711 CONNECTOR SYSTEM DUAL HALF-TAPPING AND ASSOCIATED INTERCONNECTING INFORMATION

1. GENERAL

1.1 Scope of Section

1.11 This section describes the dual half-tap tool, lists associated tools and provides a procedure for using these tools to half-tap and retrofit D4, D3, MFT, F-Signaling/SMAS on an in-service basis by utilizing 711 connector technology.

1.2 Associated Information

1.21 Refer to the following for associated information covering 711 connectorization.

1.211 I.E. Handbook 9 Section 390 for 711 connector system general splicing information.

1.212 I.E. Handbook 219 Section 824.01 for D4 Channel Bank Bay, and Section 813.01 for D3 Channel Bank Bay; Retrofit into SMAS.

1.213 I.E. Handbook 80 Section 416.01 for F-Signaling Bay, and Section 469.01 for MFT bay; retrofit into SMAS.

1.214 Refer to para. 3.15 for 711 connector data.

1.3 Precautions

1.31 Precautions to be taken against personal injury, equipment damage, and service interruptions are covered in Handbook 0; they shall be observed at all times as they apply to the operations being performed.

1.32 Specific precautions, when applicable, are included in the section associated with the particular application being performed.

1.33 Only thoroughly hands-on tool trained personnel (preferably in teams of 2) shall be assigned to this in-service retrofit program.

1.34 Before performing the work in this handbook section, the installers shall make a detailed analysis and prepare an MOP with required approvals as indicated in Handbook 3, Section 5A.

1.35 The following procedures can be used for bulk or formed cable with some modiifications and precautions to suit office conditions. There must be sufficient slack available, however, when using the dual-half tap tool R4861.

1.36 CAUTION: Loose duct wiring to 94A type connectors, terminal strips CC402037949, or to other panel or bay terminals, which could possibly be disconnected or damaged during the half-tap procedures must be securely tied to the frame or separately mounted support bars or brackets.

1.37 Always verify the wire colors and receptacle/connector numbering sequence for correctness.

1.38 To verify the color code assignments to pins, obtain the appropriate existing form cable drawings for specific retrifit program (D4, D3, MFT, F-SIGN/SMAS). Use appropriate CCED to verify color assignment on Distribution Frame for agreement with form cable connectorized group. See HB219 Sections 824.01 (D4) and 813.01 (D3) for associated information. Note that wiring to 711 connectors is paired (T.R or T1, R1) in color coded order but must be done in accordance with the specific instructions here-in for Half-Taps and SMAS cable butt splices to obtain the correct mating of receptacle assemblies.

1.39 711 Connector receptacles and mandrels must be selected for specific wire gauge and insulation types.

2. AUTHORIZATION AND APPROVAL

2.1 Authorization

2.11 The use of the 711 Connector System is not approved for usage within a Central Office unless it is requested in a job Specification or unless the Operating Company has given written approval to use this system for a specific application. Do not use this system within the confines of a Central Office without approving documentation.

2.2 Approval

2.21 The 711 Connector System has BTL approval (See para. 2.11 authorization) for splicing, half-tapping, and bridging switchboard cables within a Central Office. See HB9, Sect 390 for 711 connector usage; also BTL 711 MANUAL. See UIS, Section 390 11/20/79; See Par. 3.122 and 3.14 of Sect 390.10 for other information.

3. INSTALLING EQUIPMENT & TOOLS; TOOL SET 553; DUAL HALF-TAP TOOL R4861

3.1 Supplies

3.11 The design of the 711 Connector was formulated around the concept of securing each set of wire ends into separate plastic wire holders or receptacles. These receptacles are then subsequently joined together by a module containing beam contacts. This arrangement affords considerable flexiblility in that the connector module can be added to either receptacle to form the male side of the connector; or two receptacles can be joined with a single connector module at the time of splicing. The following is a list and description of the component parts required to assemble a 711 Connector Block.

3.12 The receptacle is a three-part plastic assembly consisting of two mandrels, around which the wire ends are formed, and a receptable housing. The tip and ring wires are placed side-by-side (preferred) in the mandrel. (see Figure 1).

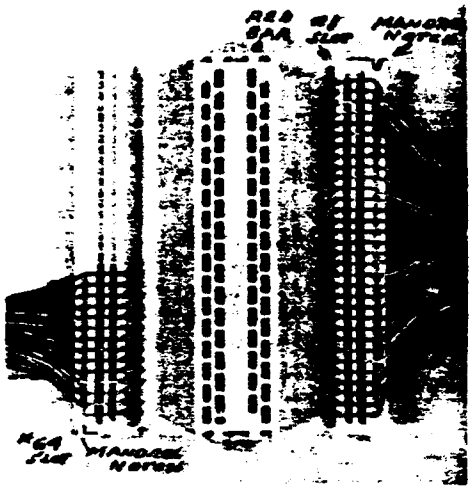


FIG. 1 RECEPTACLE - HOUSING AND MANDRELS (32 PAIR CONNECTOR) (Par. 3.12)

3.121 The mandrel is simply a plastic block that allows the wires to be formed around it in a "U" shaped manner; the small protrusions within the wire retention slots grip the conductor insulation and hold the wires in place. The wire retention feature, in addition to the bent shape of the wire, provides a strain relief. Openings are provided in both the top and bottom of the receptacle housing to allow contact entry. (See Fig. 2). An assembled unit with typical wire dress is shown in Figure 3. A typical dual half-tap receptacle is shown in Figure 4.

FIG. 2 MANDREL WIRE GRIPPING FEATURE (PAR. 3.121)

THE MANDRELS AND HOUSING ARE KEYED AND THE MANDREL MUST BE INSERTED ONLY IN THE PROPERLY ORIENTED POSITION. THE RED ALIGNMENT BAR CORRESPONDS TO NUMBER ONE POSITION.

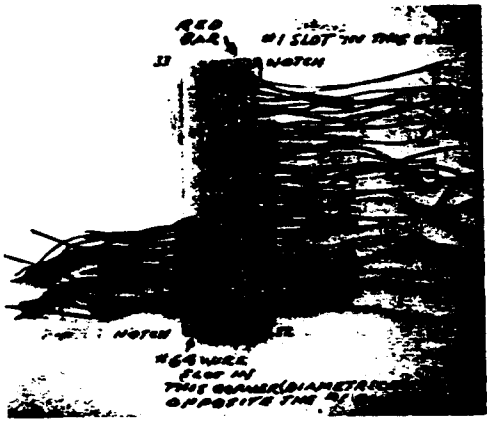
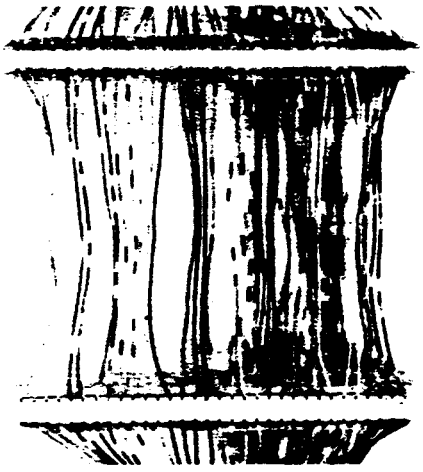


FIG. 3 ASSEMBLED RECEPTACLE AND WIRE DRESS (32 PAIR CONNECTOR) (PAR. 3.121)



(32 PAIR CONNECTOR)
FIG. 4 TYPICAL WIRED RECEPTACLES DUAL HALF-TAP ARRANGEMENT (Par. 3.121)

3.122 Because of the wire insulation gripping arrangement and the range of dielectric diameters, there are different color coded mandrels provided. It is possible to mix mandrel types in a single common housing so the full range of wire can be utilized.

3.13 The 711 Connectors are furnished in three sizes, they are the 64 wire (32 pair), the 24 wire (12 pair) and the 50 wire (25 pair) assemblies. These assemblies are 1.0" wide by .780" high. The 64 wire size is 3.56" long; the 24 wire size is 1.56" long; the 50 wire size is 2.86" long.

3.14 Refer to Tables A and B for a list of 711 Coded Part Numbers, COMCODE Numbers, and their associated description (including types of wire insulation for which used).

3.15 When the two receptacle housings and the connector module are pressed together, the slotted beam contacts of the connector module displaces the conductor insulation and provides an electric (metallic) connection between the wires secured in the top and bottom receptacles. The red bar on the end of each connector component must align with each other when connector components are pressed together. The red bar is position number one (1). Components must be pressed completely together to assure electrical continuity. (See Fig. 5).

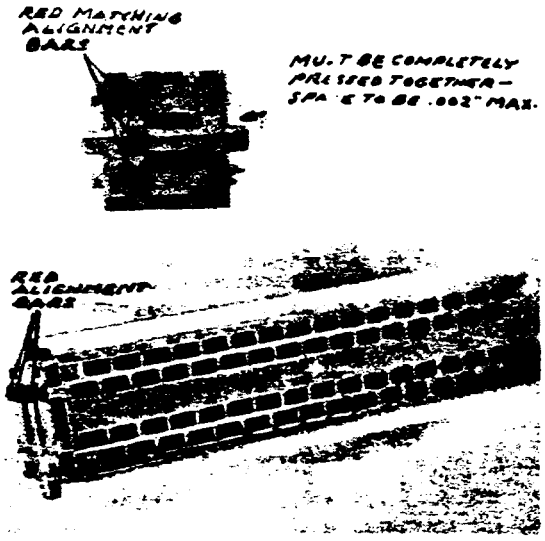


FIG. 5 TYPICAL CONNECTOR MODULE/RECEPTACLE ASSY (Par. 3.15)

*CODE NO.	COMCODE NO.	DESCRIPTION	NOTE
711RAB1-24	103043972	22, 24 GA Recpt. Assy.	1
711RAD1-24	103044079	26 GA. Recpt. Assy.	2
711CA1-24	103046231	22-26 GA Conn. Mod.	3
711RAB1-50	103043998	22, 24GA Recpt Assy	1
711RAD1-50	103044095	26GA Recpt. Assy.	2
711CA1-50	103046264	22-26 GA Conn. Mod.	3
711RAB1-64	103044004	22, 24 GA. Recpt. Assy.	1
711RAD1-64	103044103	26 GA. Recpt. Assy.	2
711CA1-64	103046272	22-26 GA Conn. Mod.	3
711RAC1-50	103044046	24 GA Rec. Assy	4

*Last two digits indicates the maximum amount of wires applicable.

