferred Pair Into Bridge Module**

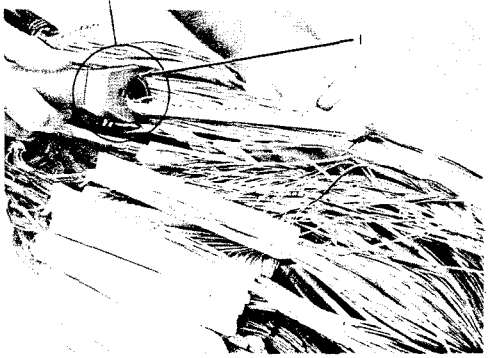
1. Move the stub (***from*** count) to the new bridge and place it in the proper position according to the pair number on the tagging tape, then using D insertion-cutting tool, press and cut the conductor.

2. Remove transfer cord and repair conductor insulation. Repeat Step 179 and Step 180 for each pair to be transferred.

**Step 181—Placing Cap on Module**

1. When all pairs have been transferred, place a cap on the module and seat with D insertion-cutting tool.





**Step 182—Removing Old Bridge**

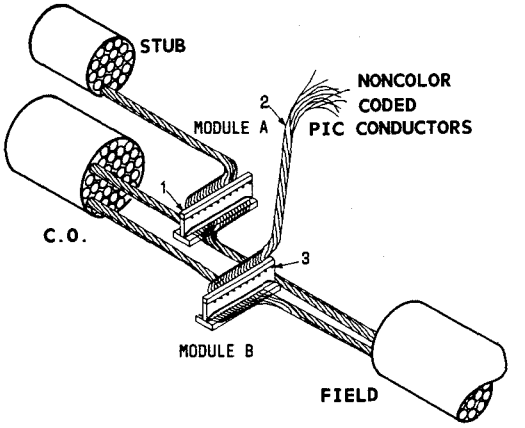
**Step 182—Removing Old Bridge**

1. If all 25 pairs of the ***from*** count have been transferred, remove the old bridge using the C bridge removal tool.

**B. Transferring 25 Pairs at a Time**

**8.03** The procedures for transferring 25 pairs at a time are outlined in Steps 183 through 187.

***Note:*** The 710 connectors illustrated in Steps 183 through 187 are turned 90 degrees rather than parallel for clarity.

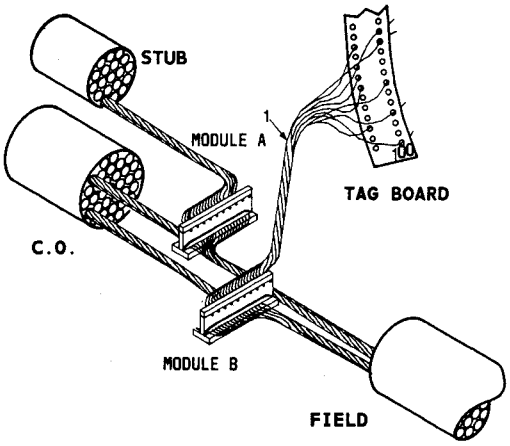



**Step 183—Locating Connector Modules Involved in Transfer**

1. Locate connector modules containing cable pairs (***from*** count, module A) to be transferred and connector module containing cable (***to*** count, module B) pairs to which transfer is to be made.

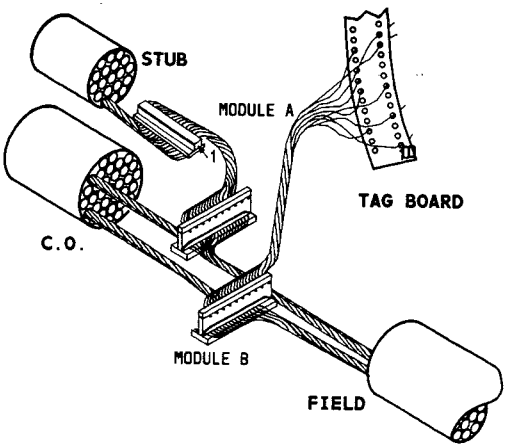
2. Preterminate 25-pair noncolor-coded PIC pairs at least 50 inches long in a bridge module as outlined in Steps 144, 145, 146, and 147.

3. Plug preterminated bridge module into connector module containing ***to*** count (module B).




**Step 184—Noncolor-Coded PIC Pairs Identified and Placed in Tag Board**

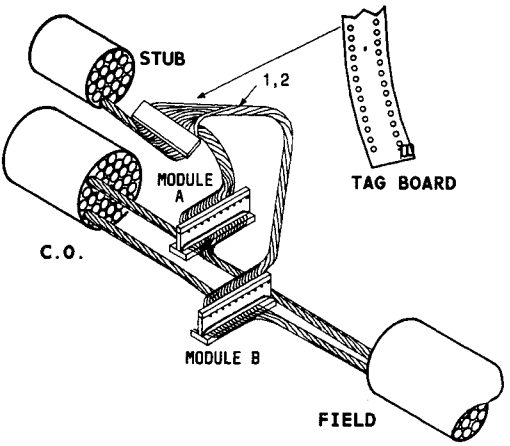
1. Identify the *to* cable pairs and place the unterminated end into a tag board.




**Step 185—Place Half-Tap Module on 25 Pairs of Stub Cable**

1. Place half-tap module on 25 pairs of stub to be transferred as outlined in Step 165 and 166. Identify pulp or noncolor-coded PIC pairs with B tagging tape.

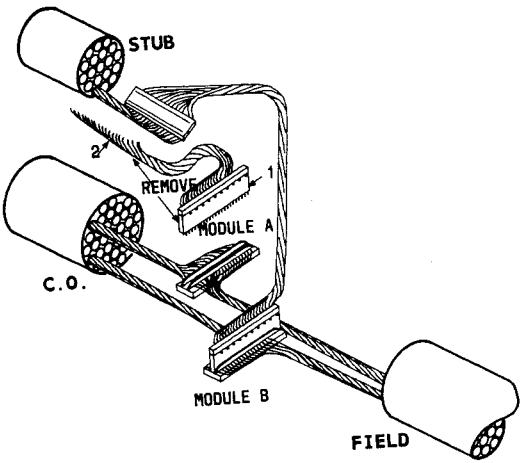
2. Place half-tap module so that banks of module will not overlap when splice is closed.




**Step 186—Placing Pairs From Tag Board Half-Tap Module on Stub Cable.**

1. Place pairs of *to* cable from tag board into half-tap module. Check placed conductors with error-tector as outlined in Step 3 for tip and ring reversal, then seat and cut the conductors.

2. Place cap over half-tap module and seat using splicing tool.




**Step 187—Transferred 25 Pairs**

1. Remove bridge connector from old count.

**Step 187—Transferred 25 Pairs (Contd)**

2. Using close-cutting insulated pliers or 840A tool, cut conductors from half-tap module after transfer. Do not let bridge contacts short onto the cutter-presser, tool mounting, or cable rack.

3. Install 710B1 cover on half-tap modules as outlined in Step 170.

**C. Retransferring 25 Pairs**

**8.04** Steps 183 through 187 outline the procedures for transferring 25 pair from module A to module B, (Fig. 51). Now in order to retransfer 25 pair from module B to module C, follow the procedure outlined in Steps 188 through 190.

*Note:* The 710 connector illustrated in Fig. 51 and Steps 188 through 190 are turned 90 degrees rather than parallel for clarity.

