United States Patent

[11] 3,571,890

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[45] Patented **Mar. 23, 1971**

[73] Assignee **AMP Incorporated**
Harrisburg, Pa.

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[54] **WIRE-TRIMMING AND CONNECTOR-CRIMPING APPARATUS**
11 Claims, 14 Drawing Figs.

[52] **U.S. Cl.** **29/203,** 72/410
[51] **Int. Cl.** **H01r 43/04,** H05k 13/00
[50] **Field of Search** ..... 29/203, 203 (DT), 200 (H), 203 (HT), 203 (HC), 203 (HM); 72/410

[56] **References Cited**

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3,328,871	7/1967	Over	29/203
3,431,621	3/1969	Gurley et al.	29/203
3,529,342	9/1970	Burgess et al.	29/203

Primary Examiner—Thomas H. Eager
Attorneys—Curtis, Morris and Safford, Marshall M. Holcombe, William Hintze, William J. Keating, Frederick W. Raring, John R. Hopkins, Adrian J. La Rue and Jay L. Seitchik

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ABSTRACT: Apparatus for trimming the ends of wires and crimping an open U-type electrical connector onto the trimmed ends comprises a die and anvil which are movable relatively towards and away from each other to crimp the connector. The die is divided into two sections along a plane extending parallel to its axis and medially therethrough, the two sections being movable transversely with respect to the die axis from an open position to a closed position. Transversely extending slots extend inwardly from the opposed sides of the die sections and cutter bars are mounted on the anvil which are adapted to enter these slots. In use, connector is positioned on the anvil and wires are positioned between the die sections when the die sections are in their open positions with the ends of the wires extending transversely through one or both of the slots. The die sections are then moved towards each other and the cutter bars move into the slots to trim the wire ends. Upon subsequent movement of the anvil towards the die, the connector is crimped onto the trimmed wire ends.

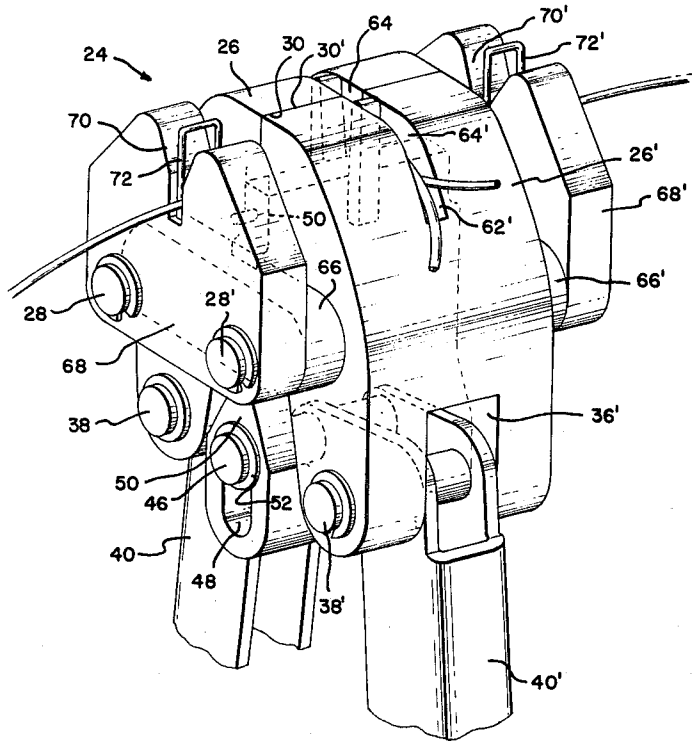
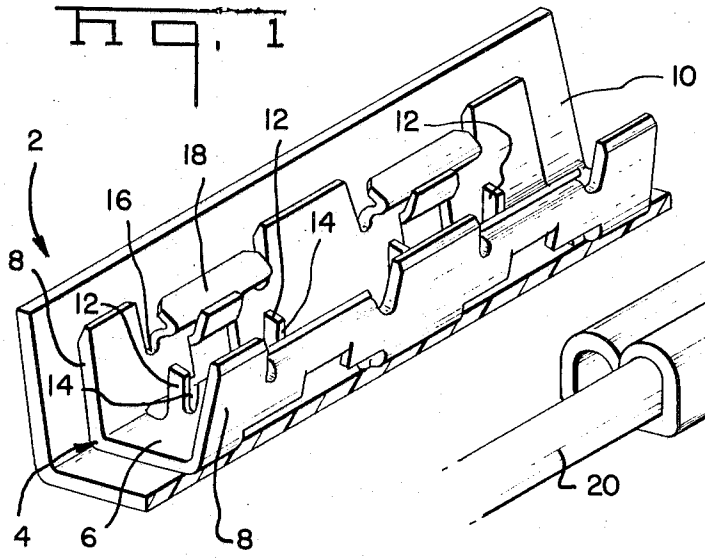