NOTES: (See TABLE B for additional application information).

1 - This gray colored receptacle assembly consists of a gray housing and two gray mandrels.
2 - This receptacle assembly consists of a gray colored housing and two white colored mandrels.
3 - The connector module contains the slotted beam contacts and is colored gray.
4 - Has pink colored mandrels.

TABLE A 711 ASSEMBLY LISTINGS (Par. 3.14)

CODE NO.	COMODE NO.	DESCRIPTION
711RA1-24	103043865	Receptacle Housing
711RA1-50	103043881	Receptacle Housing
711RA1-64	103043899	Receptacle Housing
711MB1-24	103043626	Mandrel, 22-24 GA, BU;BW (Gray)
711MB1-50	103043659	Mandrel, 22-24 GA, BU;BW (Gray)
711MB1-64	103043667	Mandrel, 22-24 GA, BU;BW (Gray)
711MD1-24	103043782	Mandrel, 26 GA, BY;D (white)
711MD1-50	103043816	Mandrel, 26 GA, BY;D (white)
711MD1-64	103043824	Mandrel, 26 GA, BY;D (white)
711MC1-50	103043733	Mandrel, 24 GA, "D",BU,(pink)

NOTE: See BTL 711 manual for other wire types; also HB9 Section 390.

TABLE B 711 INDIVIDUAL PARTS LISTING (Par. 3.14)

3.2 Tools and Tool Sets Required

3.21 a) Tool Set 553 contains the R-4861 dual (IN-LINE) half-tap tool and associated tools.

b) Tool Set 546 contains the R-4773 (850A) cutter-presser and associated tools for splicing.

c) 94A Connector Tool.

d) Butting-Stripping Tool R-4366.

e) Midget wire cutters, pliers 3/16" screwdriver and other tools available to installer.

f) Allen Wrench Set R3780.

g) Ty-Wraps R-4265 L2, 3, 4.

h) Ty-Wrap Tool R4266.

i) ITE6103 in-service lead verification set.

3.22 Refer to I.E. Handbook 9 Section 390 for use of Tool Set 546 and R-4773 cutter-presser tool.

3.23 Description of Tool Set 553

3.231 Tool Set 553 and the R4861 dual half-tap tool have been developed for equipment retrofits on an in-service basis using 711 connector system technology. In-service equipment cut overs involve dual (IN-LINE) half-tapping 711 receptacles to the continuous cables leading to the embedded equipment; connecting these receptacles, through 711 connector modules, to the 711 receptacles on the "ADD ON" equipment cables. Checking or testing the rearrangement and then cutting and removing the IN-LINE wires between the "IN" and "OUT" add on equipment cable receptacles. Other combinations of connectorization are also possible with this tool set and/or other tool sets developed for the 711 connector system. Initial utilization of tool set 553 is for D-3, D-4, MFT and F-Signaling transmission equipment.

3.232 Tool Set 553 Details (See Fig. 6)
Tool Set 553 specification and check list are included in case.

R - 4861 DUAL HALF-TAP TOOL
" DET 1 FORMING HEAD
" DET 2 SUPPORT ROD
~~" DET 3~~ ROD CLAMP (710A2,CC103059085)
" DET 4 VERIFICATION COMB
~~" DET 6~~ RETAINER TOOL (CC842689655)
" DET 8 SPARES KIT
" DET 9 CASE
" DET 11 STANDOFF
" DET 12 SUPPORT BAR
" DET 13 840059083

R-4871 List 2 Mass Cutter 25 Pair
R-4871 List 3 Mass Cutter 32 Pair
R-4862 Connector Press Tool (853A)
~~R-4773 DET1~~ Universal Vise Clamp (710A5,CC103059119)
R-4775 852A Single Lead Tool (Must have cutting blade removed for use with the R4861 dual half-tap tool)
X1 ID Plate 32 pair (comcode 843471194)
Z1 ID Plate 32 pair (comcode 843471202)
X1 ID Plate 25 pair (comcode 843471178)
Z1 ID Plate 25 pair (comcode 843471186)
(These ID plates are colored yellow and may also be in tool set 546)

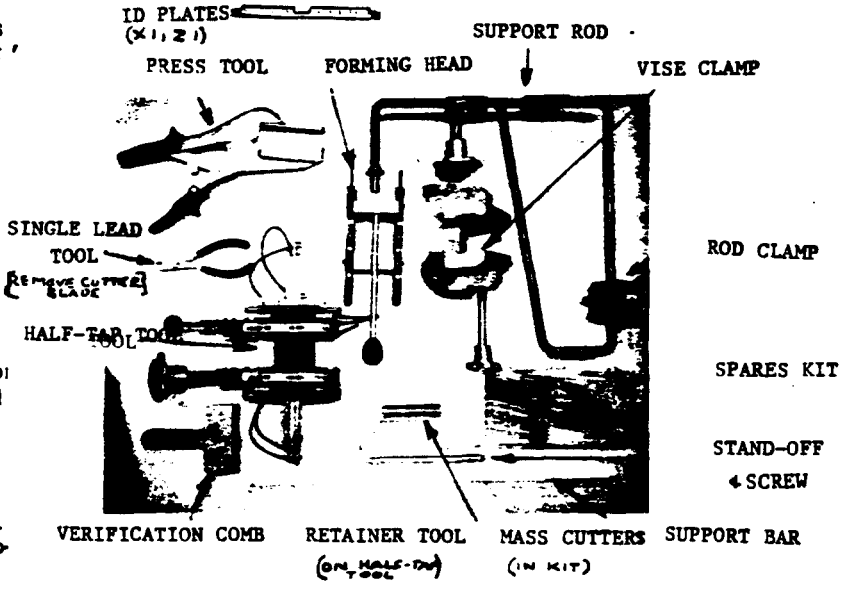
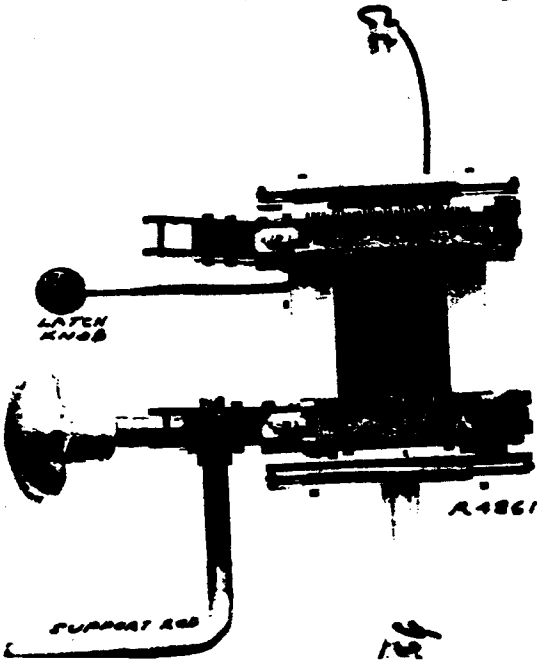


FIG. 6 TOOL SET 553
(PAR. 3.232

3.24 Description of the R-4861 Dual Half-Tap Tool

3.241 The R4861 tool has been developed for use on in-service equipment cut overs to allow simultaneous insertion of two IN-LINE half-tap 711 typereceptacles, approximately 3 inches apart, in continuous cables leading to the embedded equipment frame. It is the basic tool.

3.242 The R4861 tool is a manually operated, tandem double mandrel tool consisting of four wire fanning combs, two sets of mandrel retainers, two wire retaining springs, and a removable R4861 DET 1 forming head. The forming head is used to simultaneously press the wires into the mandrels. The tool is clamped to the support rod. See Fig. 7.



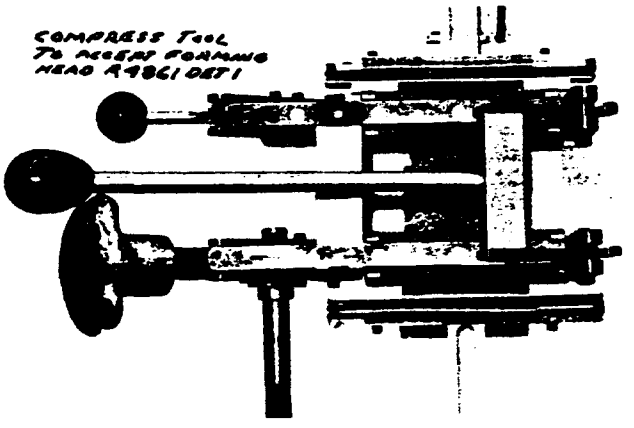


FIG. 7 R4861 TOOL AND FORMING HEAD (PAR. 3.242)

3.243 The movable wiring platform must be compressed as shown to install the forming head. The tool is held in this position by the latch. Later it will be shown how this tool compression is used to obtain wire slack. The tool is compressed by pressing downward on the movable comb until engaging the latch. See Fig. 8

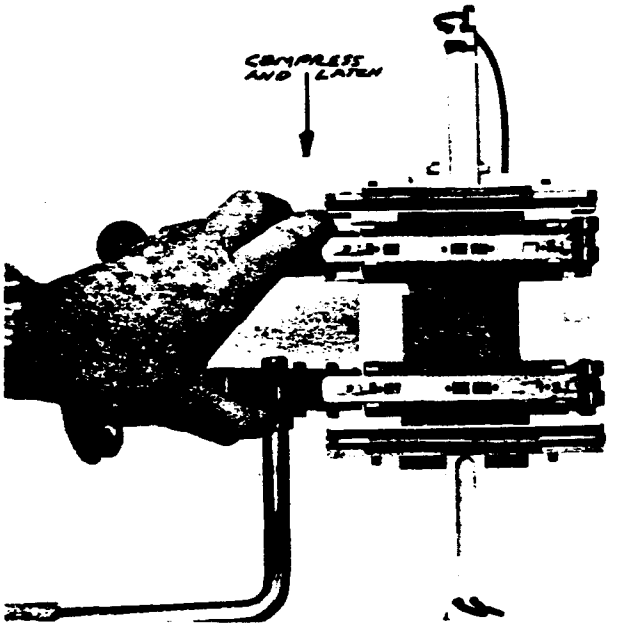


FIG. 8 COMPRESSED CONDITION (PAR. 3.243)

3.244 Mandrels are wired with the tool expanded. To expand the tool, remove the forming head and pull the latch outward. Caution: The platform is spring loaded, and it must be held and eased into position when releasing the latch.

