

SPlicing STATION WIRE AND INSIDE WIRING CABLE

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1. GENERAL

1.01 This section covers general factors to be considered and methods used to splice station, ground wire, and inside wiring cable.

1.02 This section is reissued to:

- Add information on the 700-type connector
- Add information on the G long-nose pliers
- Add information on the G sleeve presser
- Rearrange text and illustration.

Since this reissue is a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 Sections covering splicing of lead-covered cables will be found in outside plant series practices. Splicing of block, drop, and HD wire is

covered in Section 462-200-200. See also sections covering connecting blocks.

2. DESCRIPTION

GENERAL INSTRUCTIONS FOR SPlicing WIRE AND INSIDE WIRING CABLE

A. Station Wire

2.01 Whenever possible, connecting blocks should be used to splice wires rather than using sleeve-type splices. When sleeve splices must be used, consider the following:

- Do not conceal splices
- Do not place fasteners over splice or taped part of wire
- Use care to assure that splice does not cause future trouble
- Where appearance is a factor, use same color wire and tape as present run, or remove old wire back to an inconspicuous point and make the splice.

2.02 Extend station wires by splicing on additional wire when:

- Present wire run is in good condition, securely fastened, and longer than 20 feet
- Present wire run replacement would cause an unsightly appearance
- Present wire run is less than 20 feet, but to splice it would save considerable time.

2.03 Location of splice:

- Locate splice at point where it may be inspected
- Locate splice in an inconspicuous place

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- Do not place splices in walls, conduits, ducts, etc
- Locate splice so it will not appear at turns or corners
- Place splice in dry location.

B. Inside Wiring Cable

2.04 Inside wiring cables should be spliced only when absolutely necessary. Use cable terminals or connecting blocks whenever possible.

2.05 Plastic covered inside wiring cables are spliced the same as jacketed inside wiring. When locating the cable splices, consider the following:

- Locate splices where they may be inspected
- Place splices in an inconspicuous place
- Locate splices so they will not appear at corners or turns
- Place splices in a dry location when possible.

C. Ground Wire

2.06 Ground wire may be spliced, using sleeve-type splices, if the run is in good condition and is so long (over 10 feet) as to make splicing the most expeditious method of repair or extension. Table A lists the sizes and identity of sleeves available for use with ground wire.

2.07 When splicing ground wire, consider the following:

- Do not splice new ground wire runs
- Do not splice existing ground wire runs of less than 10 feet
- When splicing an existing ground wire, do not use a smaller gauge wire to extend a larger gauge wire
- Concealed ground wire runs may be spliced with the proper size sleeve and wire if the continuity of existing wire is checked and the splice will be accessible
- Do not tape ground wire splices

- Only one splice.

3. SPlicing METHODS

A. Brass Sleeve

Inside Wire

3.01 The 032-025 S brass sleeve is a single tube sleeve, 1-inch long, with a bore diameter the same size throughout its length. An indentation in the center ensures insertion of the proper length of conductor ends when the splice is made. This sleeve is used to splice jacketed station wire or inside wiring cables having the same size conductors.

3.02 Prepare D station wire, JKT (MD) station wire, or GS station wire for splicing as follows:

- (1) Remove outer covering for about 6 inches.
- (2) Cut conductors so position of splices will be staggered (Fig. 1).
- (3) In order to splice conductors of like color, reverse order of staggering on mating wire. For example, cut one yellow conductor long and yellow conductor of other wire short.
- (4) Strip and clean each conductor carefully to ensure a good connection. Avoid nicking wire.

3.03 Complete splice as follows:

- (1) Place a brass S-032-025 sleeve on each conductor of one wire and using C long-nose pliers, B (MD) or G sleeve presser tool, make a single press on sleeve near outer end.
- (2) Insert associated conductor in other half of sleeve and make single press on this end.
- (3) Repeat for each conductor of two wires being spliced.
- (4) Finish pressing sleeves using pliers or presser tool. If pliers are used, make four presses on each side of sleeve center (Fig. 2). If presser tool is used, make two presses on each side of sleeve center. Close handles of sleeve-presser tool until stops are brought together (Fig. 3) or pawl and ratchet releases (Fig. 4).