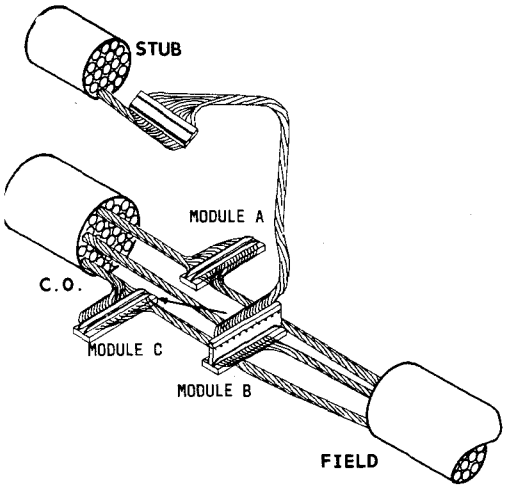
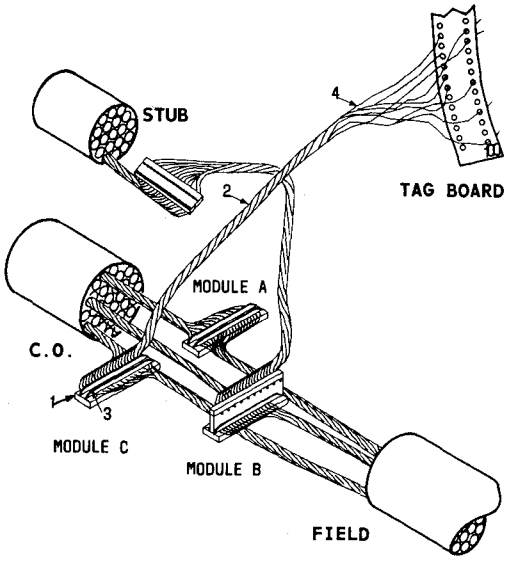



**Fig. 51—Block Diagram for Transferring 25 Pair From Module B to Module C**



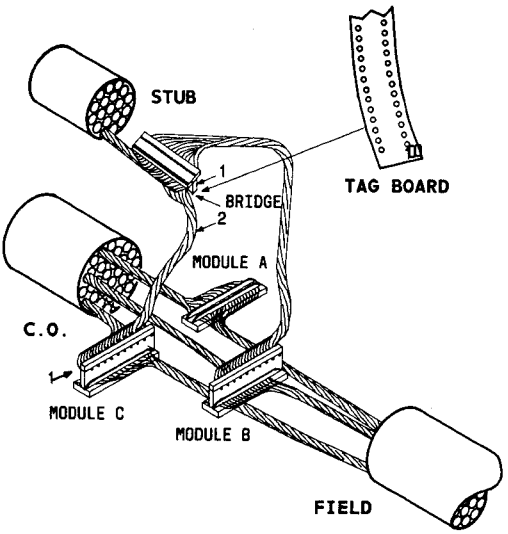

**Step 188—Pairs From Stub Cable Preterminated**

1. Locate connector module containing cable pairs to be transferred (***from*** count, module B) and connector module containing cable pairs to which transfer is to be made (***to*** count, module C).

2. Preterminate a 25-pair noncolor-coded PIC stub at least 50 inches long into a bridge module as outlined in Steps 144, 145, and 146.

3. Plug preterminated bridge module into connector module containing cable pairs to which transfer is to be made (module C).

4. Identify the PIC pairs and place the unterminated end into a tag board.

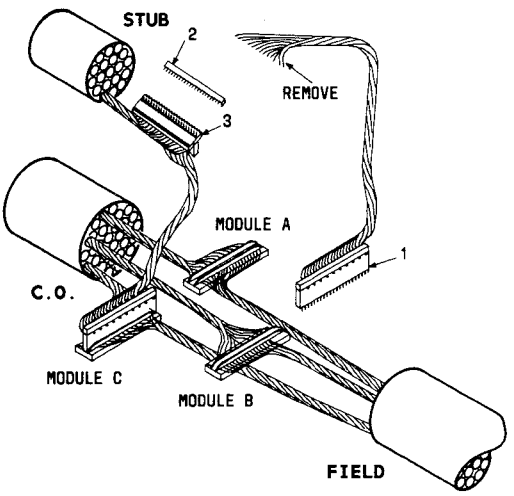



**Step 189—Placing Bridge Module Into Half-Tap Module**

1. Place a bridge connector into the half-tap connector on the stub cable as outlined in Steps 140.

2. Place conductors of ***to*** cable from tag board into top of bridge module according to pair identification on tagging tape or in accordance with PIC stub, check placed conductors with error-tector as outlined in Step 3 for tip and ring reversal, then seat and cut conductors.

3. Place cap over bridge module and seat.




**Step 190—Removing Bridge That Is No Longer Needed**

1. Using C bridge-removal tool, remove the bridge connector from splicing connector containing old stub.

2. Using a pair of lineman's pliers, remove the cap from half-tap module containing the old stub, then remove the stub conductor.

3. Place a ***new*** cap on half-tap module.

### D. Working Cable Transfer in an Existing Facility Splice (RICS)

**8.05** The block diagram in Fig. 52 illustrates a facility splice configuration and a typical example of old and new count.

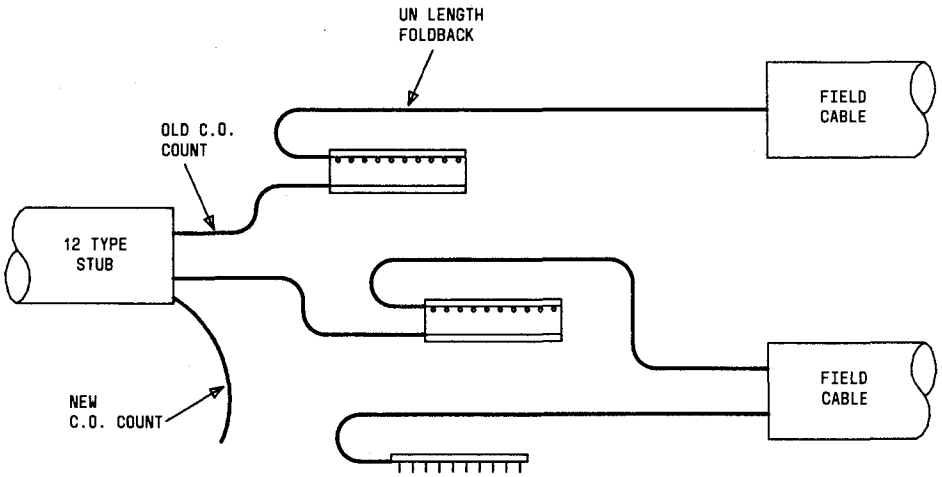



**Fig. 52—Typical Splice Old and New Count**

**8.06** The procedures for transferring old count to new count are as follows:

(a) Terminate numerically the new count from CO in a splice connector as outlined in paragraph 6.31.

(b) Rotate the connector 90 degrees and place it back in the cutter-presser holder with bridge rail up and seat an empty bridge module in the splice connector as outlined in Step 139 and 140. Leave the cutter-presser head in the down position.

(c) Place existing bridge module approximately one inch in front of new bridge module as shown in Fig. 53, then dress the existing field cable pairs into new bridge. Press and cut.

(d) Using bridge removal tool, remove bridge module from existing group as outlined in Step 182 (Fig. 53).

***Note:*** There may be a limited number of transfers that can be made to any one unit using this method. If there is not enough wire to make transfer, use the procedure outlined in Steps 183 through 187.