Fig. 1



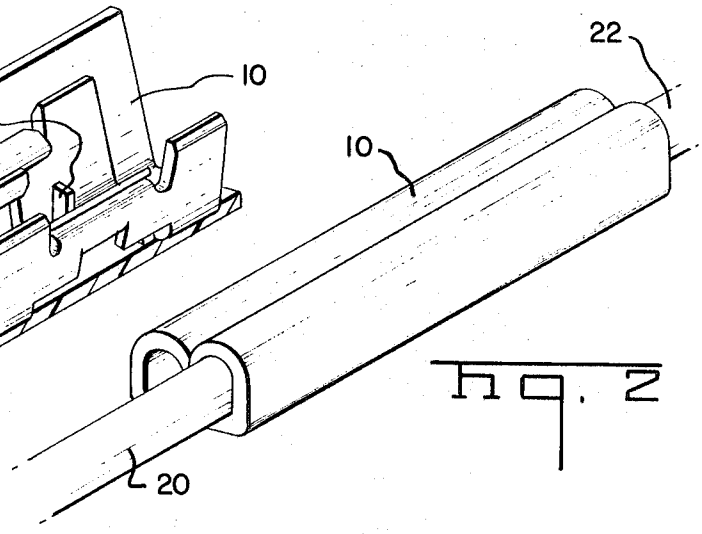


Fig. 2

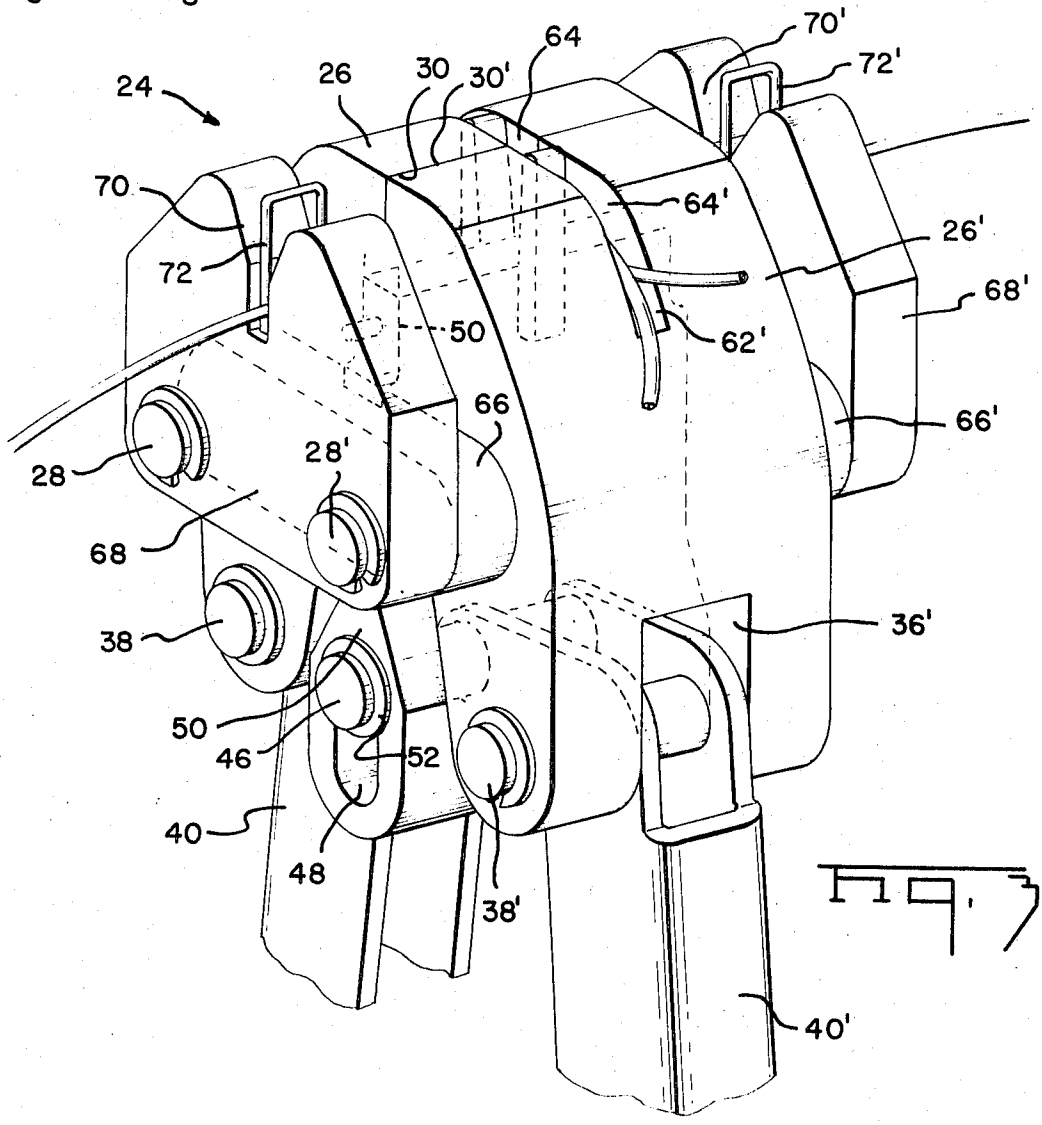
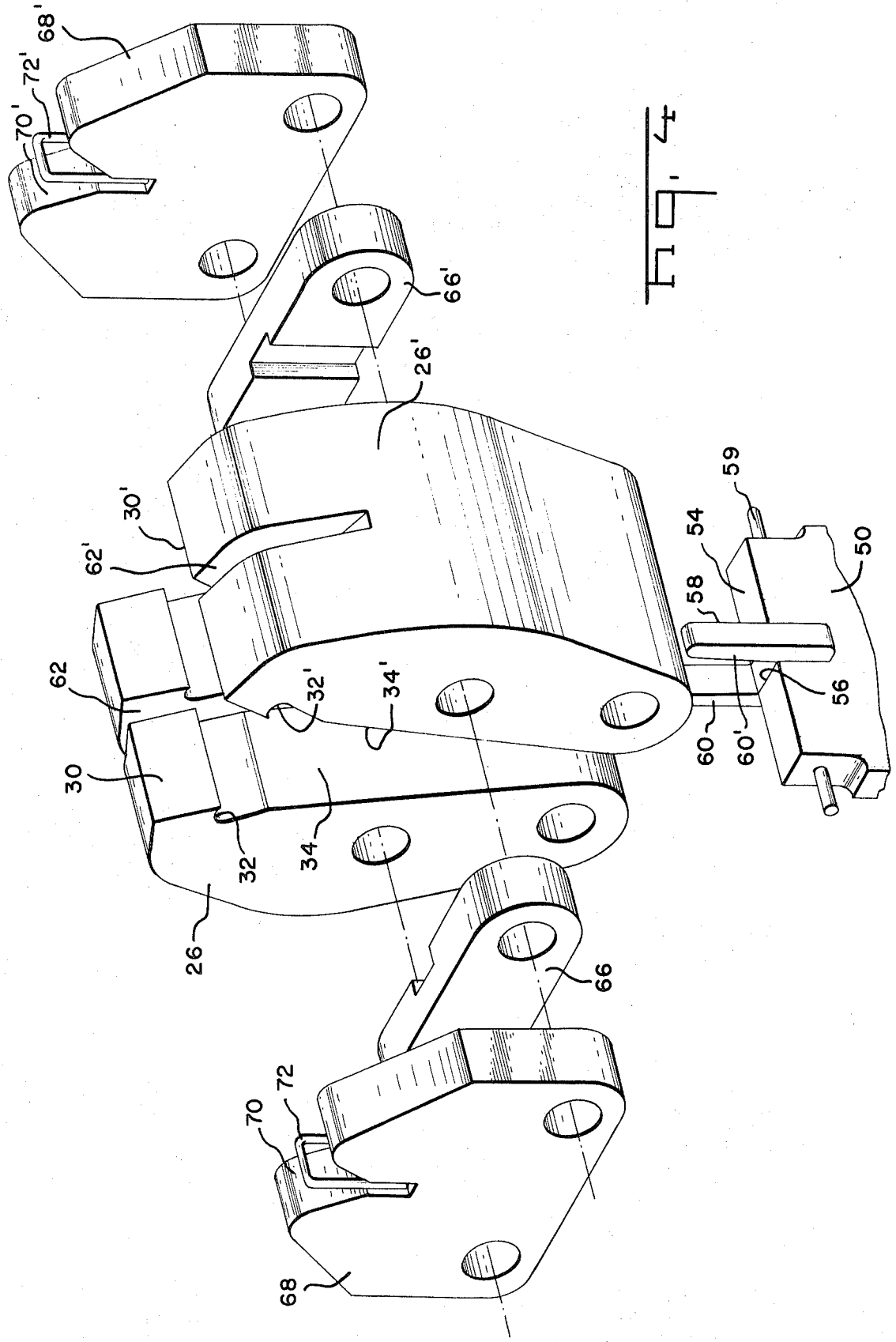