(5) Cover each sleeve with a single, half-lapped layer of vinyl tape and then wrap entire splice with a single, half-lapped layer of tape extending tape 2-1/2 inches beyond each end of area from which outer covering was removed (Fig. 4).

(6) Where damp or outdoor locations are encountered, use rubber tape before placing vinyl tape.

3.04 When it is necessary to splice shielded wire, electrical continuity of the shield as well as the conductors must be maintained. The following steps provide a method of splicing SK shielded wire.

(1) Remove outer covering for about 6 inches being careful not to cut or break shielding braid.

(2) Unwind shielding wire from around paper covering of conductors and remove paper covering (Fig. 5).

(3) Twist shielding wire so as to simulate a single wire.

(4) Splice conductors in normal manner using S-032-025 brass sleeves.

(5) Splice ends of twisted shielding wire by twisting together and soldering the twist. A 1/2- to 3/4-inch soldered joint is sufficient (Fig. 6).

(6) Tape the splices and the soldered joint as outlined in paragraph 3.03(5).

(7) At end of wire run, a tail may be made for grounding shield wire by following Steps (1), (2), and (3).

3.05 In general, splices in twisted wire are made the same as jacketed wire except longer lengths for the splices are needed to retain the twist in the wire. The S brass sleeves are used to make the splices which should be taped the same as for jacketed wire.

Inside Wiring Cable

3.06 Inside wiring cable is spliced with the same method used for inside wiring (paragraph 3.01 through 3.03).

3.07 After cable is spliced and taped, apply two layers of vinyl tape over the taped splices, extending 2-1/2 inches beyond each end of area where outer covering was removed.

3.08 Completed splice should be supported at center and ends to prevent damage due to bending or movement of cable (Fig. 7).

Ground Wire

3.09 Splice ground wire using the correct size sleeves (Fig. 8) as shown in Table A. Table A also refers to the sleeve presser required for the size of the sleeve being used. **DO NOT TAPE GROUND WIRE SPLICES.**

3.10 Refer to Section 081-750-105 for description of 31-QC and 51-JE Nicopress tools.

B. 700-Type Connector

3.11 The 700-type connector is used to join inside wire or cable of any gauge or combination of gauges without stripping of the insulation. These connectors are self encapsulating and pressed with the E or H connector presser. When splicing 10 pairs or less, the G long-nose pliers may be used. The connector may be used to join conductors in the type of wires as listed:

- D Station Wire
- SK Station Wire
- D and E Inside Wiring Cable
- B Service Wire
- C (2 Pair) Service Wire
- C (5 Pair) Service Wire
- E Armored Service Wire
- D Underground Wire
- D and E Rural Wire.

SECTION 461-200-205

3.12 This document shall cover the use of the G long-nose pliers for use as a connector presser. Refer to Section 632-205-215 for information on the use of the E and F (MD) connector pressers.

3.13 These connectors are especially useful and economical for splicing inside wire and cable because the other methods require stripping of insulation or encapsulation of joints.

Note: The 701-2AR, 701-2ART, 702-2AR, and 702-2ART connectors are for wire joining in pressurized cable and in building and entrance facilities requiring flame retardant materials.

3.14 Refer to Table B for application of the 700-type connector.

Warning: *These connectors shall not be exposed to solvents or solvent fumes, such as B cleaning fluid, acetone, etc. Such solvents can damage or destroy the plastic connector parts.*

700-, 701-, and 702-Type Connectors

3.15 All 700-, 701-, and 702-type connectors (Fig. 9) consist of the following:

(a) A plastic body with:

- (1) Two or three holes for inserting the conductors; one conductor each hole
- (2) Flexible fingers which position the conductors and provide strain relief after pressing.

(b) A plastic cap with:

- (1) A metallic insert for contacting and joining the conductors.
- (2) A sticky compound for sealing (except 701-2AR, 701-2ART, 702-2AR, and 702-2ART).
- (3) A test point for contacting the joint without piercing the conductor insulation. This test point is covered with a thin plastic membrane which is punctured with the test pick to make contact with the back side of the metallic insert as shown in Fig. 10.