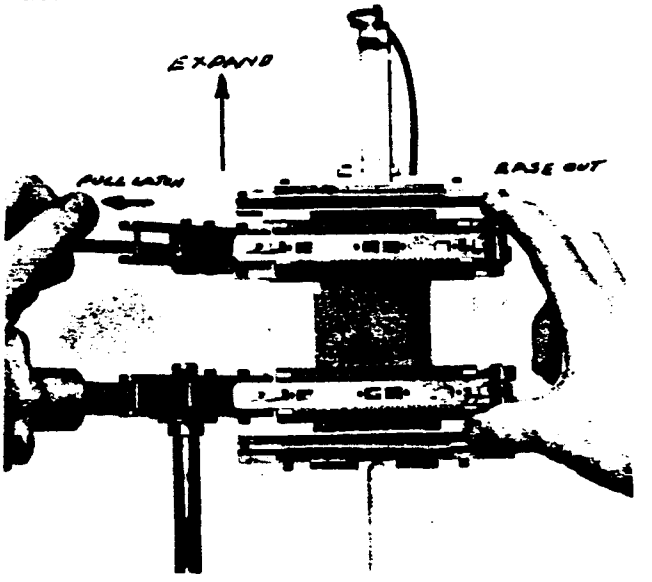


FIG. 9 EXPANDING THE TOOL (PAR. 3.244)

3.245 The tool mounts on the central office rolling carrier with the aid of R-4773 DET 1 (or 710A5) universal vise clamp, R-4861 DET 2 support rod and (710A2) Rod Clamp. (See Fig. 10). The support rod comes in two pieces and must be securely locked together by bolt and nut provided.

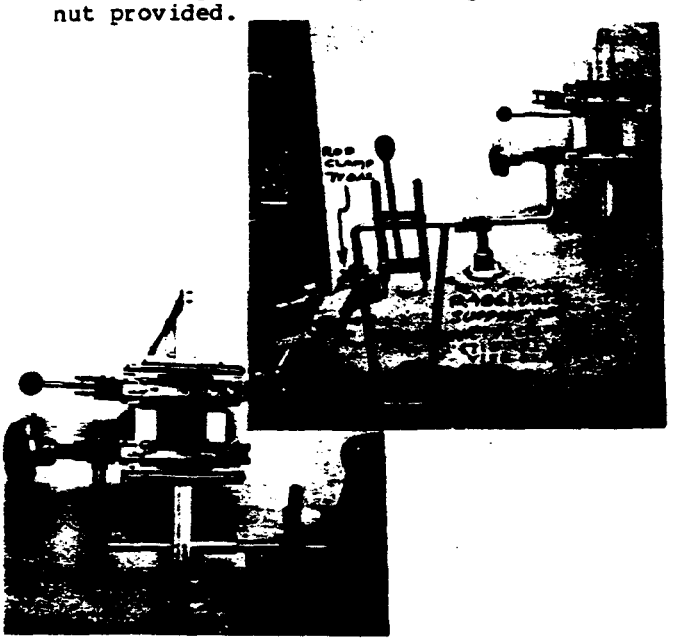


FIG. 10 MOUNTED R4861 TOOL (PAR. 3.245)

3.246 The tool can be adjusted to desirable positions, through swiveling adjustment of the clamps and support rod.

3.247 The R4861 tool can be adjusted to accept the 25, or 32 wire mandrel. Use the retainer removal tool (842689655) to remove and adjust the mandrel retainers in the slots provided. Use care not to loose retainer springs. See Fig. 11.

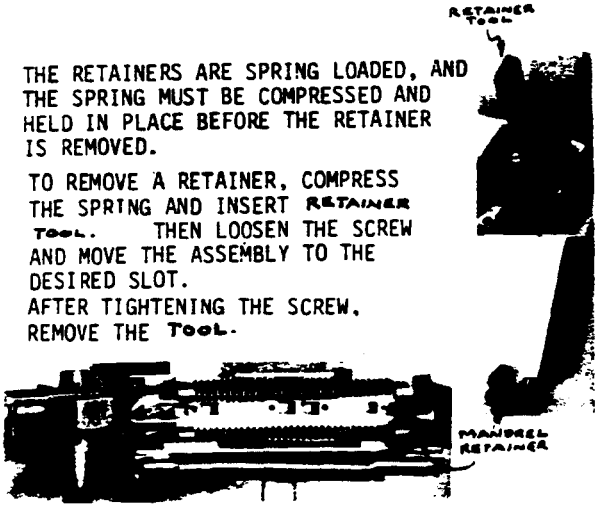


FIG. 11 MANDREL RETAINER ADJUSTMENT (PAR. 3.247)

3.428 It is important that the tool comb, mandrel, retainer relation-ship always be checked for proper alignment. Use a rigid steel rule to check that the upper and lower combs align with the mandrel slots at both ends of the mandrel; or place a taut wire, of the wire gauge to be fanned at each end of the mandrel and into the gripping springs to see that alignment exists. See Fig. 12.

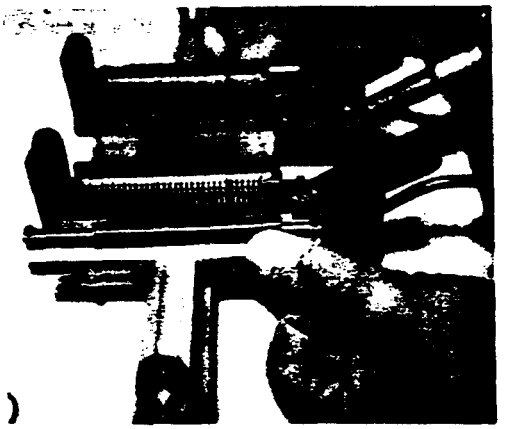


FIG. 12 CHECKING ALIGNMENT (PAR. 3.428)

4. PREPARING THE BAY CABLES WITH 711 TYPE CONNECTOR DUAL HALF-TAPS

4.1 Equipment Preparation

4.11 Refer to handbook sections listed in Para. 1.2 of this section. Caution: Care must be taken to assure that any wiring other than those being half-tapped, emanating from or going to the bay equipment is adequately secured to frame or other support so as to prevent discontinuity or service disruption (TS402037949 or 94A connector wiring, for example).

4.12 Because of wire and cable density between frames, it may be necessary to pull the cable bundles out for access and to rest or secure them on/to frames, etc. Support bars R-4861 DET12, standoffs R-4861 DET11 and screws R-4861 DET13 can also be used for this purpose. Standoffs can be temporarily screwed (using 3/8 inch socket wrench) into mounting holes on frame with spacing of 20 inch centers. Where frame holes are holding a channel bank mounting screw, the screw may be temporarily replaced by a standoff. See Fig. 13.

FIG. 13 CABLE SUPPORT BARS AND STANDOFFS (PAR. 4.12)

4.13 The recommended procedure is to start half tapping of the cabling to the lowest bank first, and then to work upwards. Where a series of bays are in a row, consideration may be given to do the banks that are on the same level, in sequence.

4.14 Sufficient slack must be available in the cabling to use the R4861 tool for the 711 half tapping operations.

4.15 The cabling, binders and/or wiring to be half-tapped for any specific bank, must be carefully determined, selected, arranged, identified and prepared prior to using the tool. Refer to job drawings for connector locations, and associated information. Refer to specific handbooks for wiring information.

4.16 A minimum of 14 inches of exposed wiring length is required for dual half tapping operations with tool R4861.

4.17 Obtain the correct 711 connector components which will be required for specific equipment being retrofitted. Refer to Tables A and B in Par. 3.14. Note also that mandrels for 26 gauge wire are colored white; mandrels for 22-24 gauge wire are colored gray. Inspect all connector components for damage.

4.2 R-4861 Tool Setup

4.21 Set up the R4861 tool on a rolling ladder, or other stable, sturdy support which may be convenient for the particular level of operation and for the installer. R-4773 DET 1 universal vise clamp, ~~R-4861 DET 3~~ Rod Clamp, and R-4861 DET2 support Rod are used for this purpose. See Fig. 14 for set up of hardware.

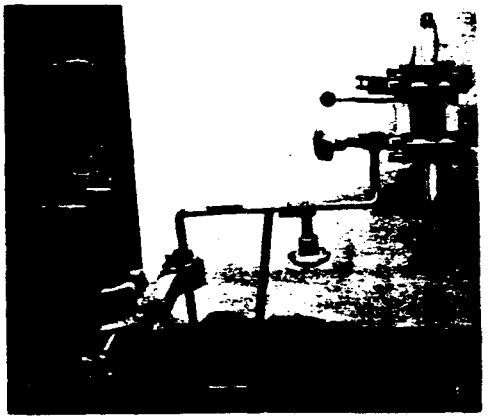


FIG. 14 TOOL MOUNTING ARRANGEMENT (PAR. 4.21)

4.211 The support rod consists of two parts which must be preassembled: a bolt and nut which are provided, must be used for securing both parts of the bar together (See Fig. 15). Note that the ~~R4861 DET 3~~ rod clamp connects to the ~~R4773 DET1~~ vise clamp. The vise clamp can be mounted to suit the installers preference.

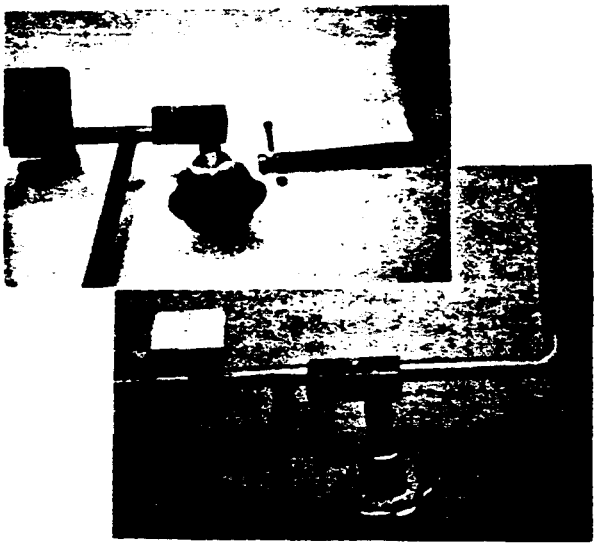


FIG. 15 SUPPORT ROD ARRANGEMENT (PAR. 4.211)

4.23 The movable comb is referenced with the main frame cable. The stationary comb (or clamp part) of the R4861 tool must be referenced with the equipment cable.