Fig. 3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72'
70'
66'
26'
30'
62'
62
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32'
34'
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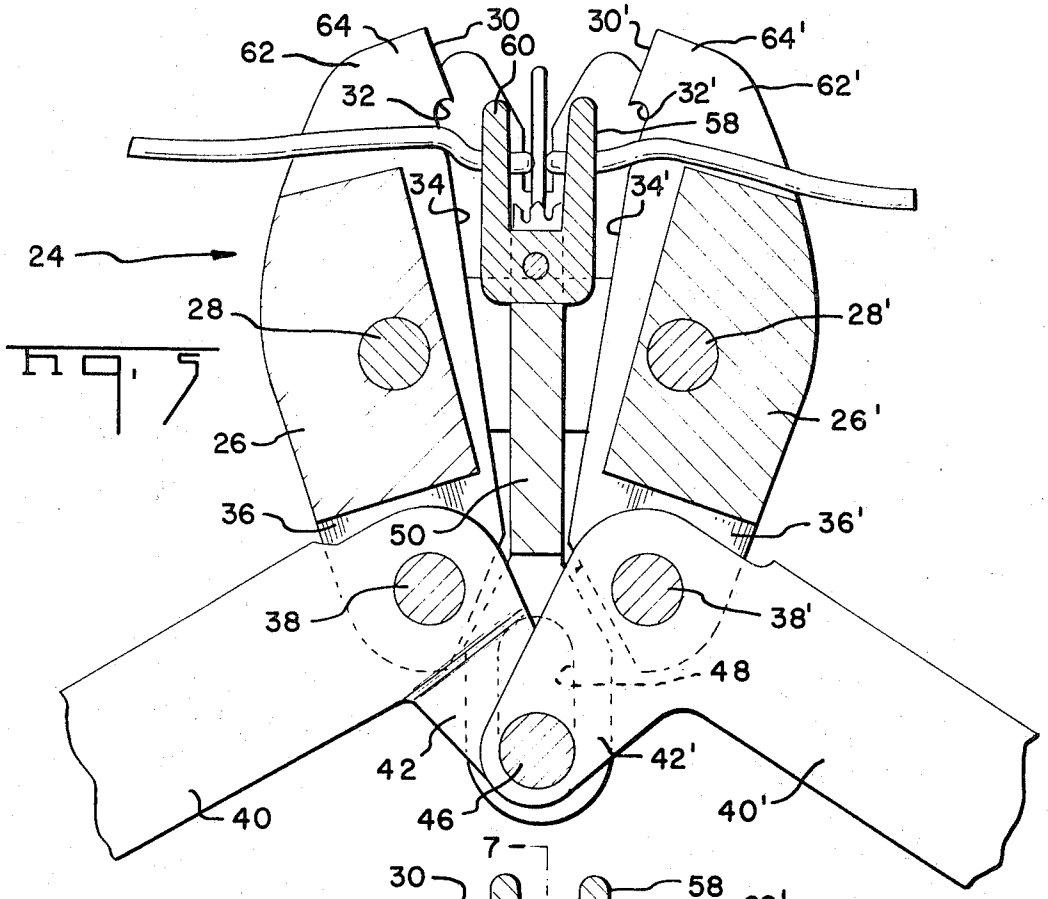
34
26
59
54
58
50
56
60
60'
66
70
72
68

Fig. 4


64
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30'
64'
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60
62'
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32'
58
34
34'
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28
28'
26
26'
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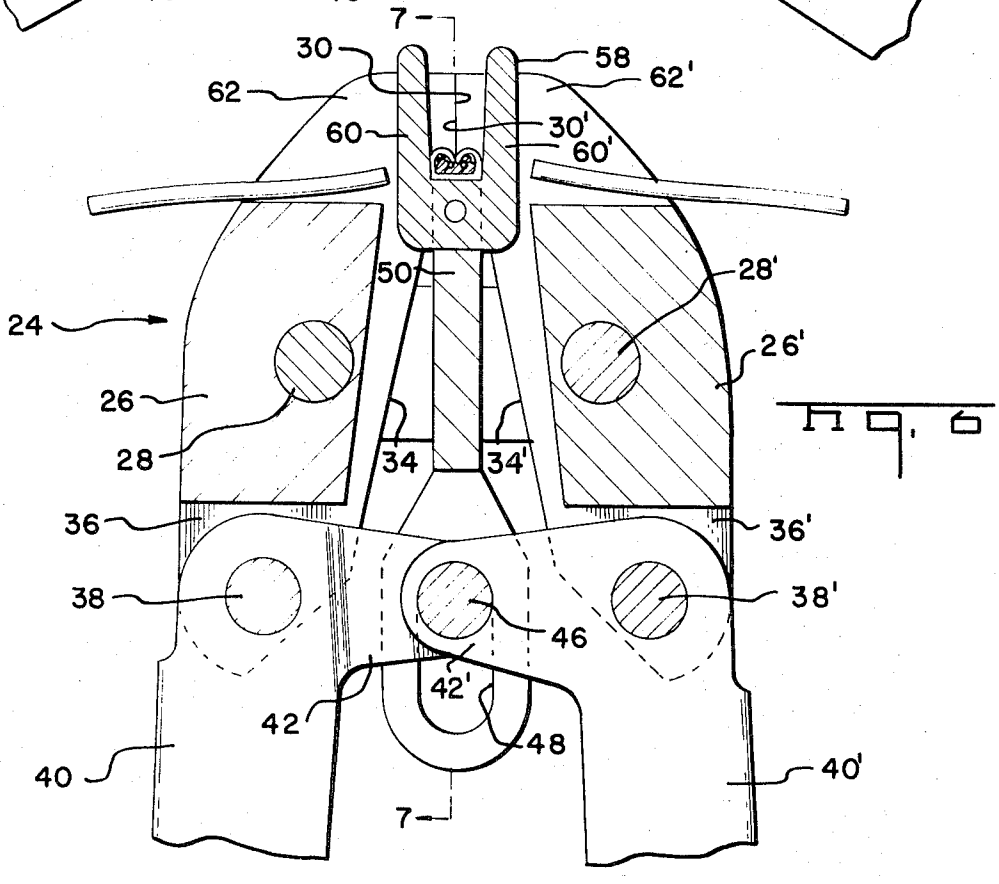
36'
38
38'
48
42
42'
40
46
40'