IMPORTANT: *This puncture must be resealed with B sealant AT-8502 to fully restore the original integrity of the connector.*

700-3B and 700-3BT Connectors

3.16 The 700-3B connector differs from the general description as follows:

- (1) A removable side wall to open a through slot to receive the through wire when bridge-tap splicing
- (2) Plastic parts are clear and untinted.

3.17 The 700-3B connector is provided in boxes of 300 for use with E connector presser.

3.18 The 700-3B connector is used for:

- (1) Splicing three wires, or bridging up to two wires to one through wire. Any two-wire holes may be used when joining only two wires.
- (2) Joining 17- through 26-gauge conductors in any combination.
- (3) Joining any combination of aluminum, copper, or copper-steel conductors.

3.19 The 700-3BT connectors are identical to 700-3B except they are mounted on tape strips, 16 connectors to the strip for use with the H connector presser. They cannot be used for half tapping when inserted in the H connector pressers.

701-2B and 701-2BT Connectors

3.20 The plastic parts of the 701-2B and 701-2BT connectors are clear with blue tinted caps.

3.21 The 701-2B connectors are provided in boxes of 300 for use with the E connector presser. The 701-2BT connectors are mounted on tape strips, 20 connectors to the strip, for use with the H connector presser.

3.22 The 701-2B and 702-2BT connectors are used for:

- (1) Splicing two wires

- (2) Joining any combination of 19- through 26-gauge copper or copper-steel conductors.

701-2AR and 701-2ART Connectors

3.23 The 701-2AR and 701-2ART connectors are identical to the 701-2B except:

- (1) The plastic parts are yellow tinted
- (2) It does not contain sealant
- (3) It is fire retardant and for use in buildings and entrance facilities requiring fire retardant materials
- (4) *It is not for nonpressurized cable use or for use on aluminum conductor cable*
- (5) The 701-2ART connectors are mounted on tape strips for use in the H connector presser.

702-2B and 702-2BT Connectors

3.24 The 702-2B connector differs from the general description as follows:

- (1) It has one hole for inserting the conductor and one through slot for bridge tap splicing
- (2) The plastic parts are clear with blue tinted caps.

3.25 The 702-2B connector is used for:

- (1) Bridging one wire to one through wire
- (2) Joining any combination of 19- through 26-gauge copper or copper-steel conductors.

702-2BT Connector

3.26 The 702-2BT connectors are the same as the 702-2B connectors except they are taped twenty to a strip for use with the H connector presser *only*.

702-2AR and 702-2ART Connectors

3.27 The 702-2AR connector is identical to 702-2B except:

- (1) The plastic parts are yellow tinted
- (2) It does not contain sealant
- (3) It is fire retardant and for use in buildings and entrance facilities requiring fire retardant materials
- (4) *It is not for outside use or for use on aluminum conductor cables*
- (5) The 702-2ART connectors are mounted on tape strips for use in the H connector presser.

G Long-Nose Pliers

3.28 The G long-nose pliers is illustrated in Fig. 11. The jaws of the pliers are arranged to accommodate and to properly close 700-, 701-, and 702-type connectors. The pliers is also suitable for general use instead of B long-nose pliers.

3.29 A pick is provided on the inside of one handle for the purpose of breaking out the side wall of the 700-type connector for half-tapping operations.

3.30 The use of the G long-nose pliers for pressing connectors is illustrated in Steps 1, 2, and 3.

TABLE A

SLEEVES FOR SPLICING GROUND WIRE

GROUND WIRE SIZE	SPLICED TO SIZE	USE SLEEVE SIZE	COLOR MARKING	SLEEVE PRESSING TOOL
6	6	165S Copper	None	51-JE Nicopress Tool
10	10	104S Copper	None	31-QC Nicopress Tool
12	12	080S Copper		
6	10	165S x 104S Copper Combination	None	51-JE Nicopress Tool
10	12	104S x 080S Copper Combination	None	31-QC Nicopress Tool
	14	104S x 064S Copper Combination		