4.24 Position the R-4861 tool as required to freely accommodate the exposed cable or binder wiring (minimum 14 inch length) for the half-tapping operation. Adjusting can be made on the various clamps to fit the tool to the proper work position. See Fig. 16.

FIG. 16 TOOL POSITIONING
(PAR. 4.24)

4.25 Check that the combs are extended to the full open position each time a new pair of mandrels is to be wired. This is very important because the tool may have been left in the closed position inadvertently during handling. This can also occur following the completion of a previous half-tap operation. The upper comb is movable. A knob on the left side of the tool is moved outward to unlatch the upper comb from the closed locked position. Note: The upper mandrel is spring loaded; ease it into the extended position when unlatching. See Fig. 17.

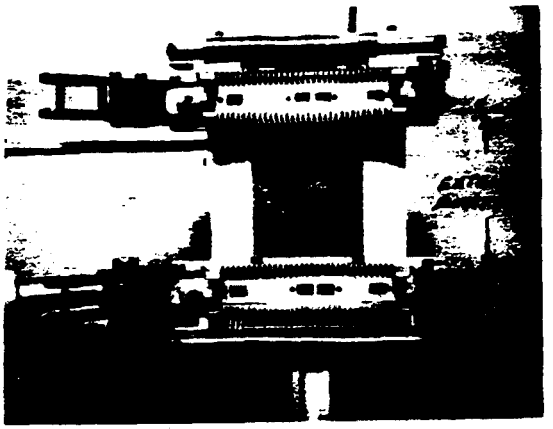


FIG. 17 EXTENDED COMB POSITION
(PAR. 4.25)

4.26 The tool is designed to accept ~~12~~ 25 or 32 wire mandrels. The mandrel retainers must be spaced in the tool so as to accept the specified mandrel size. See Fig. 18. ~~R4861 DET 6 retainer tool~~ is used to change retainer position.

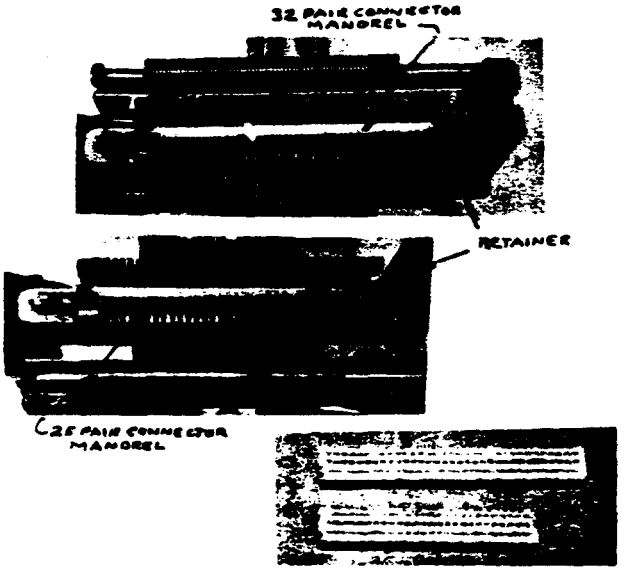


FIG. 18 RETAINER POSITIONS
(PAR. 4.26)

4.3 Half-Tap Procedure

4.31 Select the correct color mandrel for the specific gauge of wire to be half-tapped. The 26 gauge mandrels are colored white. The 24-22 gauge mandrels are colored gray. Caution: Do not mistake mandrels that are colored light gray for white.

4.32 One at a time insert the two correct mandrels properly and pressed fully down between the two spring loaded mandrel retainers in the R-4861 tool. Make sure that the slotted (notched) end of the mandrel is pointed to the left, toward the forming head hinges on the clamp side of the R4861 tool. The mandrel wire separation peaks are pointed outward. The mandrel ends must be properly seated in the retainers or damage may result to the wires and tool. See Fig. 19.

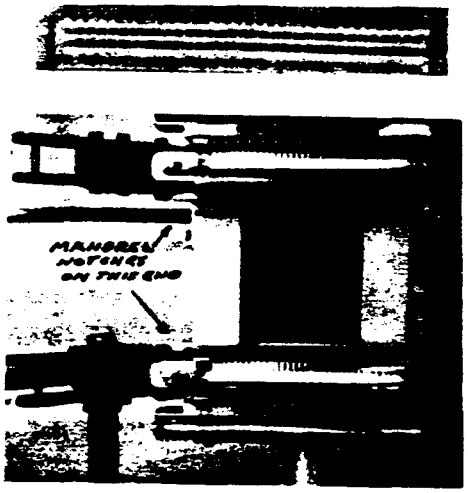


FIG. 19 MANDREL POSITIONING
(PAR. 4.32)

4.33 It is imperative that cable binders and/or wire bundles to be half-tapped for each channel bank be correctly identified and marked before starting the half-tap procedures. Refer to appropriate wiring documents for requirements.

4.34 Sufficient slack must be available for fanning and half-tapping procedures. Select the first wire bundle to which the receptacles are to be half-tapped. Separate the wire pairs to aid in the fanning operation.

4.35 Clamp a minimum of 14 inches of the wire bundle between the elastic cord cable ties on the R4861 tool. There should be at least 5 inches distance under the bridged (looped) bundle to the tool platform. Wrap the free ends of the elastic cords around the wire bundle; press and secure the cords in the tapered tool slots. See Fig. 20.

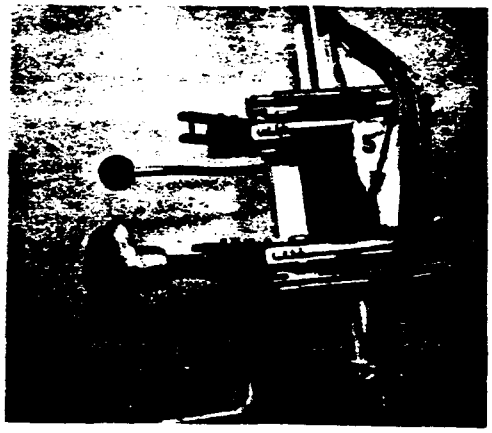


FIG. 20 WIRE BUNDLE IN TOOL
(PAR. 4.35

4.36 Separate out the first 32 wires (16 pairs of T and R wires) to be placed if a 32 pair connector is used (24 wires if a 25 pair connector is used). Move the remaining wires to the right away from the tool. See Fig. 21.

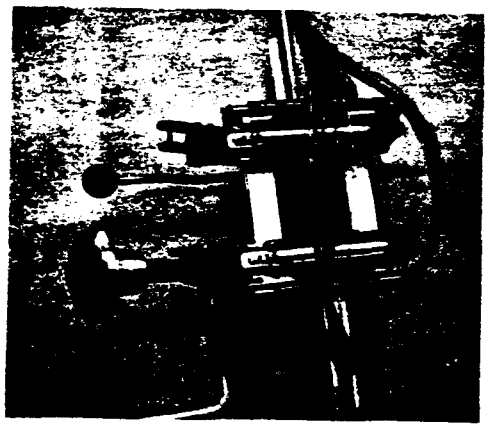


FIG. 21 WIRES TO BE FANNED
(PAR. 4.36)

4.37 Check that the upper comb is in extended position.

4.38 Select the first wire pair (color coded order). Untwist the pair over a 7" length in the center and carefully stretch the wires straight beyond the retainer springs. Dress the T and R wires respectively (T on left and R on right) into the first and second slots on the extreme left end of each set of combs, and into the springs. The wires must be dressed positively into and downward into the springs to be held securely. Important: Each wire must be in the correct comb slot and there must be no twist or wire cross all the way to and also slightly beyond the outside of the springs (twisted wire can result in wire breakage in later operations). Dress and center the wires so that there is an equal amount of wire on the outside of each spring. See Fig. 22.

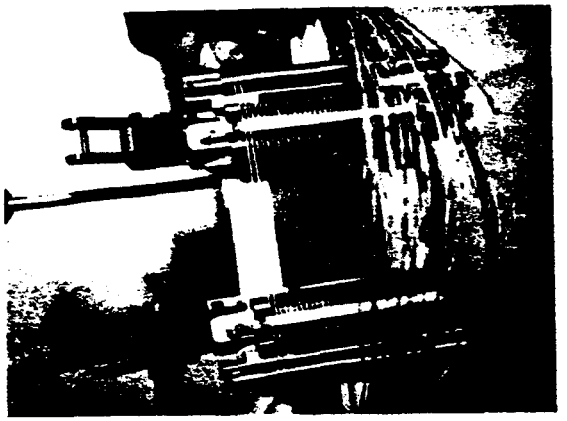


FIG. 22 FIRST FANNED T AND R WIRES (PAR. 4.38)

4.39 In correct sequence, continue fanning T and R wires in the bundle until all of the comb mandrel slots are filled in the 32 wire mandrel (fill the first 24 mandrel slots in the 25 wire mandrel; the last slot is empty). Verify the wiring for correct location in slots, only one wire in a slot, no T & R crosses, no empty slots in the 32 wire mandrel (the last slot in the 25 wire mandrel is empty). See Fig. 23. Dress and center the wires so that there is an equal amount of wire on the outside of each spring.

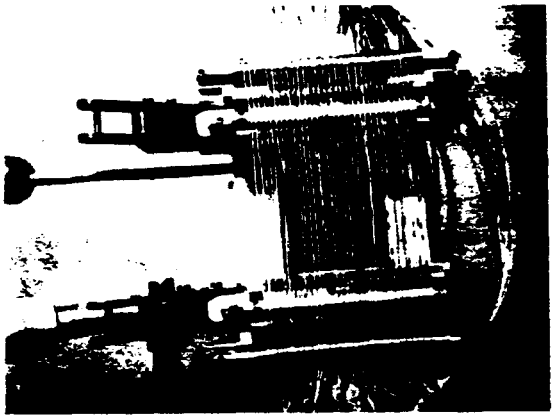


FIG. 23 FANNED T AND R WIRES (PAR. 4.39)

4.310 Before continuing refer also to Par. 4.311. Use the wiring verification comb R-4861 DET 4 to check for crossed wires, empty slots and wires in wrong slots by gently combing downward and upward . See Fig 24.

FIG. 24 USING VERIFICATION COMB (PAR. 4.310)

4.311 Slack is needed for folding the wires over the two mandrels. This is obtained by compressing the tool (moving the upper comb toward the lower comb and latching it in place) while simultaneously gently pressing the wires in the center downward with the verification comb (this procedure can be accomplished sequentially with the verification check in Par. 4.310. Note that the latch engages with an audible snap. See Fig. 25.