Fig. 5


7
30
58
62
62'
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30'
60'
50
28'
24
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26
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36
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38
38'
46
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42
48
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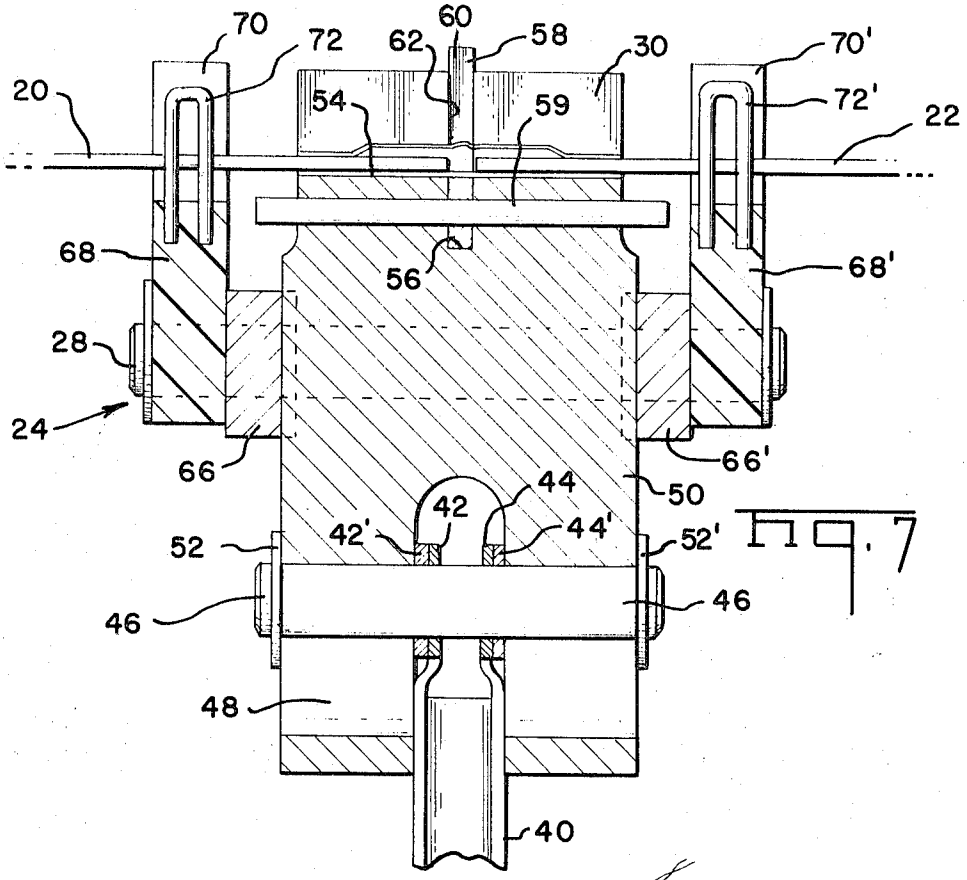
40'
7

Fig. 6


70
72
62
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30
70'
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54
59
72'
22
68
56
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42'
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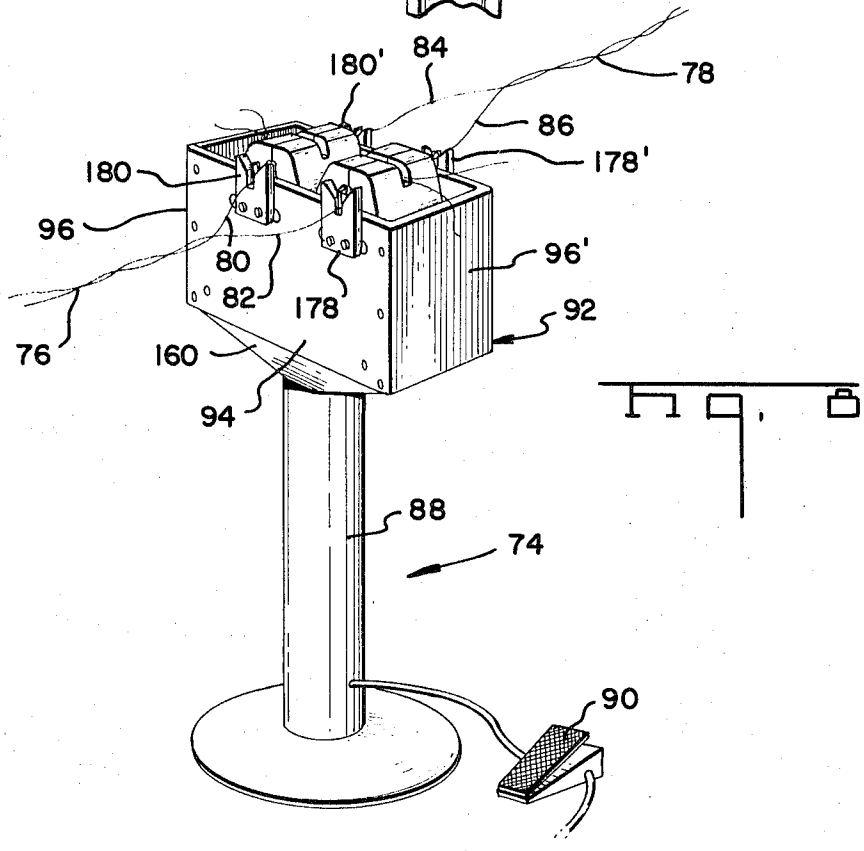
Fig. 7