TABLE B

APPLICATION OF 700-TYPE CONNECTOR

APPLICATION	CONNECTOR									
	700-3B	700-3BT	701-2B	701-2AR	701-2ART	701-2BT	702-2B	702-2AR	702-2ART	702-2BT
SPLICE 2 Wire— Copper (Note) or Aluminum	17-26 gauge	17-26 gauge								
2 Wire— <i>Copper Only (Note)</i>			19-26 gauge	19-26 gauge	19-26 gauge	19-26 gauge				
3 Wire— Copper (Note) or Aluminum	17-26 gauge	17-26 gauge								
BRIDGE AND/OR HALF TAP 1 Wire to 1 Thru Wire— Copper (Note) or Aluminum	17-26 gauge									
1 Wire to 1 Thru Wire— <i>Copper Only (Note)</i>							19-26 gauge	19-26 gauge	19-26 gauge	19-26 gauge
2 Wire to 1 Thru Wire— Copper (Note) or Aluminum	17-26 gauge									
COMMENTS	Universal connector	Preferred for 3-wire and 17-gauge splicing		Flame retardant— unsealed		Preferred for 2-wire splicing— copper	Half tapping of copper	Flame retardant— unsealed		Preferred for half tapping— copper

Note: Includes copper-steel conductors.

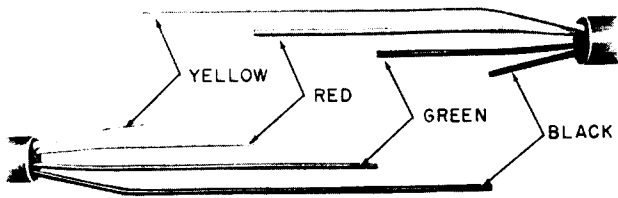


Fig. 1—Jacketed Wire

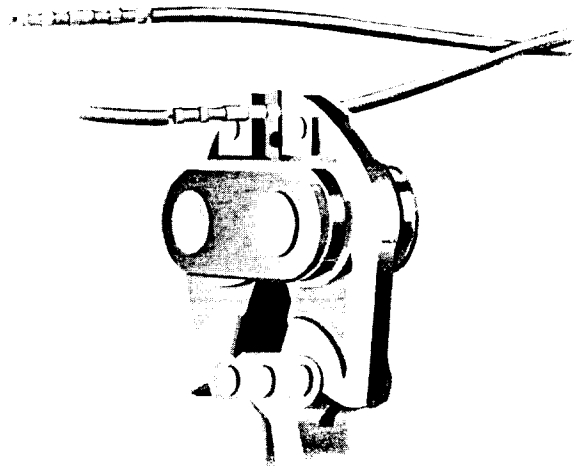


Fig. 3—B (MD) Sleeve Presser

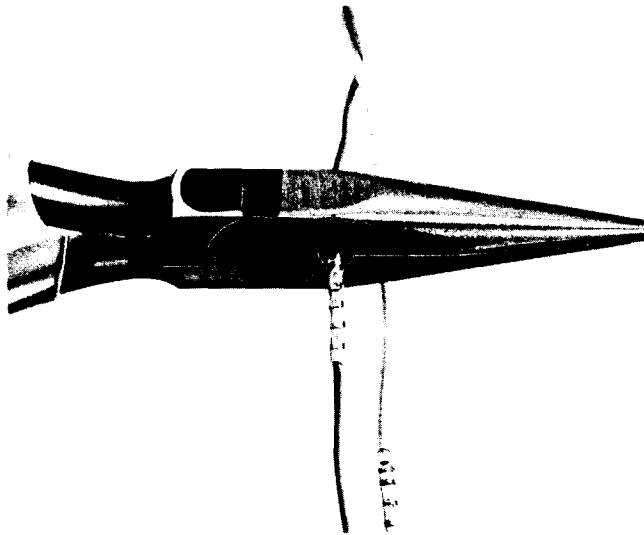


Fig. 2—Pressing Sleeve With C Long-Nose Pliers

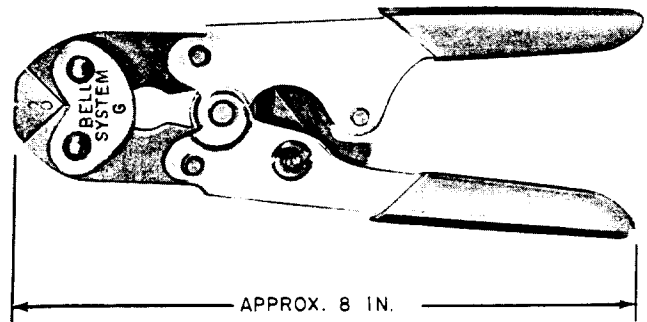


Fig. 4—G Sleeve Presser



Fig. 5—Taping Splice

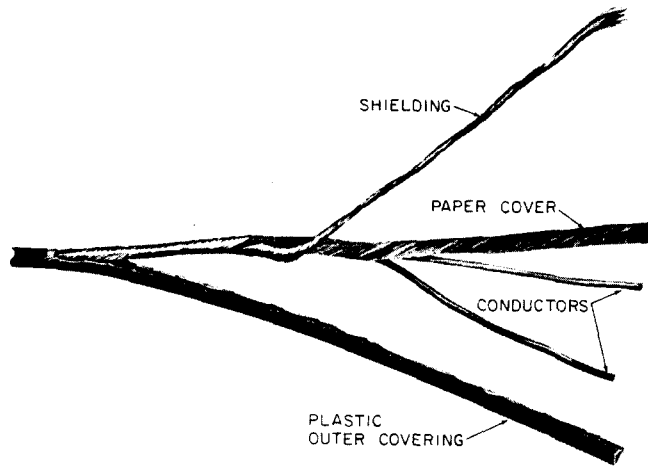


Fig. 6—Unwinding Shield of SK Shielded Wire



Fig. 7—Shielded Wire Splice