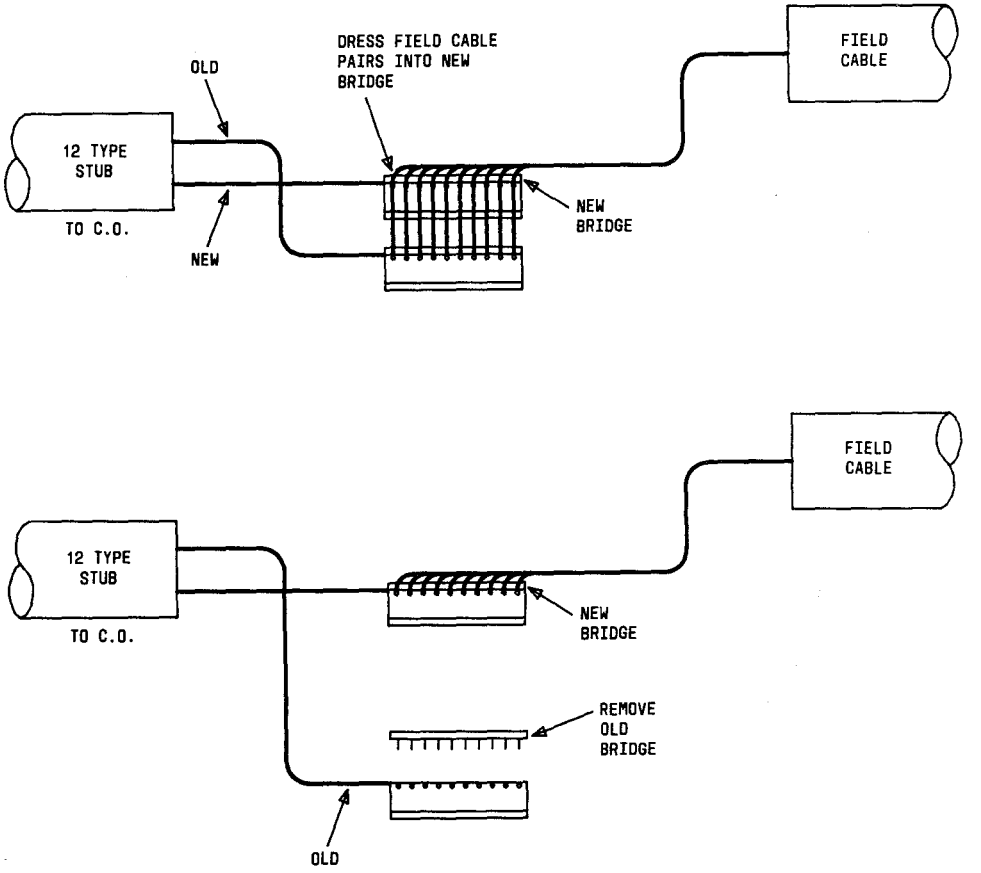



**Fig. 53—Placing New Bridge Module**

## 9. SPECIAL APPLICATIONS

### A. Buildings and/or Vaultless Central Office

*Note:* Not to be used with Pulp, Paper, or filled cable.

**9.01** The following materials must be ordered to splice tip-to-feeder cables on a wall-mounted racking system within buildings.

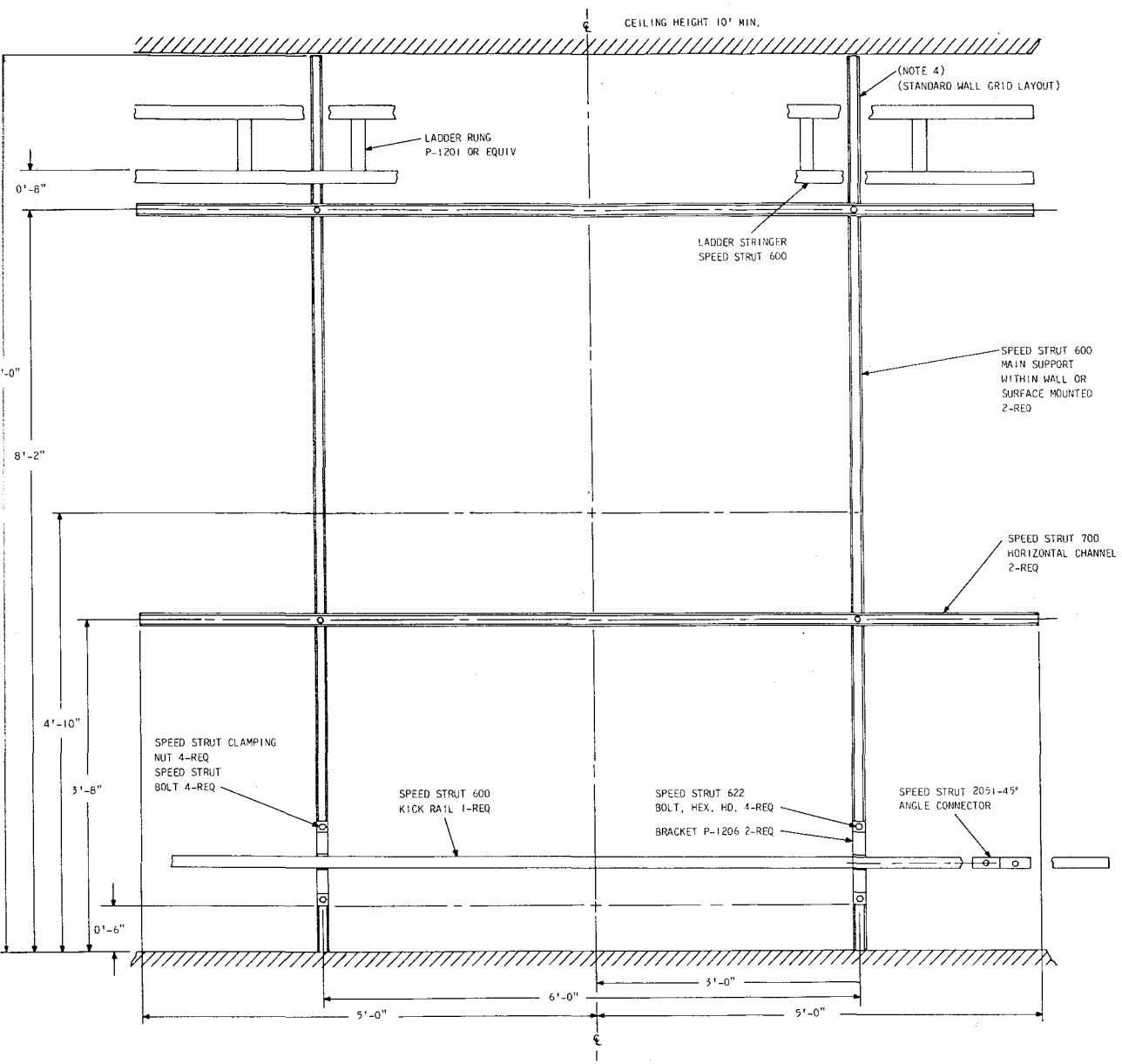
- 710-SD1-25 fire retardant connector (1 connector for each 25 pairs)
- 710A1 bracket (see Table F for quantity)
- 710A2 cover assembly (see Table F for quantity)
- 710A1 retainer 2 retainers required for each connector
- C Presser Support Frame Assembly AT-8820.

**TABLE F**

**QUANTITY OF BRACKETS AND COVERS REQUIRED FOR CONNECTOR MOUNTING RACK**

| CABLE PAIR COMPONENTS | 900 | 1800 | 2700 | 3600 | 4500 |
|---|---|---|---|---|---|
| | QUANTITY REQUIRED | | | | |
| 710A1 Bracket | 2 | 3 | 4 | 5 | 6 |
| 710A2 Cover | 1 | 2 | 3 | 4 | 5 |

**9.02** Install framing channel for mounting brackets as shown in Fig. 54.


℄
CEILING HEIGHT 10' MIN.
(NOTE 4)
(STANDARD WALL GRID LAYOUT)
LADDER RUNG
P-1201 OR EQUIV
0'-8"
LADDER STRINGER
SPEED STRUT 600
SPEED STRUT 600
MAIN SUPPORT
WITHIN WALL OR
SURFACE MOUNTED
2-REQ
'-0"
8'-2"
SPEED STRUT 700
HORIZONTAL CHANNEL
2-REQ
4'-10"
SPEED STRUT CLAMPING
NUT 4-REQ
SPEED STRUT
BOLT 4-REQ
3'-8"
SPEED STRUT 600
KICK RAIL 1-REQ
SPEED STRUT 622
BOLT, HEX. HD. 4-REQ
BRACKET P-1206 2-REQ
SPEED STRUT 2051-45°
ANGLE CONNECTOR
0'-6"
3'-0"
6'-0"
5'-0"
5'-0"
℄

NOTES:

1. THIS LAYOUT IS TO BE USED WHEN THE WALL GRID IS DIRECTLY OPPOSITE THE LOW PROFILE COMBINED DISTRIBUTING FRAME, AND PROVIDES SPACE IN THE CORNER OF THE OFFICE FOR EQUIPMENT SUCH AS A CABLE COMPRESSOR.
2. THE WALL GRID MATERIALS ARE STANDARD "U CHANNELS" AND HARDWARE OR APPROVED SUTSTITUTE.
3. THE HEIGHTS ABOVE THE FLOOR ALLOW SPACE FOR CABLE PRESSURIZATION (INTRODUCED INTO THE PRESSURE FLANGE) AND CABLE PLUGGING. IF PRESENT CABLES DO NOT REQUIRE PRESSURIZATION; THE STRIP MOUNTINGS WHICH SUPPORT THE 710 CONNECTORS COULD BE LOWERED TO PROVIDE EASIER ACCESS. THIS SHOULD NOT BE DONE, HOWEVER, IF THERE IS ANY POSSIBILITY THAT FUTURE CABLE ADDITIONS MIGHT REQUIRE PRESSURIZATION.
4. THE WALL GRID SHOULD BE SECURED TO THE WALL USING ANCHORS SUITABLE TO THE TYPE OF WALL CONSTRUCTION. THE MAIN VERTICAL SUPPORTS SHOULD EXTEND TO THE FLOOR SO THAT THE WALL ANCHORS DO NOT HAVE TO SUPPORT THE WEIGHT OF THE WALL RACK.
5. AFTER INSTALLATION ON THE WALL THE ENTIRE WALL GRID SHOULD BE PAINTED TO MATCH THE WALL.

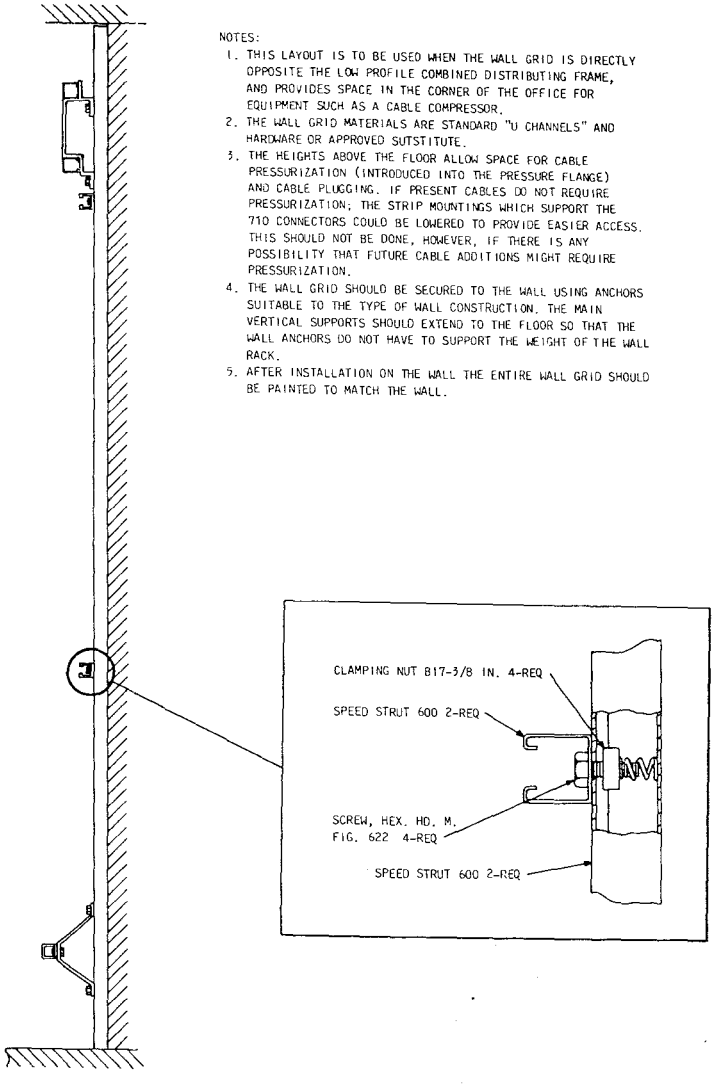
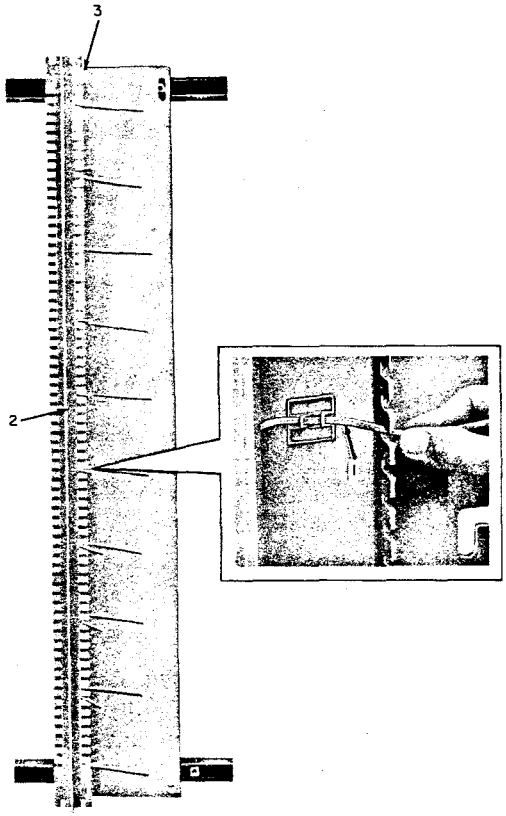


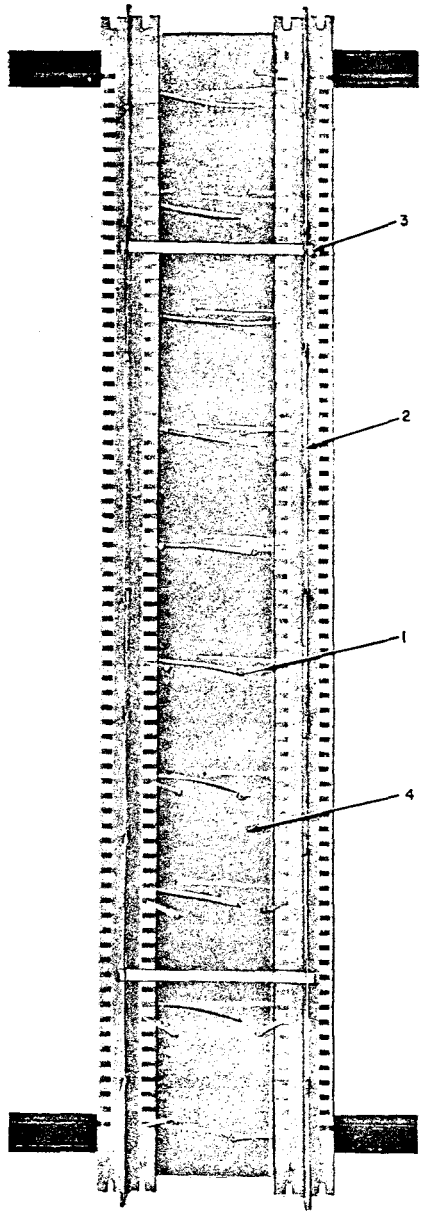

**Fig. 54—Installing Frame Channel for Bracket**

**9.03** Procedures for installing 710A bracket and backpanel are illustrated in Steps 191 and 192.




**Step 191—Installing 710A1 Bracket**

1. Attach cable ties to 710A1 bracket.
2. Position bracket on back panel, with flange of bracket underneath panel, and secure with screws provided.
3. Secure assembled bracket and panel to framing channel.