180'
84
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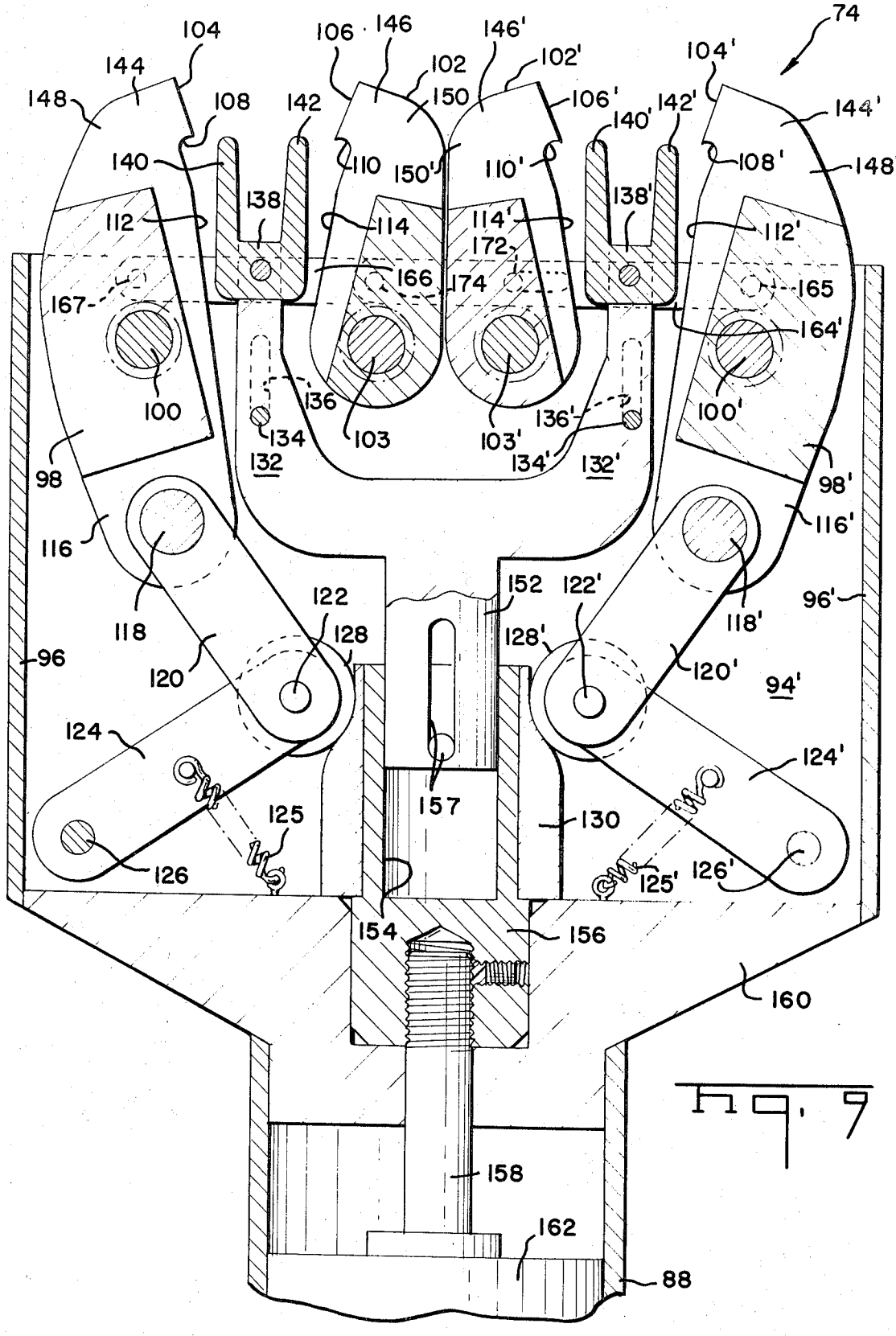
178'
96
96'
80
82
178
92
76
160
94
88
74
90

Fig. 8


74
104
106
146
146'
102
102'
104'
144
148
108
142
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106'
140'
142'
144'
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110
150'
110'
108'
148'
138
138'
112
114
114'
172
112'
166
174
165
167
164'
100
136
136'
100'
134
103
103'
134'
132
132'
98
98'
116
116'
122
152
122'
96'
118
118'
128
128'
96
120
120'
94'
124
124'
157
125
130
125'
126
126'
154
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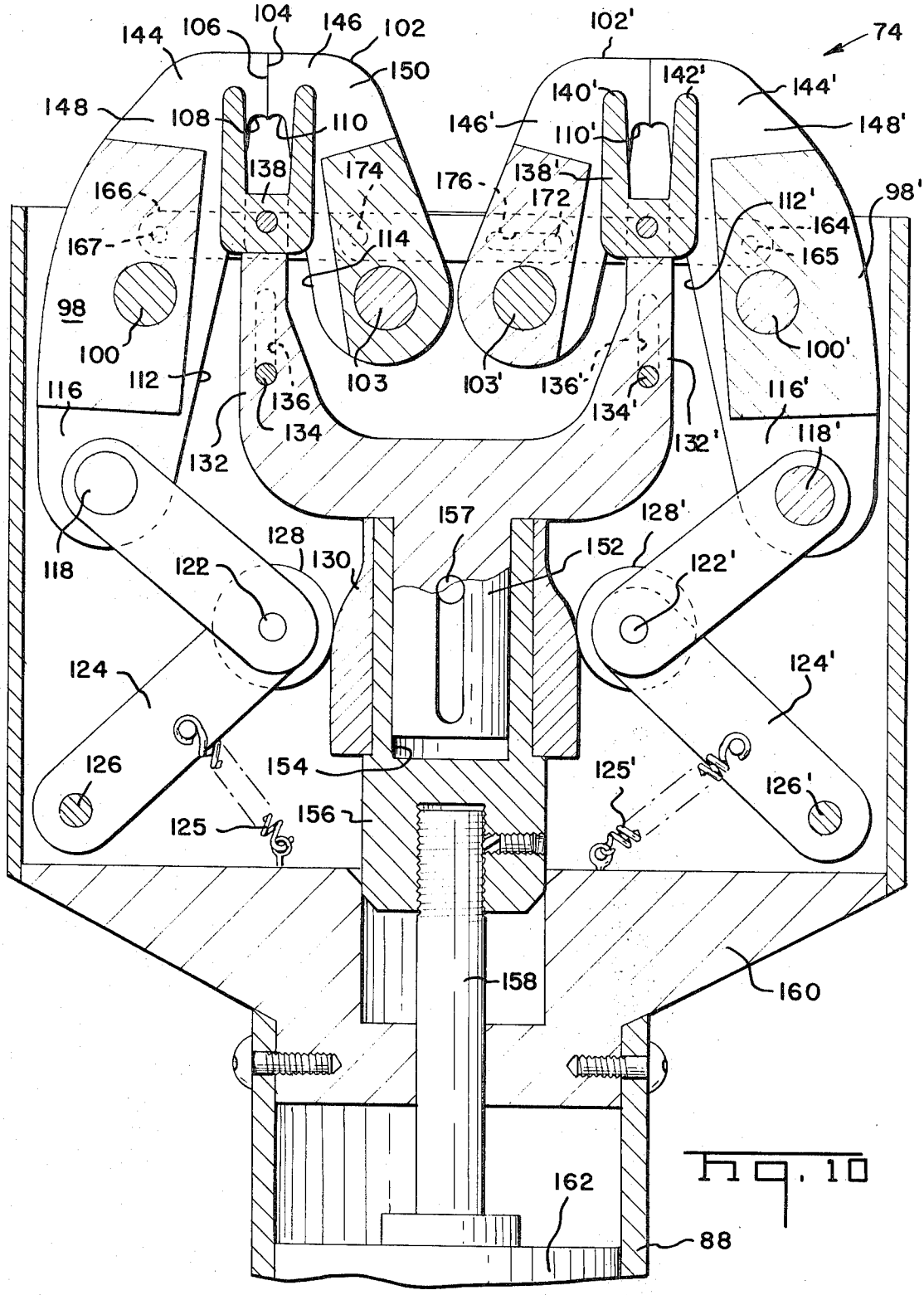
160
158
162
88