Fig. 8—Completed Inside Wiring Cable Splice

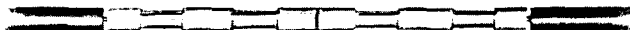


Fig. 9—Ground Wire Splice Made With "B" Sleeve

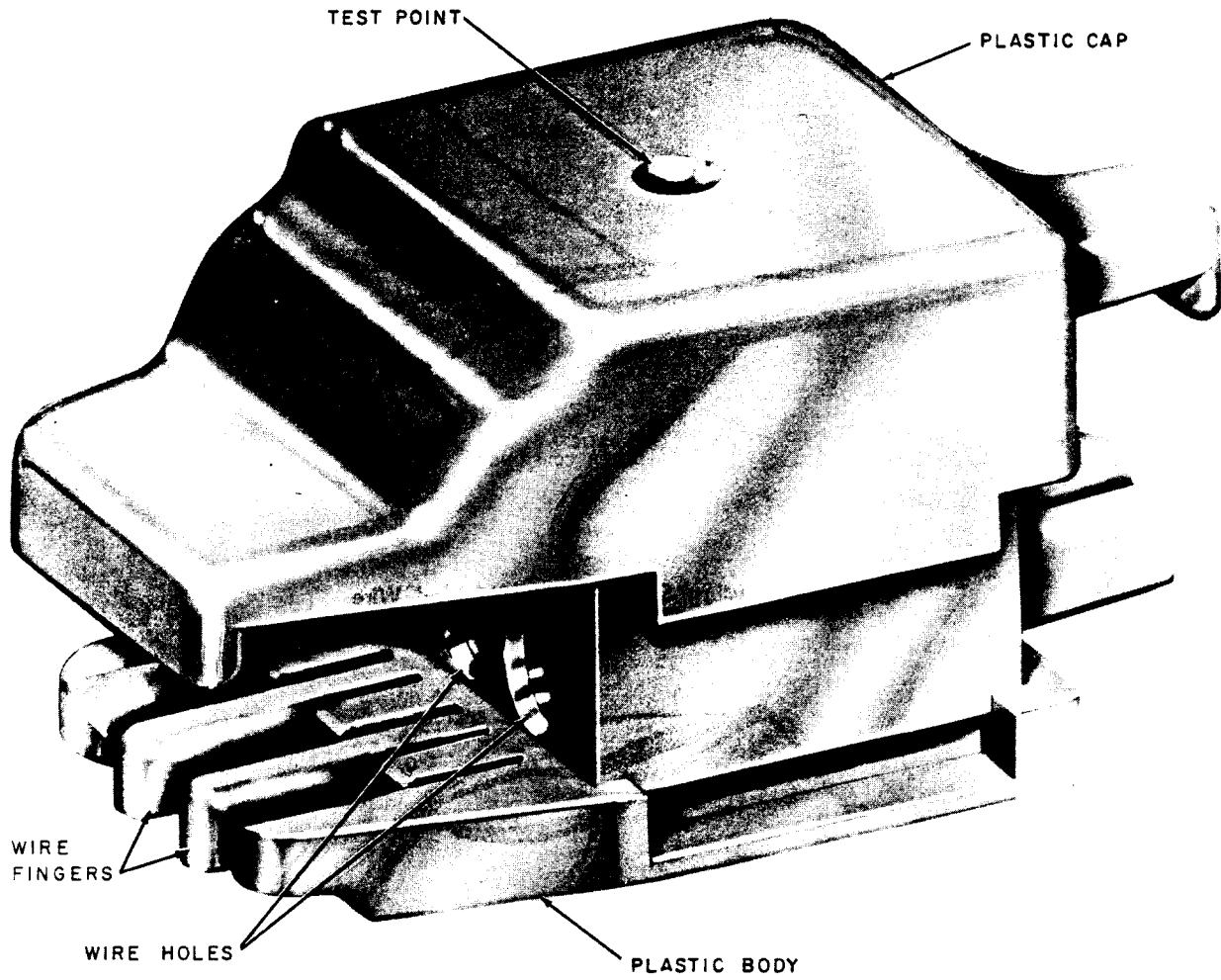


Fig. 10—700-Type Connector

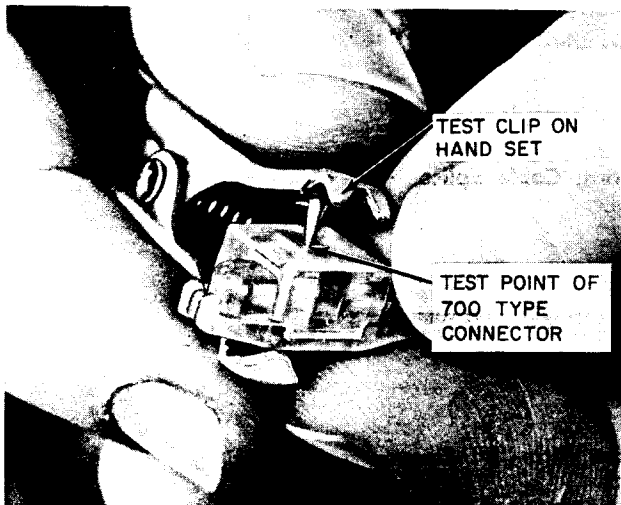


Fig. 11—Contacting Joint

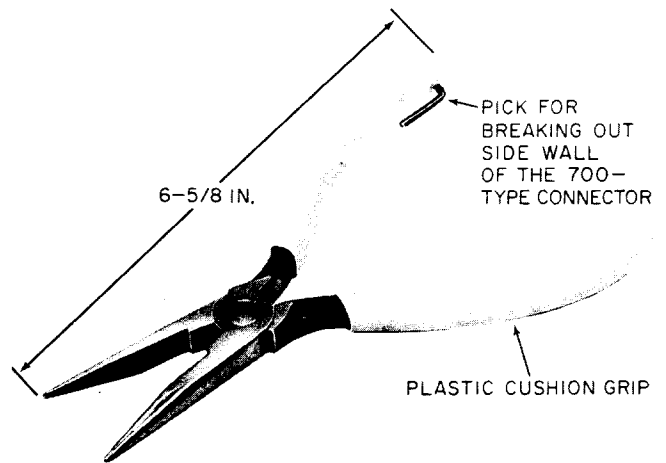
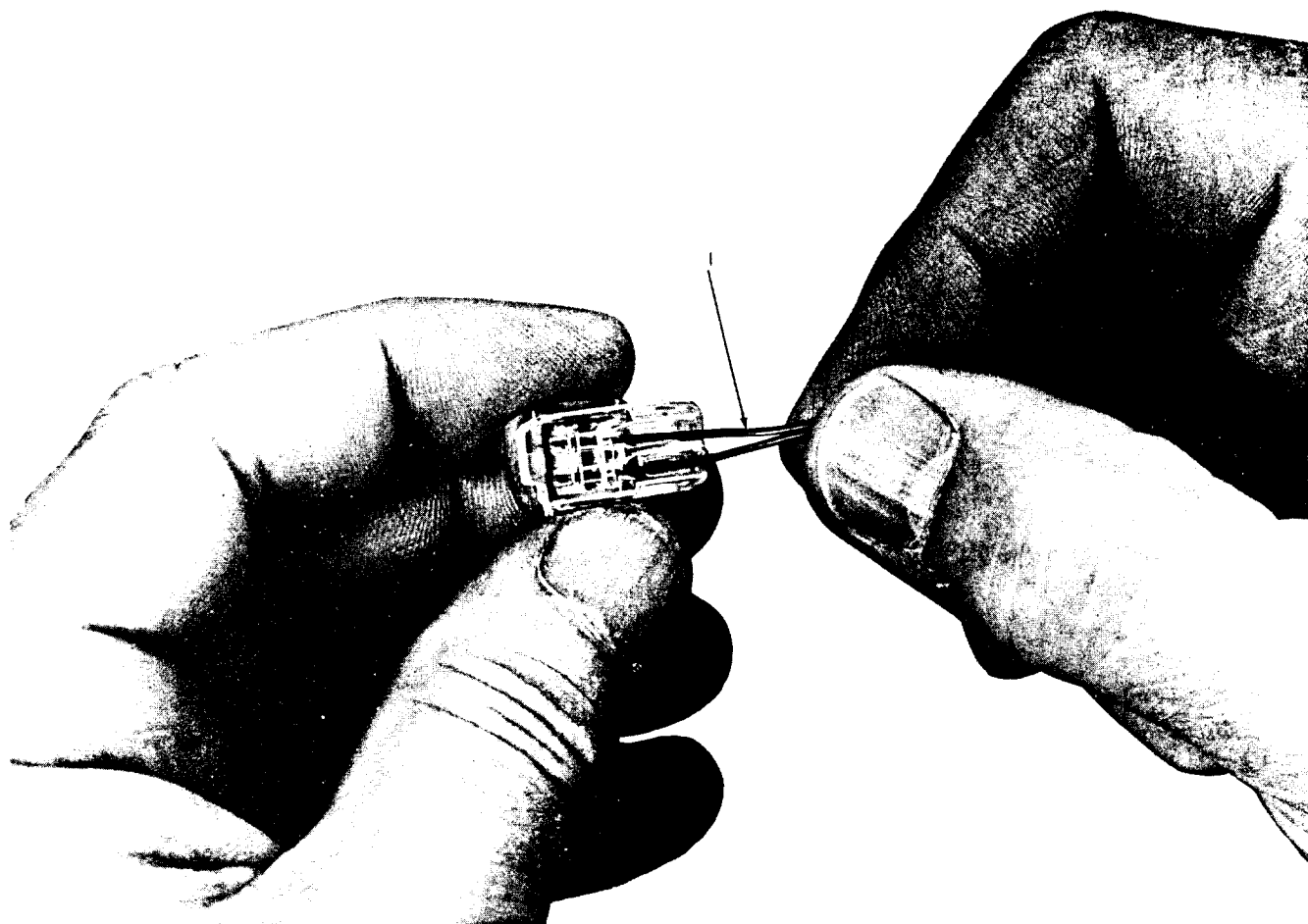
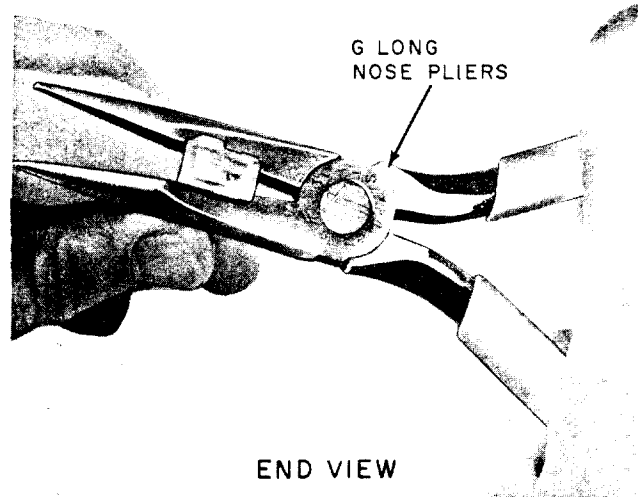
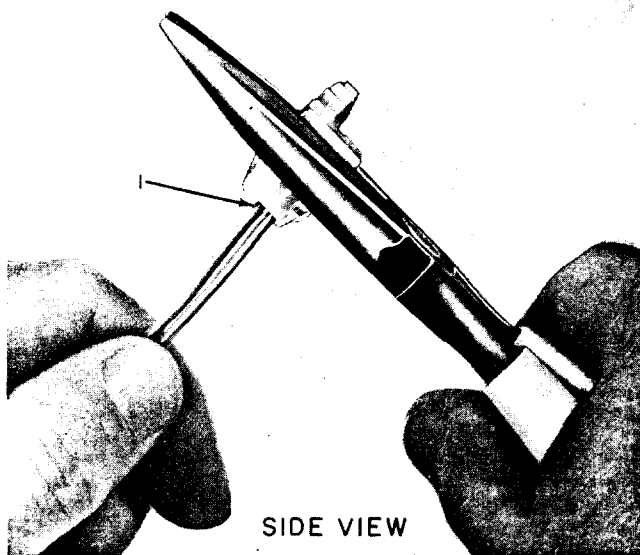