**Step 192—Installed Bracket**

1. Attach cable ties to second bracket.

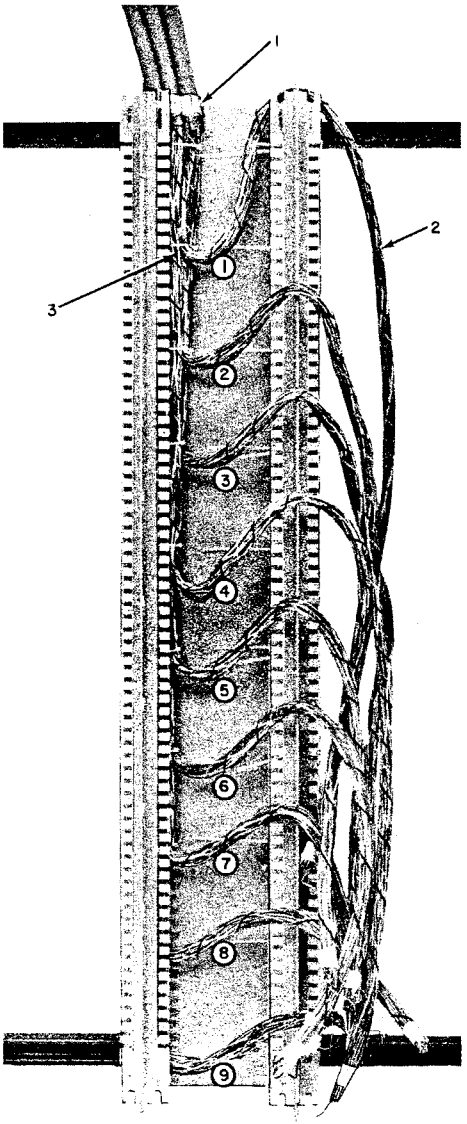
**Step 192—Installed Bracket (Contd)**

2. Position bracket on back panel, with flange of bracket underneath panel. Secure bracket to framing channel with screws provided. Do not tighten screws.

3. Install two alignment bars between two brackets, assure brackets are in alignment, then tighten screws to secure right side to framing channel. Assure alignment bars move freely.

4. Secure back panel to bracket with screws provided.

**9.04** Prepare cables and set up for splicing as shown in Steps 193 through 196.




NOTE:
○ NUMERAL INDICATES TIP CABLE IDENTIFICATION

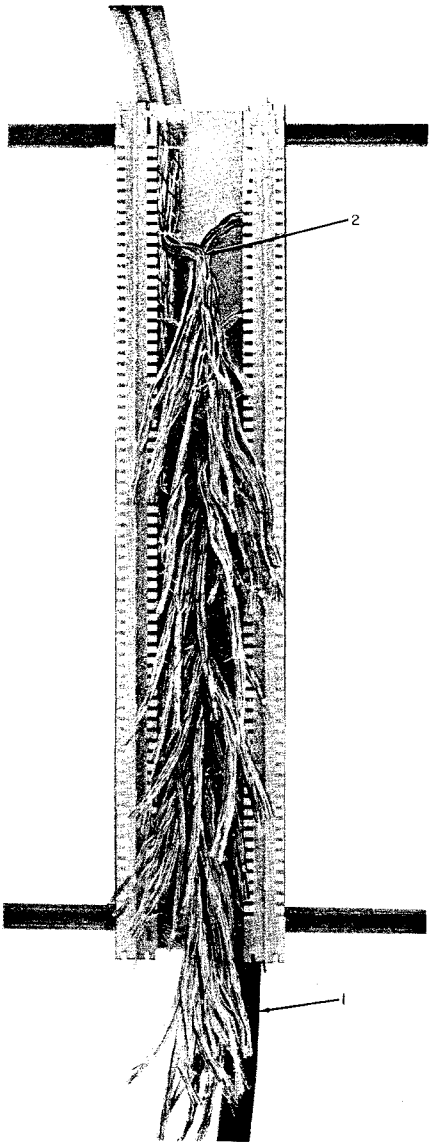
**Step 193—Prepared Tip Cables**

**Step 193—Prepared Tip Cables (Contd)**

1. Identify and mark tip cables.

2. Remove the required cable sheath from end of tip cables. Install D bond clamp/bond strap assembly on each tip cable and attach other end to frame ground.

3. Fan out tip cables and secure to left bracket with cable ties.

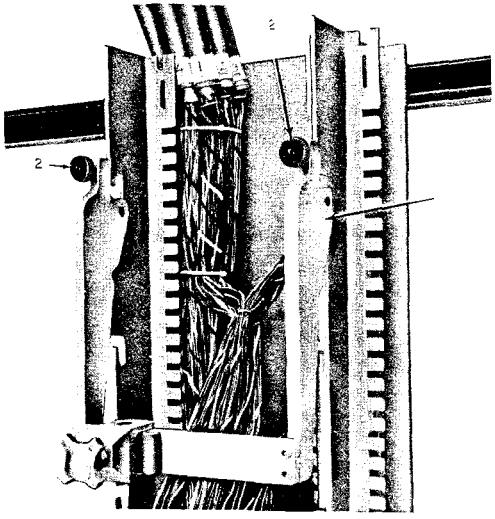



**Step 194—Prepared Cables**

**Step 194—Prepared Cables (Contd)**

1. Prepare main cable and route up the right side of bracket. Install D bond clamp and bond strap as outlined in Section 081-852-118 on cable sheath, attach other end of bond strap to frame ground.

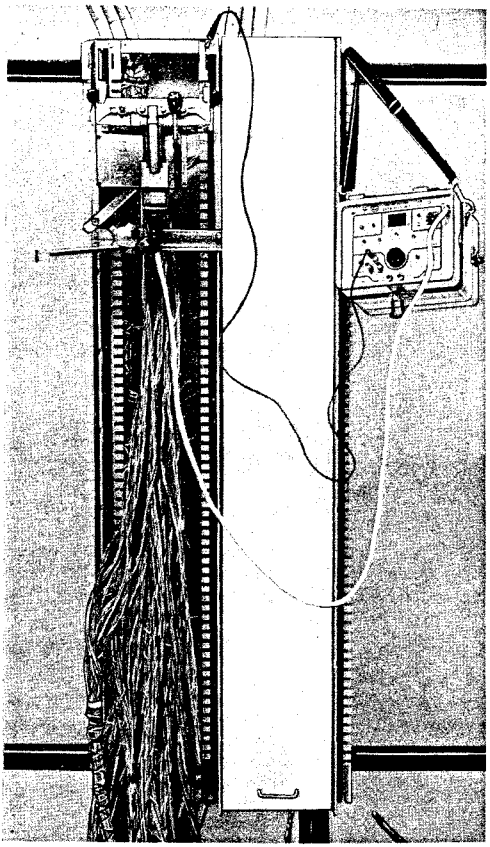
2. Tie the tip cable stubs to the matching units of the feeder cable for splicing.




**Step 195—Installed C Presser Support Frame Assembly**

1. Loosen knobs and install C presser support frame assembly on 710A1 brackets by sliding into L-shaped slots.

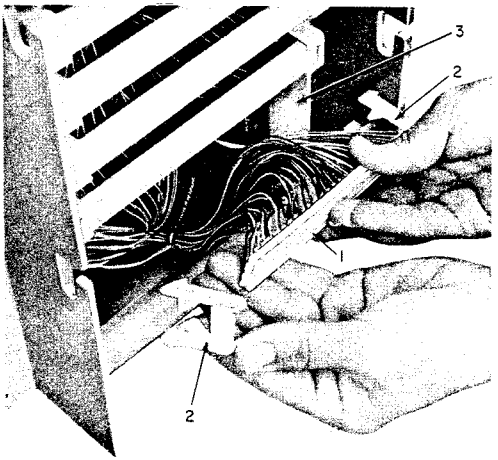
2. Tighten knobs to secure C presser support frame assembly.