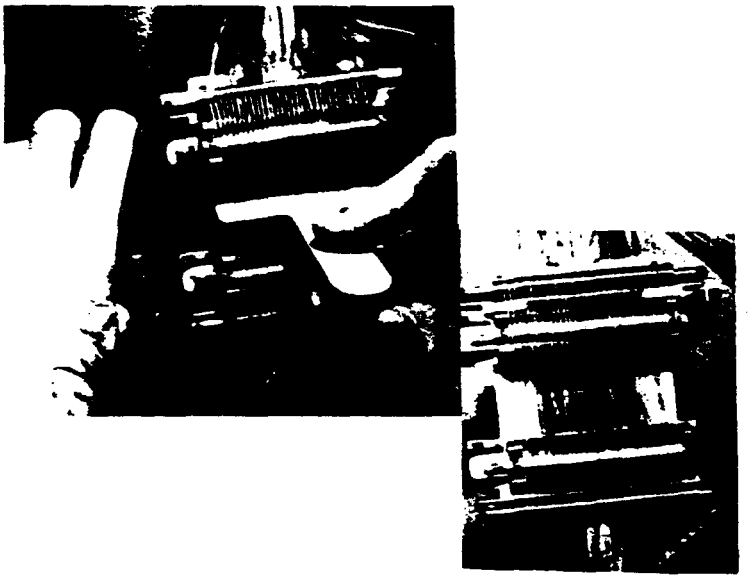


FIG. 25 CREATING SLACK BETWEEN COMBS (PAR. 4.311)

4.312 Check that all wires are in place and have not moved out of the combs and springs; check also that the wires are in the correct mandrel slot location

4.313 Engage the R4861 DET 1 forming head with the R4861 tool by sliding the slotted ends of the forming head onto the R4861 tool hinge pins on the clamp side; bring the forming head cams under the rollers of the R4861 tool. See Fig. 26. Refer to Par. 4.314 before proceeding.

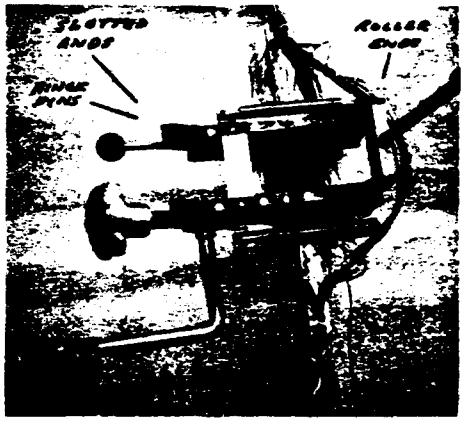


FIG. 26 FORMING HEAD ENGAGEMENT (PAR. 4.313)

4.314 Carefully close the forming head handle, but not all the way, only until the forming heads have contacted and are holding all of the mandrel wires in place. Carefully pull the wires out of the springs. See Fig. 27.

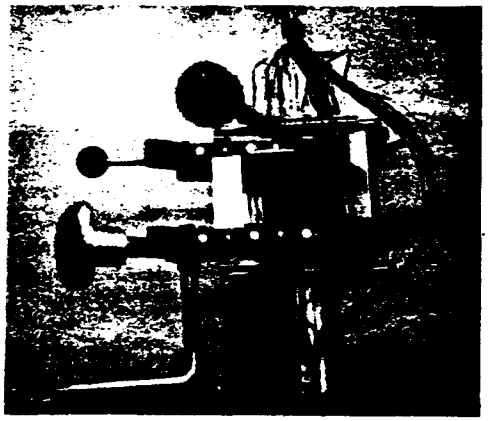


FIG. 27 PARTIAL HEAD CLOSURE - PULL OUT SPRING WIRES (PAR. 4.314)

4.315 Carefully close the forming head handle all of the way to the stop. (If for any reason there is excessive or undue resistance to the forming head stuffers as they press the wires around the mandrel, it may be caused by two wires in the same slot; if so, corrective action should be taken before continuing). See Fig. 28.

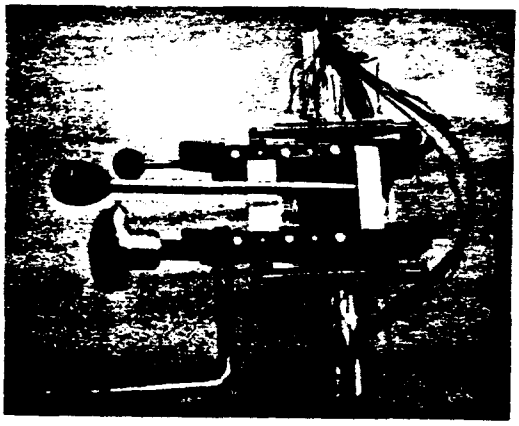


FIG. 28 CLOSING FORMING HEAD (PAR. 4.315)

4.316 Pull the R4861 DET 1 handle open. CAUTION: If a mandrel binds in the forming head stuffer, it may be a sign of two wires in the same slot and should be corrected.

4.317 Remove the R4861 DET 1 forming head tool from the R-4861 tool. Verify that all wires are filling the correct mandrel slots and are properly wrapped around the mandrels. Make visual color code check.

4.318 Select the appropriate receptacle housing and note the red alignment bar on one end. Place the housing over the upper cable mandrel with the red alignment bar down and pointing to the left toward the R-4861 hinge (same positioning as the mandrel notch). The red alignment bar and the mandrel notch correlate with the number one wire position. See Fig. 29.

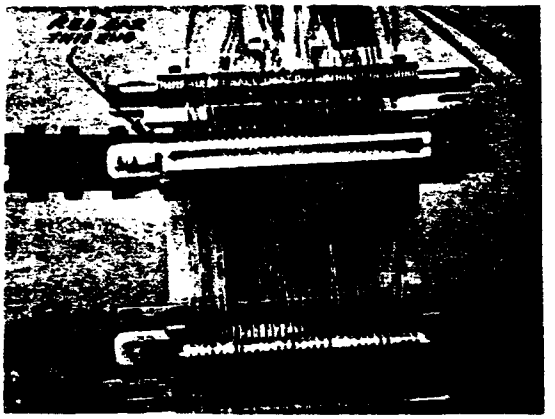


FIG. 29 PLACING RECEPTACLE HOUSING ON MANDREL (PAR. 4.318)

4.319 Press the housing firmly over the mandrel to fully insert the mandrel in the housing. The spring loaded mandrel retainers will CAM outward to release the mandrel. The mandrel and housing latches will audibly snap in this operation and indicate seating of the mandrel in the housing. See Fig 30.

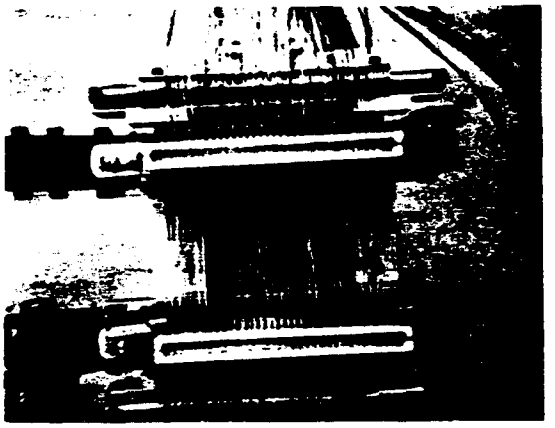


FIG. 30 COMBINING THE HOUSING AND MANDREL (PAR. 3.319)

4.320 Repeat the same procedure as in Par. 4.318 and 4.319 above to place a housing on the lower cable mandrel in the stationary comb.

4.321 Release the tie bands from the upper wire bundle so that the wired assembly may be removed. Do not release the bottom wire bundle tie bands (this orients the wires for the next operation).

4.322 Remove both receptacle/mandrel assemblies from the tool and place them carefully to the right side of the tool See Fig. 31.

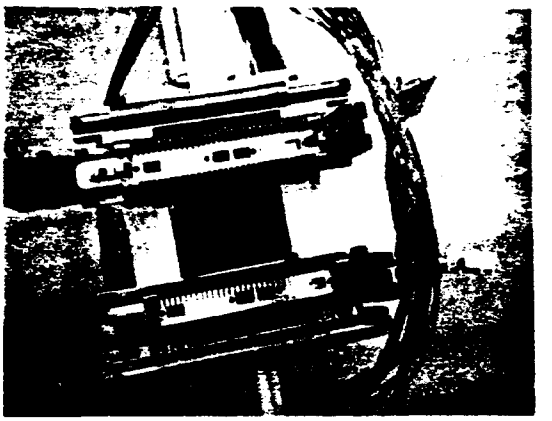


FIG. 31 RECEPTACLE/MANDREL (PAR. 4.322)

4.323 Extend the upper comb. Release the movable comb latch knob on left or hinge side of the R-4861 tool. Gently restrain the comb while it is moving to the full open position (approx 4 inches). It is important that this be done, to prepare the tool for subsequent operations. See Fig. 32.

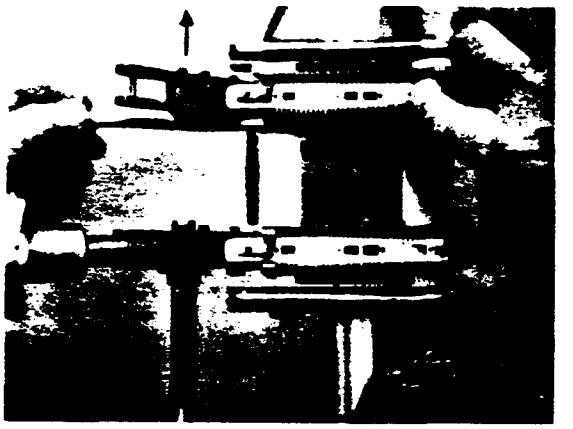


FIG. 32 EXTENDING THE COMBS (PAR. 4.322)

4.324 If a T & R reversal or other wiring problem is to be corrected in a mandrel/receptacle assembly refer to Par. 4.5 for the procedure.

4.325 The following procedures prevail for the remaining wires in the wire bundle.

4.326 Refer to Par. 4.31 and 4.32 for proper selection and insertion of mandrels into the R4861 Tool. Check for extended combs. Install two appropriate mandrels in the tool, with notches to the left as before. Place the remaining wire bundle into position with a 5 inch space under the bundle loop. See Fig. 33.