Fig. 9


74
144
106
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146
102
102'
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142'
140'
144'
148
108
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146'
110'
148'
138
174
176
138'
172
166
112'
98'
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164
165
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100
112
103
103'
136'
134'
100'
116
136
134
132
132'
116'
118'
118
157
128'
128
130
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124'
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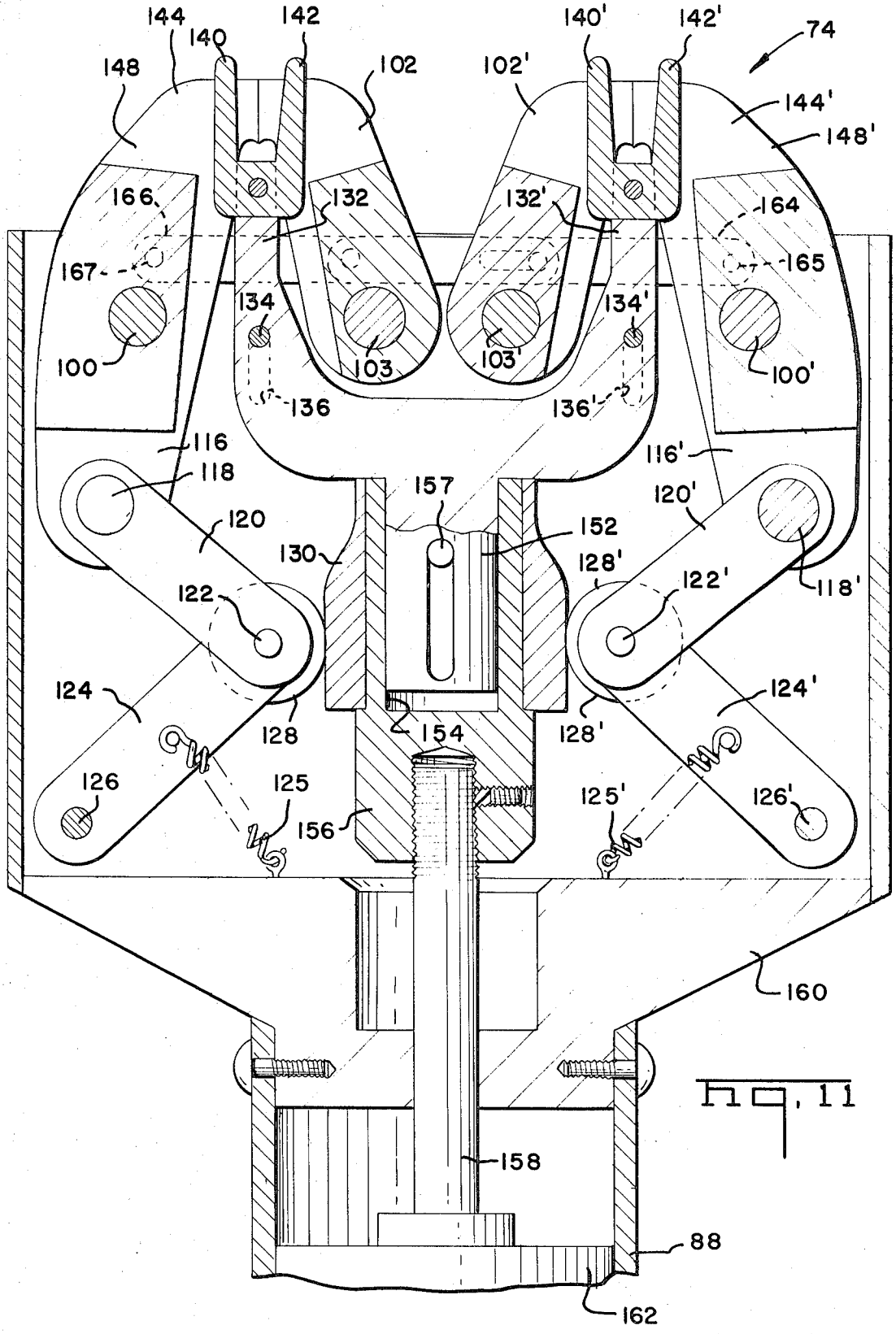
Fig. 10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140'
142'
74
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102'
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148'
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132'
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167
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134'
100
103
103'
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136'
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128'
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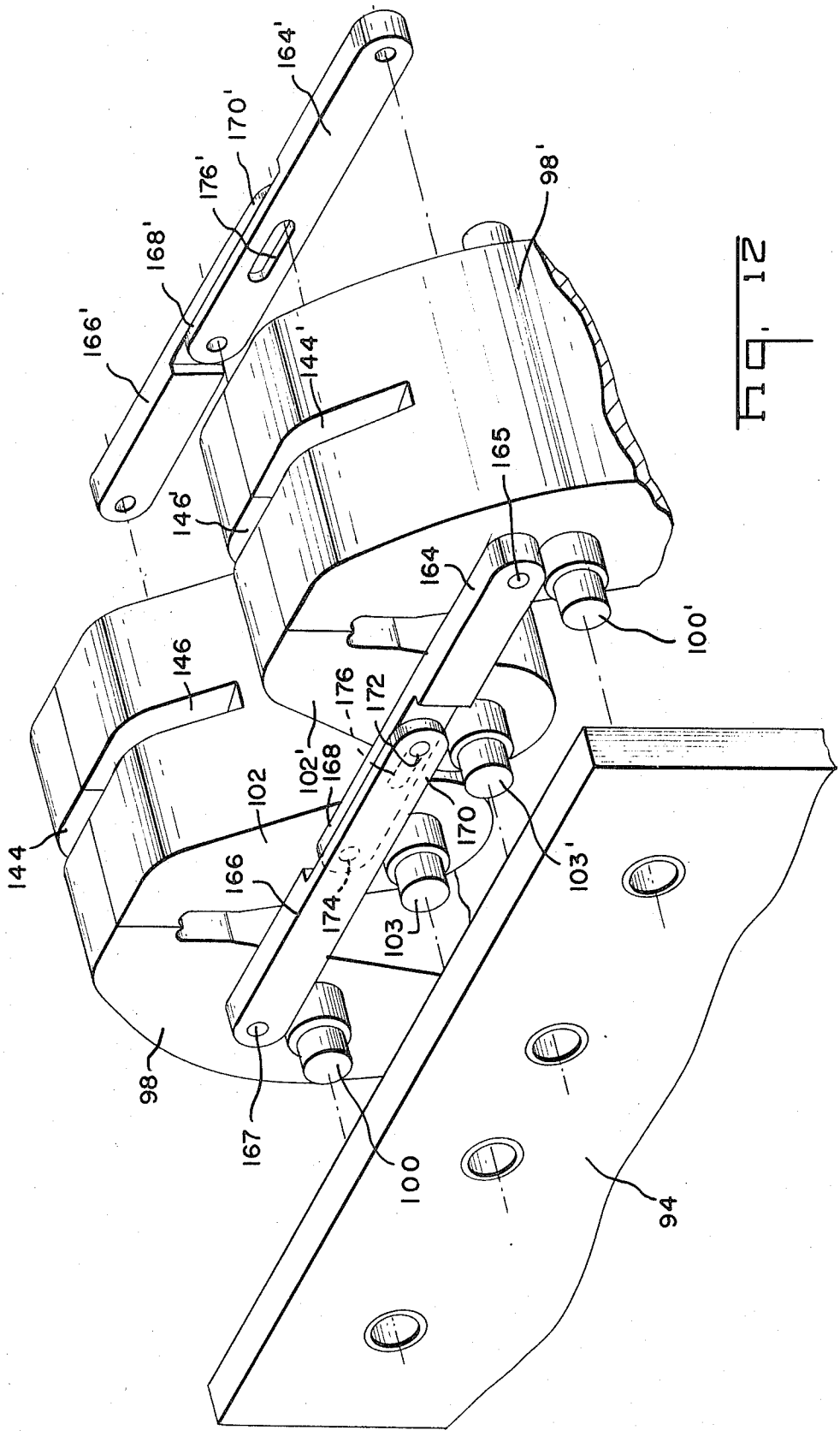
126'
156
160
158
88
162