**Step 196—Installed Splicing Tool**

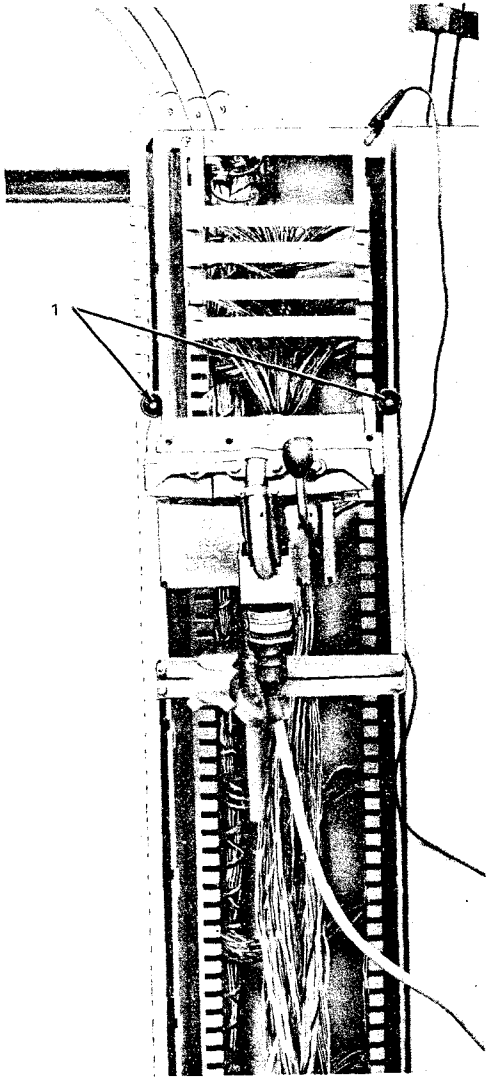
1. Install cutter-presser on support frame and center between 710A1 brackets.

**9.05** Splice the conductors using the 710-SD1-25 fire retardant connectors and the splicing tool as outlined in Part 4. Steps 197 and 198 illustrate the procedures for attaching 25-pair splice to 710A bracket and lowering splicing tool after splicing 100 pairs. Step 199 illustrates a completed splice.



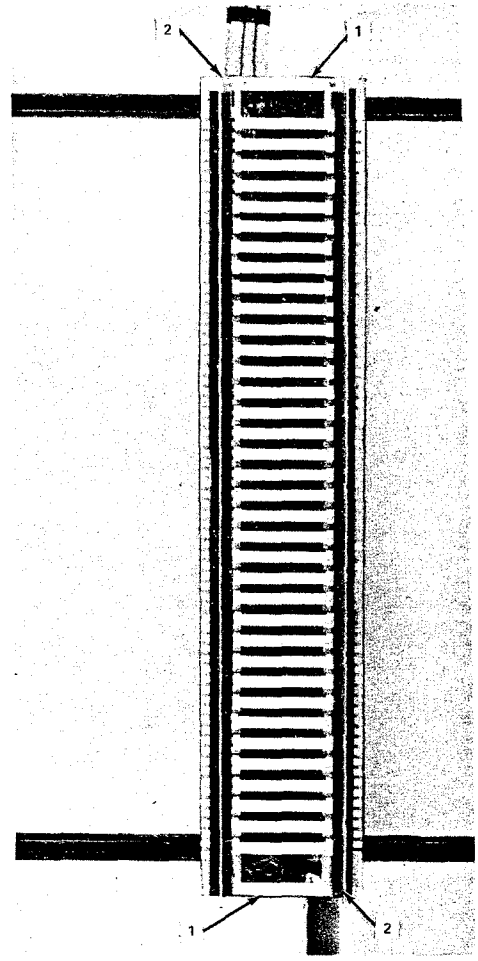

**Step 197—Installing 25-Pair Splice on 710A Bracket**

1. Remove 25-pair splice from splicing tool.
2. Place a 710A1 retainer on each end of connector.
3. Snap connector into slot provided on brackets.



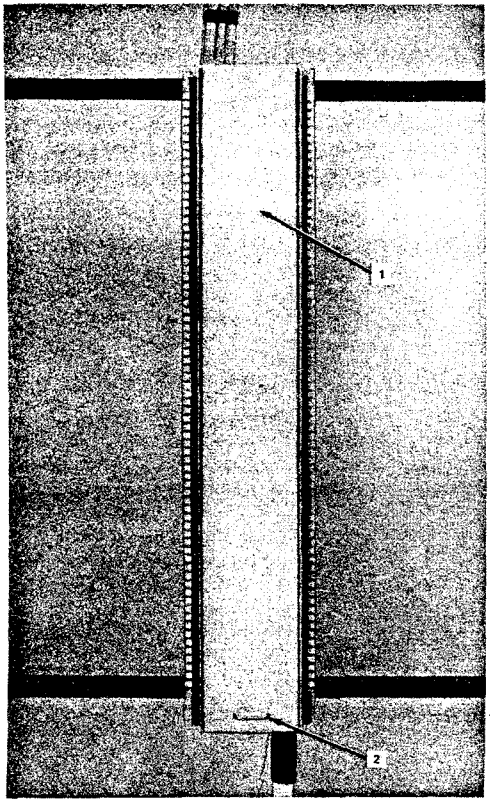

**Step 198—Repositioned Splicing Tool**

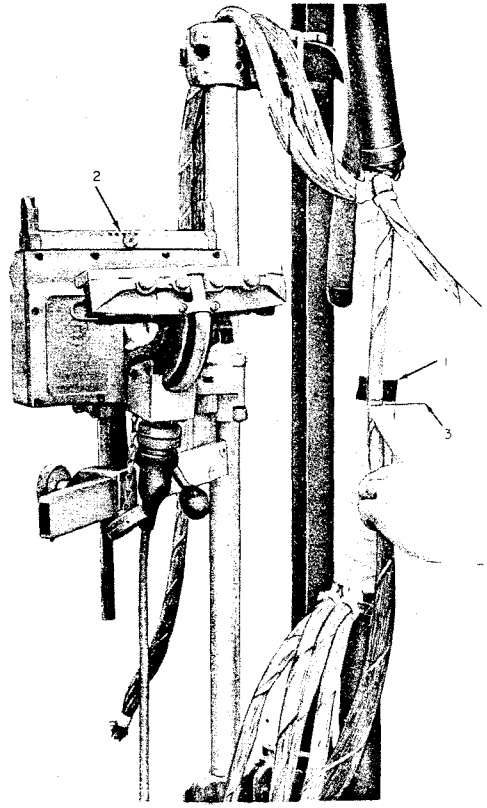
1. After splicing 100 pairs, loosen knobs and lower cutter-presser to next slot. Tighten knobs.




**Step 199—Completed Splice**

1. Install top and bottom cover brackets using screws provided.
2. Fill voids between cables and brackets with furnished sealing putty. This provides fire protection.
3. Install neoprene foam strip across top and bottom to provide air seal for fire protection.




**Step 200—Enclosed Splice**

1. Install and secure cover over completed splice.

2. To remove cover pull handle outward to release latch at base, then lift cover upward to disengage clips at top. Use care not to strike topmost connector when removing cover.

**B. Setup for Vertical Splice**

**9.06** Install B support frame in vertical position as shown in Fig. 23 or 710A tool mounting and prepare cables for splicing using foldback method as outlined in paragraphs 6.03 through 6.09.

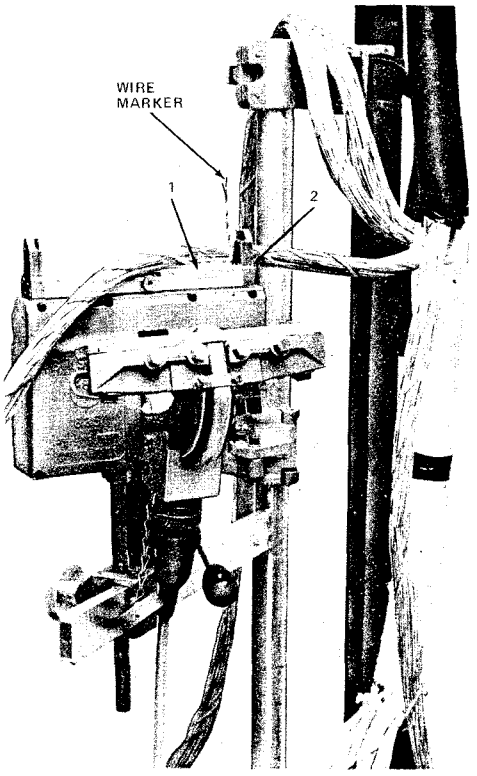
**9.07** Procedures for vertical splicing are outlined in Steps 201 through 204.