Fig. 12—G Long-Nose Pliers



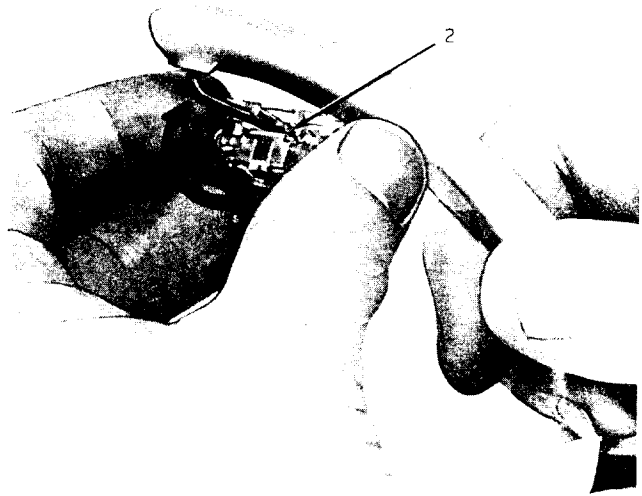
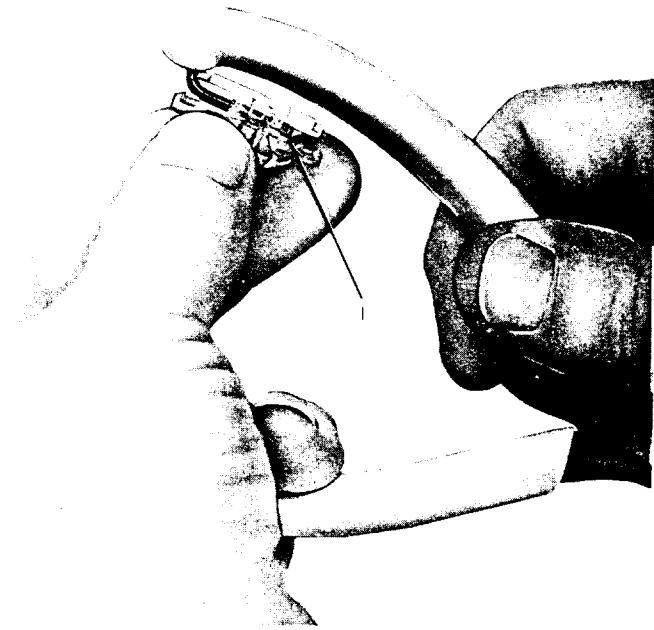
Step 1—Inserting Conductor

- ① Cut the matched conductors evenly and *FULLY* insert in the holds of the connector.



Step 2—Pressing 700-Type Connector

- ① Using G long-nose pliers, press the connector.



Step 3—Removing Side Wall for Making Bridge Splice

- ① Push pick through membrane of connector.
- ② Twist connector to remove sidewall.