Fig. 11


164'
170'
176'
168'
166'
98'
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146'
165
164
100'
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176
172
102'
168
102
144
166
174
103
170
103'
98
167
100
94

Fig. 12

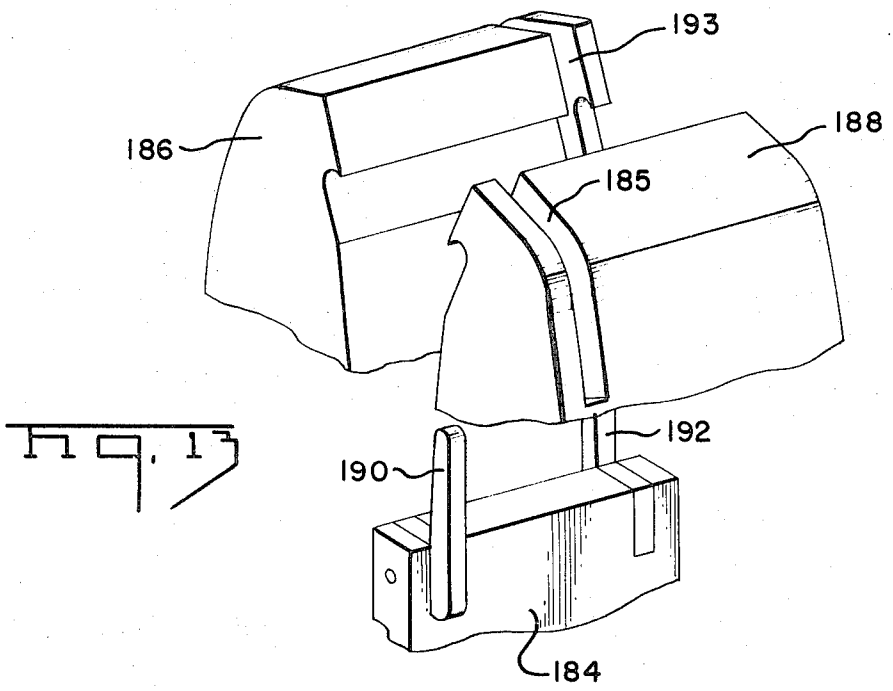

Fig. 13

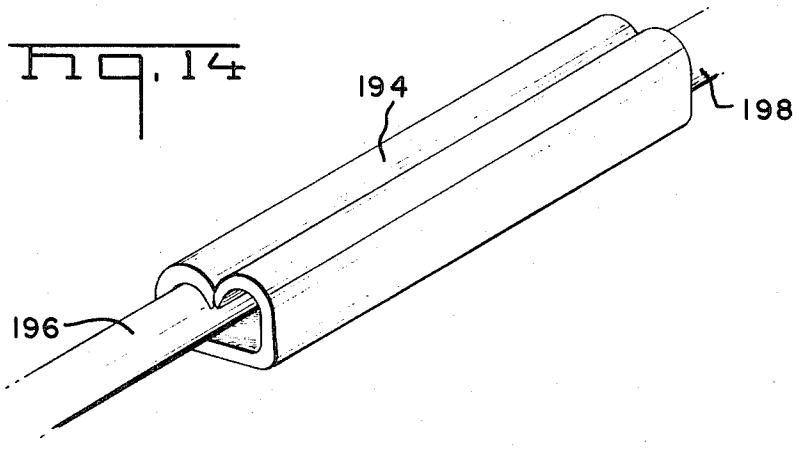

Fig. 14

WIRE-TRIMMING AND CONNECTOR-CRIMPING APPARATUS

BACKGROUND OF THE INVENTION

The present invention relates to tools for trimming the ends of wires and crimping an electrical connector onto the trimmed wire ends. Tools and applicators of this general type, which trim the wire ends concomitantly with the connecting operation, have received wide acceptance in the telephone industry where they are used in cable-splicing operations in which the numerous wires in the end of one cable section are connected, in individual electrical connections, to the wires in an adjacent cable section. At the time the connections are made, it is necessary to remove the unwanted slack from the wires being connected and it is desirable to be able to trim the slack from the wire ends and crimp a connector onto the wire ends in a single operation. Tools for accomplishing these results are shown, for example, in U.S. Pat. Nos. 3,328,871 and 3,431,621. The principles of the invention are, of course, not limited to use in the telephone industry but can be employed wherever it is desired to trim the ends of wires concomitantly with the wire connecting operation.

An object of the invention is to provide an improved tool for trimming wire ends and crimping an electrical connector onto the trimmed wire ends. A further object is to provide a wire-trimming and connector-crimping apparatus having a two-part die, the die parts or sections being movable between open and closed positions so that a connector and the wires can be moved through the gap between the die sections when they are in their open position, and the completed electrical connection can be removed from the die through the gap between the die sections after the crimping operation has been carried out. A further object is to provide an improved apparatus for connecting the corresponding wires to two associated pairs of wires to each other and trimming the ends of the wires during the connecting operation. A still further object is to provide an apparatus for trimming wire ends and crimping a connector onto the trimmed wire ends in a minimum of time and which does not require a high degree of skill or dexterity on the part of the operator.

These and other objects of the invention are achieved in embodiments thereof described briefly in the foregoing abstract, described in detail in the description presented below, and shown in the appended drawings in which:

FIG. 1 is a perspective view of one form of open U-type electrical connector which is adapted to be crimped by the apparatus embodiments of the instant invention.

FIG. 2 is a perspective view of the connector of FIG. 1 crimped onto two wires.

FIG. 3 is a perspective view of a trimming and crimping apparatus in accordance with the invention showing the position of the parts at the end of the trimming and crimping operation.

FIG. 4 is a perspective exploded view of the apparatus of FIG. 3.

FIG. 5 is a transverse sectional view showing the positions of the parts at the beginning of the operating cycle and after the connector and the wires have been placed in the apparatus.

FIG. 6 is a view similar to FIG. 5 but showing the positions of the parts after the trimming and crimping operations have been carried out.

FIG. 7 is a view taken along the lines 7–7 of FIG. 6.

FIG. 8 is a perspective view of an alternative embodiment of the invention which is adapted to connect the corresponding wires of two pairs of wires to each other.