**Step 201—Marking Top Units to be Spliced**

1. Measure across the sheath opening to find center of core. Mark this spot and center one inch wide vinyl tape over this mark. This mark will be used to position each module.

2. Install splicing tool on ***long*** horizontal bar.

3. Take the first cable unit from the ***topside*** of the opening and lay it along the core; then using a piece of wire, mark the unit at a point on the opposite edge of the vinyl tape. ***This is important so that modules do not overlap in the center of the splice.***




**Step 202—Align Tool to Splice Top Units**

1. Position cutter-presser so that:

   (a) Wire marker aligns with inside edge of the vertical post.

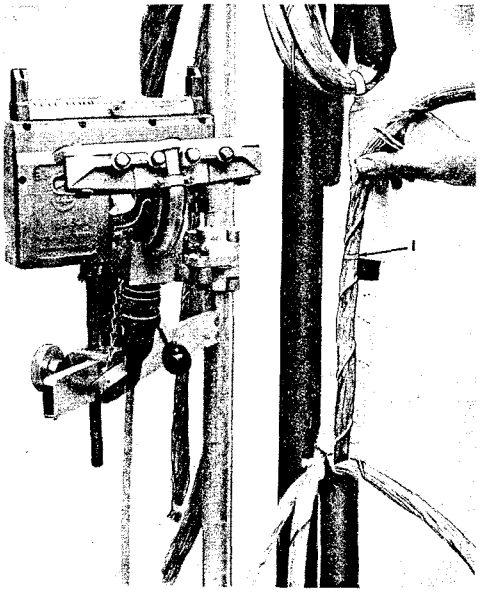
   (b) The cutter-presser is ***in alignment with the unit to be spliced.***

   (c) Index strip is 1-1/2 inches above the sheath opening.

2. Remove the binder units and tie off near the end post of tool, and splice and test the unit as outlined in Part 4 for splicing tool being used.

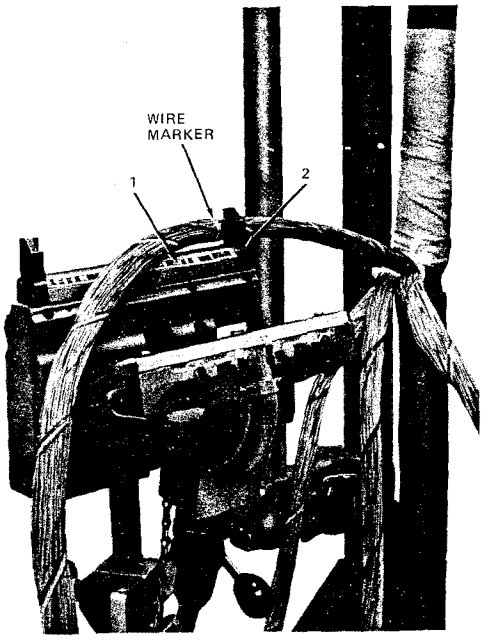
**Step 202—Align Tool to Splice Top Units (Contd)**

3. Repeat 1 and 2 for each unit from the top side of the splice. ***It is recommended that you begin with the back units and work to the front to avoid having to work around already completed modules.***



**Step 203—Marking Bottom Units to be Spliced**

1. Take the first cable units from the ***bottom*** side of opening and lay it along the core; then using a piece of wire, mark the unit at a point on the opposite edge of the vinyl tape. ***This is important so that the modules do not overlap in the center of the splice.***




**Step 204—Align Tool to Splice Bottom Units**

1. Position cutter-presser so that:

   (a) Wire marker aligns with the inside edge of the vertical post.

   (b) Cutter-presser ***is in alignment with the unit*** to be spliced.

   (c) Index strip is 1-1/2 inches above the sheath opening.

2. Remove the unit binder, tie off near the end post of the tool and splice the unit as outlined in Part 4 for splicing tool being used.

3. Repeat 1 and 2 for each unit on the bottom side of the cable. ***It is recommended that you begin with the back units and work up to the front to help you keep from having to work around already completed modules.***

**Step 204—Align Tool to Splice Bottom Units (Contd)**

4. After all units have been spliced, fold units into core and enclose as outlined in Steps 97 and 98.

## C. Terminating (Clearing) Cable Ends in Modular Connectors

### Clearing Cable Ends Using 710 Connector Module

**9.08** Remove the required cable sheath and set up splicing tool, and clear cable ends as follows (Fig. 55):

(a) Place and secure the index strip in connector holding device of cutter-presser as outlined in Part 4.

(b) Dress the conductors from 25-pair binder group to be cleared into index strip. Separate the tip and ring conductors on the colored peaked (Λ) projections of the index strip, tip side to the left and ring side to the right.

(c) Use the error-tector, check for placing errors such as two conductors in one slot, vacant slots, tip and ring reversals, or transposed pairs.

(d) Position T-bar over the index strip, then cut the conductors. Pull T-bar back to its original position.

(e) Place connector module into cutter-presser keeping it parallel to the index strip.

(f) Position T-bar over the connector module and seat the module.

(g) Pull T-bar back to its original position.

(h) Place and seat cap on connector module.

(i) Remove assembled connector from cutter-presser.

(j) Repeat steps (a) through (i) for each 25-pair binder group to be cleared.

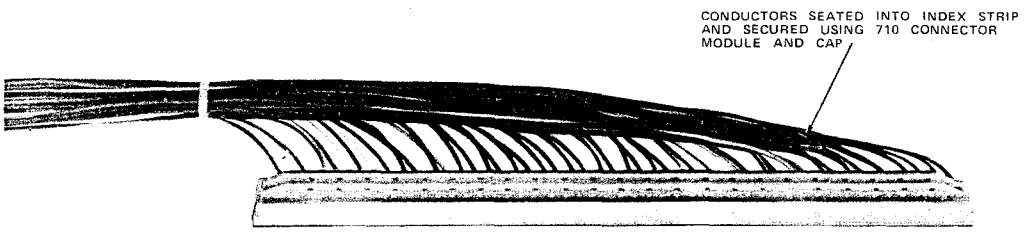
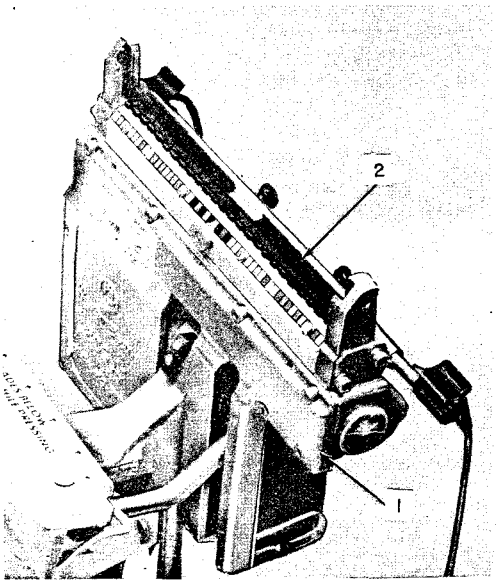
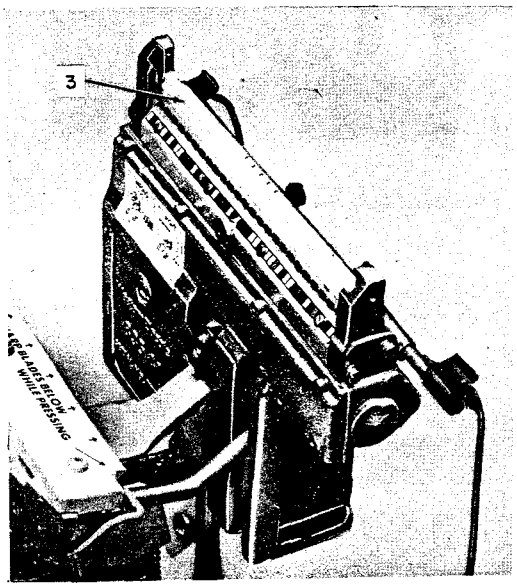



**Fig. 55—Cleared Cable End**

### D. Creating Bottomless Splice Module (BSM)

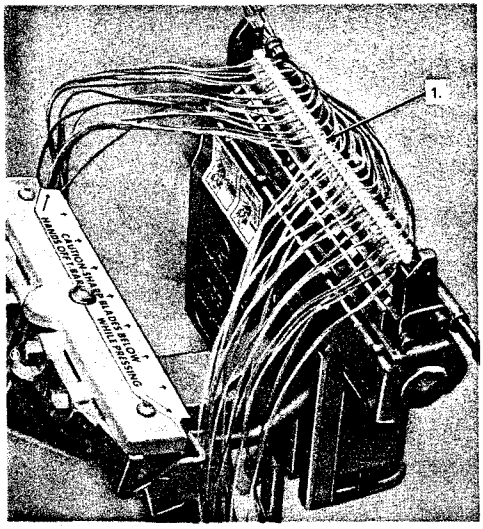
**9.09** The procedures for creating a bottomless splice module (BSM) for mating with the wire holding index strip (WHIS) are outlined in Steps 205 through 207.