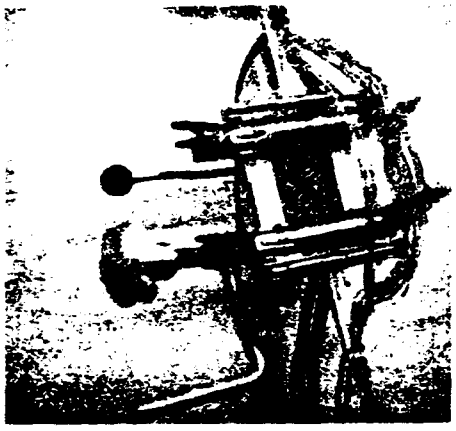


FIG. 33 WIRING SECOND MANDREL SET (PAR. 4.326)

4.327 IMPORTANT: This part or phase of the procedure must be started with deliberate care, depending on connectors used (32 pair or 25 pair).

4.328 Select the first of the remaining T & R wires in the wire bundle and continue to place in color coded order. See Par. 4.38 and 4.329.

4.329 For 32 wire mandrels start at the first left slot (25 wire mandrels start at the first left slot). Both upper and lower mandrels should have the same number of wire slots.

4.330 Depending on the mandrels used place and dress the first "T" wire into the proper mandrel comb slot (See Par. 4.329). Place and dress the "R" wire into the adjacent right side comb slot. Note that the wires must be carefully stretched without twist beyond the retainer springs when fanning, placing and dressing wires in the combs. Verify that these first wires have been correctly located.

4.331 Fan the remaining T & R wires respectively, in proper sequence to the right and into the comb slots. There should be no wires remaining to be fanned. See Fig. 34 (32 wire mandrel).

Note: Completed 32 pair receptacle assemblies will have positions 50 through 64 filled, and 33 through 49 empty. Completed 25 pair receptacle assemblies will have positions 25 and 26 empty.

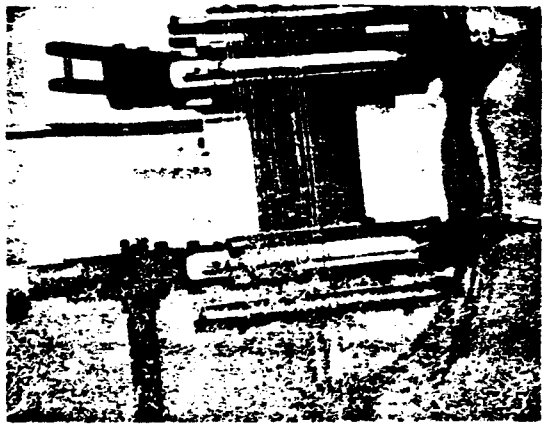


FIG. 34 FANNED REMAINING WIRE BUNDLE (PAR. 4.331)

4.332 Verify that there are no empty slots between the first and last wires; check for T & R reversals and wrong wiring; no two wires in one slot; the first slot on the left should be filled for the 32 wire and 25 wire mandrels.

4.333 Use the verification comb (refer to Par. 4.310 and 4.311) to make above checks and obtaining wire slack.

4.334 Complete remaining procedures Para. 4.312 through 4.317 (removal of forming head).

4.335 Carefully flip or swing the two previously wired receptacle assemblies around and over the newly wired mandrels so that the red alignment bars are up and on the right facing the R-4891 tool rolls. See Fig. 35.

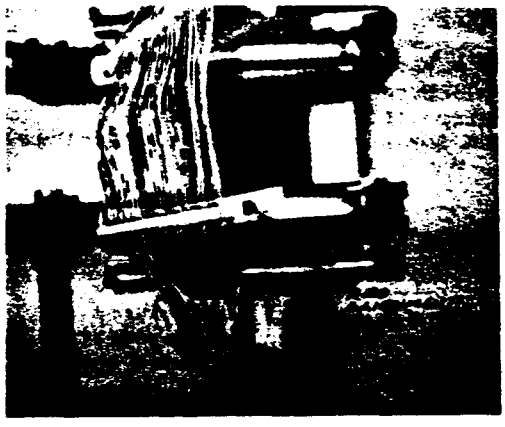


FIG. 35 FLIPPED RECEPTACLE ASSEMBLES (PAR. 4.335)

4.336 Place the two wired receptacles on the newly wired respective upper and lower mandrels in the R-4861 tool. Press the receptacles onto the mandrels until an audible click or snap is felt. Check that the red bars are up and to the right.

NOTE: The alignment notches of the mandrels in the tool combs will be in the 64 wire corner (or 50 wire corner of 50 wire connector) of the receptable; and should be diagonally opposite the notches of the mandrels aligned with the red alignment bar (#1 wire corner) of the receptacle housing.

4.337 Remove the elastic ties from the incoming and outgoing cable.

4.338 Remove the wired receptacle-mandrel assemblies from the R-4861 tool. Check that the mandrels are fully seated in the housings and that the notch-alignment bar relationships are correct. View the housing windows to see that the wires are centered and intact. See note in Para. 4.331.

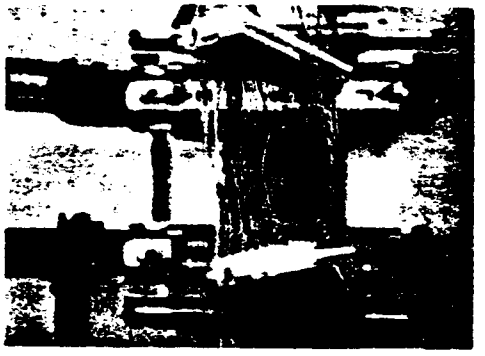


FIG. 35A REMOVING ASSEMBLY (PAR. 4.338)

4.339 Tag the completed half-tap in accordance with other associated wiring documents and/or handbook instructions.

4.340 Make continuity checks in accordance with associated installation test instructions. Refer to Para. 4.4 for method of test connecting. Refer to Para. 4.5 for wiring error repair.

4.341 Tie the half-tapped cable out of the way.

4.342 Repeat half-tap procedures for other wire bundles associated with the channel bank. Position the tool as needed.

4.343 NOTE: No more than two (2) dual half-taps should be positioned side-by-side. Allow at least three (3) inches between other connectors in other bundles. See Fig. 36.

FIG. 36 HALF-TAP SPACING DIFFERENT BUNDLES (PAR. 4.343)

4.344 Position the R-4861 tool to suit as it is moved to each higher channel bank in the bay. Repeat the half-tap procedures as above.

4.4 Testing The Half-Tapped Receptacles

4.41 Verification of continuity tests should be accomplished in accordance with associated I.E Handbook test instructions.

4.42 Various techniques may be used to obtain test probe points.

4.421 A test module can be aligned (red color bars) and pressed onto the inside face (between half-tap receptacles) of the receptacle to be checked. Use an unwired blank receptacle assembly and the R-4862 tool with spacer block for the pressing operation. The unwired receptacle is then pried off by twisting a 3/16 inch screwdriver tip in the end slots. The exposed slotted beams can be used as probing contacts. After tests are concluded, the test module is also removed by twisting the 3/16 inch screwdriver in the end slots.

FIG. 37 TEST MODULE WITH EXPOSED BEAM CONTACTS (PAR. 4.421)

4.422 If desired the test module in 4.421 can be equipped with a "permanent" pressing receptacle having 22 gauge bare strap wiring inserted in the white 26 gauge mandrels. The 22 gauge bare wires in the receptacle windows can be used as test probe contacts. See Fig. 38. The receptacle is not removed from the module (remains mated to module).

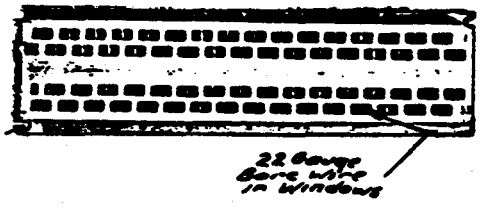


FIG. 38 TEST MODULE WITH "PERMANENT" BARE WIRE RECEPTACLE

4.423 Cabled test connectors are wired in accordance with associated test instructions. To prepare a cabled test connector, attach a connector module to a wired test connector receptacle assembly (use a temporary empty receptacle assembly when pressing the module and wired test receptacle together). The R4862 press tool, with spacer block, is used. Remove the empty receptacle to expose the slotted beams. The test connector module is now pressed onto the inside face (between both half-taps) of the receptacle being checked. Important: The red alignment marks on all components must always match when modules and receptacles are pressed together. The free ends of the cable can now be probed directly (See Fig. 39), or can be wired to a "permanent" remote test probe connector assembly as in Par. 4.424.

FIG. 39 CABLED TEST CONNECTOR (PAR. 4.423)

4.424 To aid in the continuity probing procedure, the remote or probing end of the test connector cable can be attached to a remote receptacle/module assembly. The exposed terminals on one side of the module can beused as probing points. The test cable and test connector wiring must be verified for correctness with half-tap to be checked. See Fig. 40.

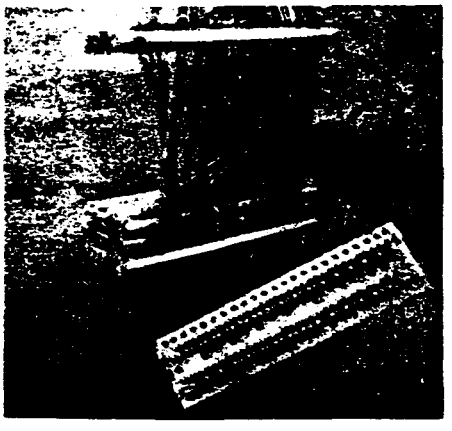


FIG. 40 REMOTE PROBING CONNECTOR (PAR. 4.424)

4.425 Using R4862 connector press tool with spacer to press a "sandwich" of two receptacles and a module. See Fig. 41.

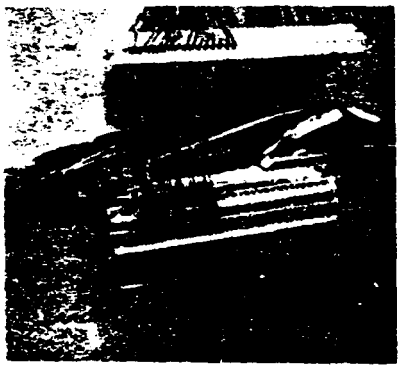


FIG. 41 PRESSING CONNECTOR COMPONENTS (PAR. 4.425)

4.426 After testing, separate the test module from the half-tap by inserting the tip of a 3/16 inch blade screwdriver in the end slots of the half tap receptacle connector module interface. Twist the screwdriver blade to raise the ends of the receptacle and release the end latches. See Fig. 42

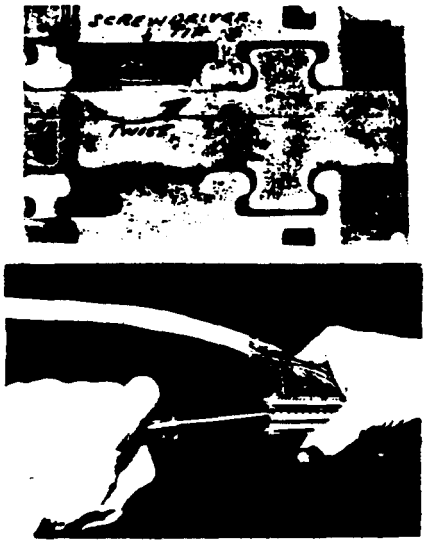


FIG. 42 SEPARATING RECEPTACLE FROM TEST MODULE (PAR. 4.426)

4.5 Error Correction Procedure

4.51 Tip-Ring reversals or other wiring errors should be corrected using the following method (Refer to Par. 4.54; note that a wired receptacle assembly must be separated from a module before the mandrel can be removed from receptacle housing).