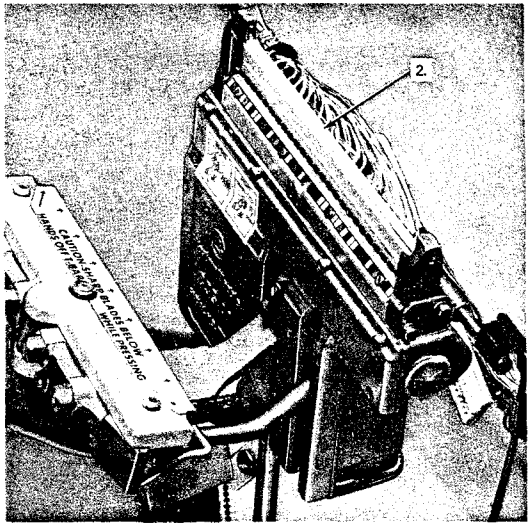



**Step 205—Place F Module Support and Connector Module**

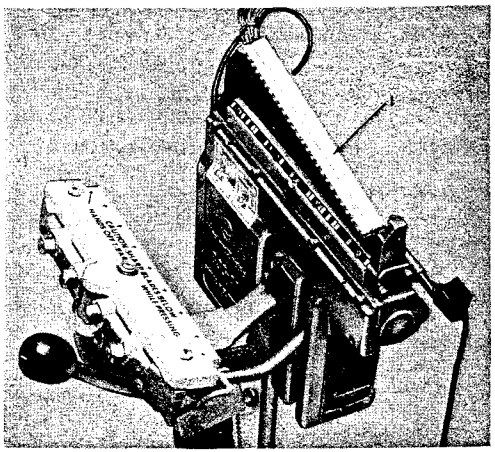
1. Set up splicing tool as outlined in Part 4.
2. Place F module support in head of splicing tool.
3. Place connector module in F module support. Do not use T-bar to seat connector module—seat by hand.




**Step 206—Completed BSM**

1. Dress the conductors into connector module and check using the error-tector as outlined in Part 4.
2. Cut the conductors, test (if appropriate), place and seat cap on connector module.



**Step 207—Completed BSM Removed From F Module Support**

**Step 207—Completed BSM Removed From F Module Support (Contd)**

1. Remove completed BSM from F module support.
2. Place connector male contact cover to protect contacts on bottom of module.

## 10. REPLACEMENT PARTS

**10.01** The replacement parts and tools are as follows:

| Comcode | Part |
|---|---|
| 841732373 | Book, Instruction, 152A Test Set |
| 900306903 | Brush |
| 102632668 | Cap, dry, 710CB (25) |
| 103257507 | Cap, dry, green 710CB1 (25) |
| 102632650 | Cap, filled, 710CA (25) |
| 103212916 | Cap, filled, 710CAL (25) |
| 102632676 | Cap, frame retardant, 710CD (25) |
| 103274544 | Cap, flame retardant, 710CD1-25<br>Cap, flame retardant 710CD1-5<br>Cap, filled, |
| 103062733 | Connector, 710BAL-25 |
| 103262184 | Connector, 710BAL-5 |
| 103257515 | Connector, 710BB-25 |
| 103274569 | Connector, 710BD1-25 |
| 103062909 | Connector, 710BC1-25 |
| 103262150 | Connector, 710BC1-5 |
| 103062741 | Connector, 710SAL-25 |
| 103262192 | Connector, 710SAL-5 |
| 102257523 | Connector, 710SB-25 |
| 103316964 | Connector, 710BD1-5 |
| 103062717 | Connector, 710SC1-25 |
| 103274577 | Connector, 710SD-25 |
| 103316972 | Connector, 710SD-5 |
| 103062758 | Connector, 710TAL-25 |
| 103262200 | Connector, 710TAL-5 |
| 103062725 | Connector, 710TC1-25 |
| 103262176 | Connector, 710TC1-5 |
| 102604808 | Cord, W100A |
| 103067716 | Cover, 710B1 |
| 103316998 | Cover, 710B5 |
| 401496328 | Cutter-Presser, D |
| 401496336 | Cutter-Presser, E |
| 401927413 | Cutter-Presser, F |
| 103156261 | Tool, 890A |
| 401134291 | Error-tector |
| 401117742 | Frame, Support, B |
| 401802442 | Frame, Support, Presser C |
| 401474523 | Guard, B |
| 402383467 | Head, Cutting Insertion D |
| 103119178 | Index Strip (white) 710IS (25) |
| 103119186 | Index Strip (green) 710ISI (25)<br>Index Strip (green) 710IS1 (5) |
| 103119194 | Index Strip (blue) 710ISL (25) |
| 840376164 | Key spring guide, long |
| 401495492 | Key spring guide, short |
| 402384390 | Knife, C, Assembly |
| 401926803 | Leg, B, Swivel |
| 400492971 | Lubricant |
| 102988284 | Mounting Tool, 709A |
| 102974805 | Mounting Tool, 710A, Complete Tool Assy. |
| 103059077 | Mounting Tool, 710A1 Base |

| Comcode | Part |
|---|---|
| 103059085 | Mountig Tool, 710A2, Tool Clamp |
| 103059093 | Mounting Tool, 710A3, Swivel Bar |
| 103059101 | Mounting Tool, 710A4A Tube Clamp |
| 103059119 | Mounting Tool, 710A5 Vise |
| 103059127 | Mounting Tool, 710A6 Swivel Bar & Knob |
| 103059135 | Mounting Tool, 710A7A, Tube/Tool Clamp |
| 103059143 | Mounting Tool, 710A8 90 degree Mount |
| 103059150 | Mounting Tool, 710A9 Carrying Case |
| 103050142 | Mounting Tool, 710B Base and Tool Clamp |
| | Oil, hydraulic Enerpac HF100 Series or equivalent |
| 900477514 | Pin, Roll for 835-Type Tool |
| | Pliers, cutting flush, Proto Tool #453 or equivalent |
| 401496211 | Press Clamp Assembly |
| 402155873 | Presser, K, Connector |
| 402490064 | Presser, L, Connector |
| 103319471 | Slack Group Holder, 55A |
| 401495492 | Strip, Color Code |
| 402029367 | Support, Module E |
| 402398077 | Support, Module F |
| 103317640 | Support, Module 710BM5 |
| 103317657 | Support, Module 710CM5 |
| 401473046 | Tape, Tagging B |
| 102478716 | Test Set, 152A |
| 402321590 | Tool, Bridge Removal C |
| 402383343 | Tool, Insertion-Cutting D |
| 103068870 | Tool 835A1 |
| 102956794 | Tool 836A |
| 103176400 | Tool 840A |
| 103289765 | Tool 945A (Complete) |
| 103551511 | Tool 945A1 |
| 103551529 | Tool 945A2 |
| 103551337 | Tool 945A3 |
| 103551545 | Tool 945A4 |
| 103551552 | Tool 945A5 |
| | Tool 945A6 |
| 103551560 | Tool 945A7 |
| 900306754 | Wrench, Set Allen |