4.52 Separate the wires on the mandrel side containing the error into three (3) groups of equal size. Join the entry and exit wires of each group together using a tie-wrap. Tighten the tie-wrap at a distance of about 1/2 inch from the mandrel. See Fig. 43.

FIG. 43 BINDING WIRES WITH TIE-WRAPS (PAR. 4.52)

4.53 NOTE: Pull the slack in the outside wire pairs, to prevent the wires from pulling out of the slots when the mandrel is withdrawn.

4.54 Remove the mandrel from the housing. Insert a penny into the notch and twist. Caution: If a receptacle assembly is connected to a module, it must be separated from the module before the mandrel can be removed from receptacle housing. See Fig. 44.

RECEPTACLE MUST FIRST BE SEPARATED FROM THE CONNECTOR MODULE.

FIG. 44 REMOVE MANDREL
(PAR. 4.54)

4.55 Identify the reversed pair. Using a spudger, pull one of the reversed wires from the mandrel slot. Move this wire to the side. Take care not to loosen the other wires. See Fig. 45.

FIG. 45 IDENTIFY AND PULL WIRE
(PAR. 4.55)

4.56 Now remove the other reversed wire from its slot and place it in the proper slot by hand. Use the R-4775 tool (with the blade removed) provided in T.S. 553 to press the wire fully in the slot. Be sure that the blade is removed from R-4775. See Fig. 46. Other pressing methods can be carefully used, if necessary.

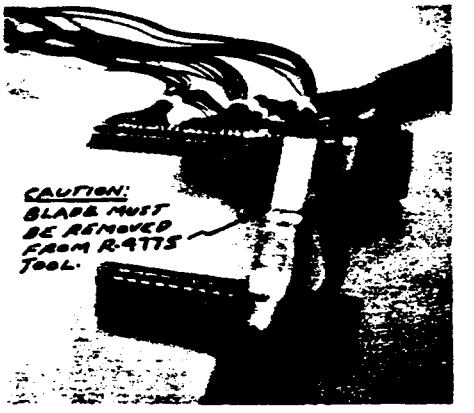


FIG. 46 PRESS WIRE IN PROPER SLOT
(PAR. 4.56)

4.57 Using the same procedure above, seat the first wire in its proper slot. See Fig. 47. Check to see that no other wires have been displaced. Press loose wires back in place.

FIG. 47 BOTH WIRES IN PLACE
(PAR. 4.57)

4.58 Snap the mandrel back into correct position. Cut the wire ties. View the receptacle housing windows to see that the wires are in place. See Fig 48.

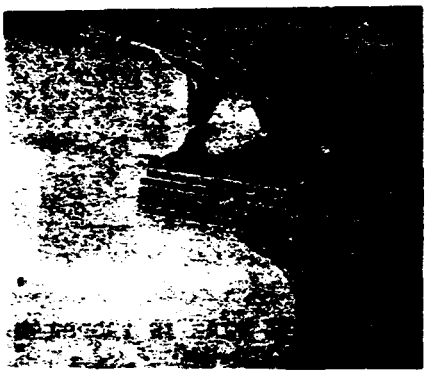


FIG. 48 SNAP MANDREL INTO HOUSING (PAR. 4.58)

4.59 Repeat the procedure to make any corresponding correction on the other receptacle, if required.

5. PREPARING THE SMAS CABLE WITH THE 711 CONNECTOR

5.1 Tool Set 546 will be required for butt splicing the 711 connector receptacles to the SMAS connectorized cables.

5.11 Refer to I.E. Handbook 9, Section 390 instructions for use of the R-4773 tool, and other tools, in tool set 546 for the 711 connectorization procedures.

5.2 Refer to other appropriate I.E. Handbook for the preparations of the SMAS cable with the 711 connector receptacles, in conjunction with specific equipment codes.

5.21 Refer to associated wiring documentation for fanning the cable leads into the correct mandrel positions. These fanned wires must correlate with wiring in the dual half-tap receptacles when SMAS is mated to equipment.

5.22 Wire in two appropriate mandrels on SMAS cable (for cable wire gauge and mandrel size required). Note that the R-4773 tool mandrel latch retainers must be set for the specific mandrel size being used. Refer to Par. 5.221.

5.221 The SMAS cable receptacle to be connected to the lower half-tap receptacle is wired using the "X1" wiring identification plate. The SMAS cable receptacle to be connected to the upper half-tap receptacle is wired with the "Z1" wiring identification plate. See Fig. 49. The X1 and Z1 plates are yellow colored.

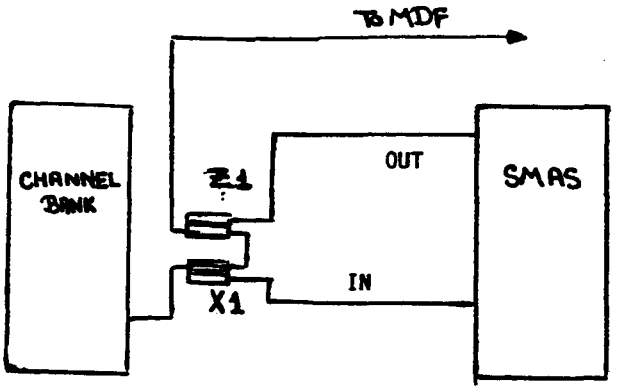


FIG. 49 INCOMING-OUTGOING SMAS (PAR. 5.221)

5.222 Observe the correct orientation of the mandrels (and notches) in the tool combs and in accordance with the specific wiring identification (indicator) plate required.

5.223 When wiring the X1 pattern, start with position 1 and place the wires in color coded order, right to left. After completing the first mandrel, move to position 64 and continue wiring right to left. See Fig. 50.

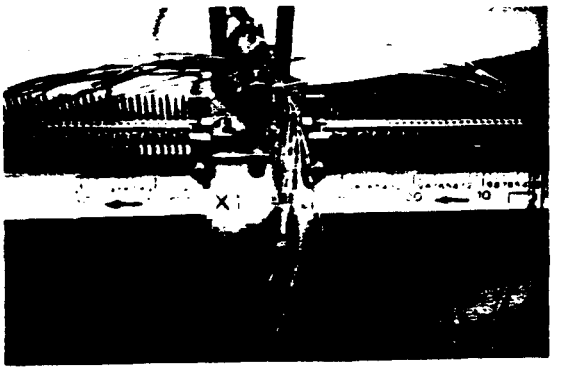


FIG. 50 WIRING WITH X1 PLATE (PAR. 5.223)

5.224 When using the Z1 plate for the SMAS cable, start wiring in position 1 and continue wiring left to right on both mandrels; wire in color code order. See Fig. 51.

FIG. 51 WIRING WITH Z1 PLATE (PAR. 5.224)

5.225 After wires are seated in the mandrels, check for correct slot wiring, T & R reversals, only one wire to a slot and no empty slots (between the first and last wires in each mandrel; refer to Par. 4.39 and 4.331).

5.226 Insert the mandrels into a receptacle housing. Observe the orientation of the red bar on the housing with the notch of the mandrel holding the slot number one wire and press housing onto mandrel. The notch of the second mandrel should be diametrically opposite the notch on the first mandrel, and also diametrically opposite the red bar on the receptacle housing. Refer to I.E. HB 9, Section 390.

5.326 Tag the completed receptacles as specified in HB219 sections for specific equipment being retrofitted.

5.327 To make individual lead corrections use the R4775 repair tool per HB 9, Section 390.

NOTE: The R4775 repair tool in tool set 546 is equipped with a cutting blade, to repair the mandrel wiring for the SMAS cables only.

Caution: Do not use this tool with blade for half-tap mandrel wire repair described elsewhere.

5.3 Make test verification of cables in accordance with associated instructions.

6. CONNECTING THE BAY AND SMAS INTERCONNECTING CABLES

6.1 Refer to appropriate cabling drawings and I. E. Handbook instructions for connector identification, mating and marking information.

6.11 Join the correct SMAS cable receptacle assemblies to the equipment cable receptacle assemblies by sandwiching the 711 modules between. Be sure that the red bars are aligned. Use the R-4862 pressing tool with the tool spacer in place to press the sandwich together. Note that the SMAS cable receptacles are "outside" the equipment cable receptacles. See Fig. 52.

FIG. 52 SMAS TO EQUIPMENT (PAR 6.11)

6.12 Refer to appropriate test instructions for verification of continuity requirements.

6.13 Use the R-4862 pressing tool with spacer removed to attach the test module (or test cable module; refer to Para. 4.4). An empty receptacle assembly must be used to press the module in place if the module contact forks are to be used as probe points. See Fig. 53.

NOTE: Test connector modules are placed on the inside (between) of half-taps. To remove the tool spacer, push the spacer block toward the tip of tool (approximately 1/4 inch) until it unlocks. Lift the spacer block from the tool jaw. To reinsert spacer, reverse procedure by pushing spacer back into jaw until it locks in place.

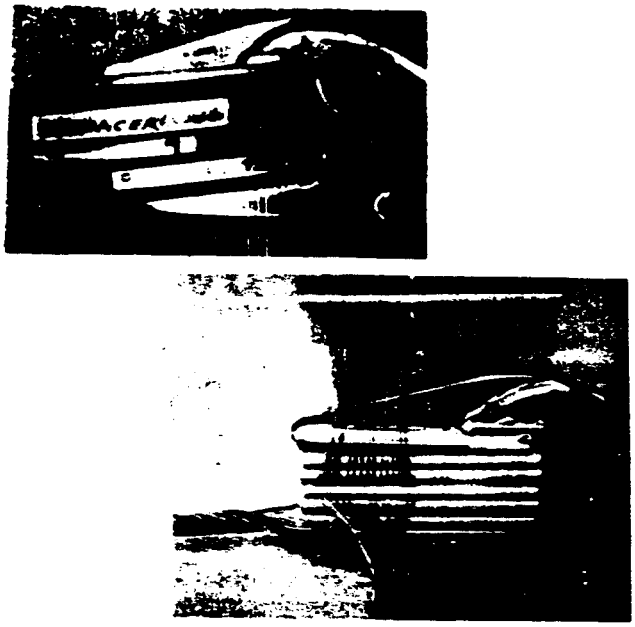


FIG. 53 R4862 PRESS TOOL WITHOUT SPACER (PAR. 6.13)

6.131 To expose test module contact forks for probing, twist a 3/16 inch screwdriver tip the slot at the ends of the connector to pry the receptacle off. See Fig. 54. (refer to Par. 4.4).

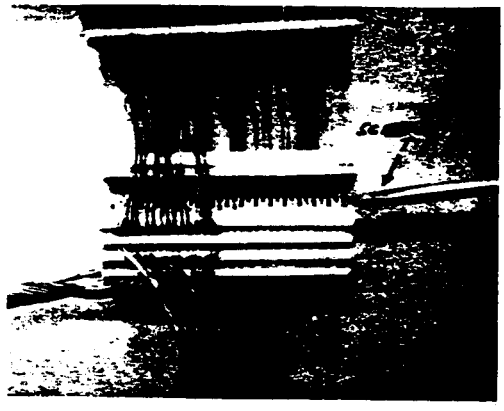


FIG. 54 SEPARATING RECEPTACLE FROM MODULE (PAR. 6.131)

6.14 After verification checks are complete, remove test module from half-tap sandwich by using screwdriver tip as in Par. 6.131.

6.2 Removing Half-Tap Connecting Wires

6.21 A special mass cutting tool is used to cut the half-tap interconnecting wires. This cutter tool has an array of towers on one side, similar to a connector module. Instead of the slotted beam contacts, the tool contains electrically isolated knife blades. A removable receptacle is used to protect the cutter, when the cutter is not in use.

NOTE: The cutter has a red mark on one end. The red end of the cutter must always be positioned with the red end of the dual-half-tap connector on which wires are to be cut. The cutter and connector red marks do not have to be aligned, but must be on the same end. Be sure that cutter towers align with receptacle windows. Spread wires outward if necessary to clear the cutter.

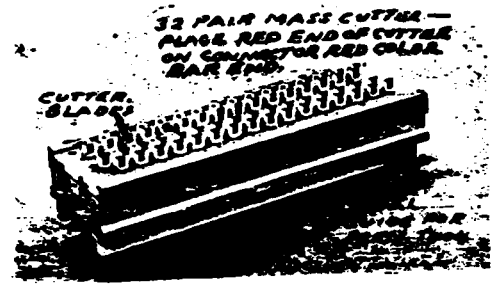


FIG. 55 MASS CUTTER (PAR. 6.21)

6.211 The mass cutter identifications are:

R-4871 L1 for 12-pair connector
R-4871 L2 for 25 pair connector
R-4871 L3 for 32 pair connector

6.22 If necessary, wires can be cut on an individual basis with extreme care required to avoid shorting across adjacent conductors. This is a time consuming operation, however, and requires precision tools.

6.23 To use the mass cutter, the spacer on the R-4862 must be removed. To remove the spacer, push the spacer block toward the tip of the tool (approximately 1/4 inch) until it unlocks. Lift the spacer block from the tool jaw. To reinsert the spacer, reverse the procedure by pushing the spacer back into the jaw until it locks in place. See Fig. 56.

FIG. 56 R-4862 TOOL SPACER
(PAR. 6.23)

6.24 Place the cutter on the inside face of the half-tap connector assembly. The red colored end of the cutter should be on the same end of the red bars on the connector. . Bend wires outward as necessary to clear the cutter. Important: Be sure that the cutter towers align with the receptacle windows. See Fig. 57.

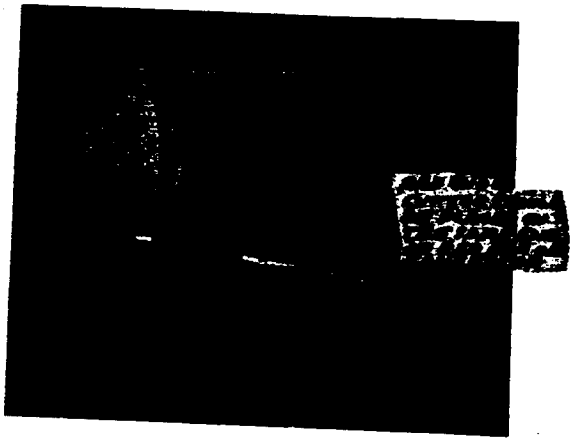


FIG. 57 CUTTER IN POSITION
(PAR. 6.24)

6.25 Slide the jaws of the R-4862 tool over the cutter-connector assembly and press the units together. This operation cuts the wires in the windows. See Fig. 58.

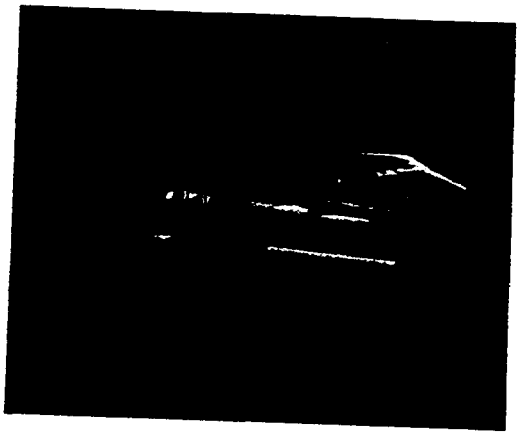


FIG. 58 MASS WIRE CUTTING
(PAR. 6.25)

6.26 Use a screwdriver to remove the cutter, by twisting the tip in the end slot. See Fig. 59.

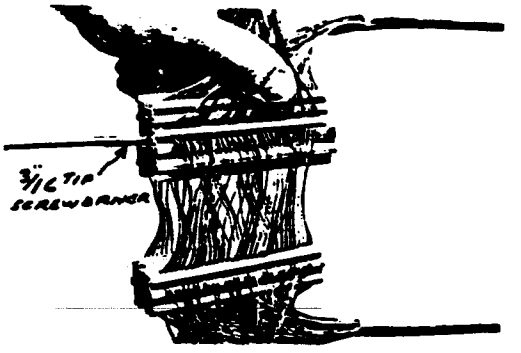


FIG. 59 REMOVING CUTTER
(PAR. 6.26)

6.27 Repeat the cutting operation on the other half-tap connection.

6.28 Pull 2 or 3 wires at a time from the upper connector. Pliers may be used to grip the wires from the other receptacle if necessary. See Fig. 60. Disgard wires in bay or container.

6.29 This completes the connector assemblies. Place cables back in the Bay duct and secure as required for a neat dress.

6.210 Remove temporary support bars and standoffs..

6.211 Make final visual checks.

6.212 Stamp banks or bays as required.

FIG. 60 REMOVING WIRES
(PAR. 6.28)

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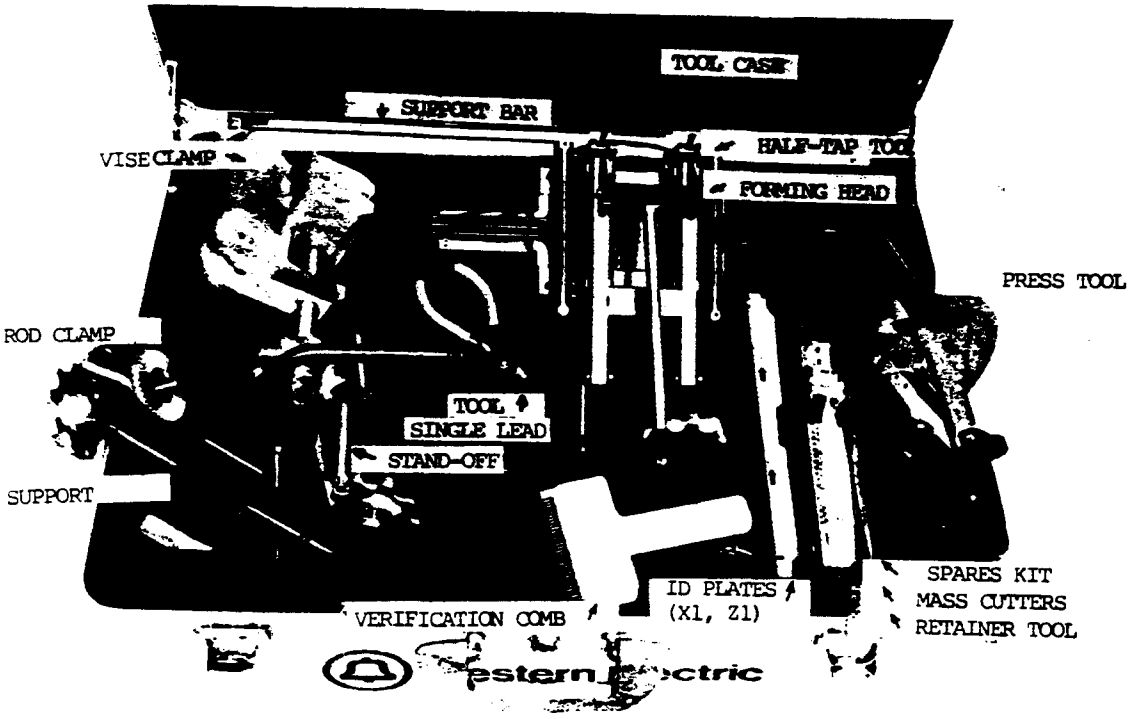

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