FIG. 9 is a transverse sectional view of the head portion of the apparatus of FIG. 8 showing the positions of the parts at the beginning of the operating cycle.

FIG. 10 is a view similar to FIG. 9 but showing the positions of the parts after the die sections have been moved against each other and the end portions of the wires trimmed by the cutter bars.

FIG. 11 is a view similar to FIG. 10 but showing the positions of the parts after completion of the crimping operation.

FIG. 12 is a fragmentary perspective view of the upper portion of the head of the apparatus of FIG. 8 showing some of the parts exploded in the interests of clarity.

FIG. 13 is a fragmentary perspective view of a further embodiment of the invention.

FIG. 14 is a perspective view of a crimped connection formed by the apparatus of FIG. 13.

Referring first to FIGS. 1 and 2, a connector 2 which is adapted to be crimped onto the ends of two wires 20, 22 comprises a metallic channel section 4 of brass or beryllium copper having a web 6 and sidewalls 8. A suitable film of insulating material 10 such a Mylar (polyethyleneterephthalate) is bonded to the external surface of the channel member 4 and extends axially beyond its ends and upwardly beyond the upper edges of its sidewalls. Four lances 12 are struck up from the web 6 and extend transversely thereacross, two lances being provided adjacent to each end of the channel member. These lances are provided with downwardly extending slots 14 which are adapted to receive the insulated wires 20, 22, the width of the slots being such that the insulation of the wires is penetrated to establish electrical contact with the conducting cores of the wires.

Downwardly extending notches 16 are provided in the sidewalls on each side of each pair of lances and the sidewall portions between the slots 16 is inwardly formed as shown at 18, the arrangement being such that when the sidewalls are bent inwardly and downwardly, the inwardly formed sidewall sections 18 engage the wires and force them down into the slots 14 of the lances 12. Connectors of the type shown at 2 are adapted to receive and connect four wires if desired although in most circumstances, two wires 20, 22 are connected to each other as shown in FIG. 2. Further structural details of the type of connector shown in FIG. 1 are set forth in U.S. Pat. No. 3,320,354, which is hereby incorporated by reference. It will be understood that tools and apparatus in accordance with the invention can be used with other types of connectors or connecting devices if desired.

Referring now to FIGS. 3—7, a preferred form of hand tool 24 in accordance with the invention comprises a composite crimping die composed of two sections 26, 26′ which are pivotally mounted on parallel spaced-apart pins 28, 28′. As will be apparent from FIG. 5, this tool is substantially symmetrical about its vertical axis. Accordingly, the same reference numerals, differentiated by prime marks, will be used to denote corresponding elements on the opposite sides of the vertical axis.

The die block sections 26, 26′ have opposed surfaces 30, 30′ at their upper ends which abut each other when the die blocks are swung towards each other about their axes 28, 28′ in a manner described below. Immediately beneath the surfaces 30, 30′ the opposed sides of the die blocks are inwardly curved as shown at 32, 32′ and extend downwardly at 34, 34′. These surfaces are spaced apart, when the die blocks are in their closed positions, and an anvil block 50 is located between them.

The lower ends of the die block sections 26, 26′ are transversely notched as shown at 36, 36′ intermediate their ends for the reception of channel-shaped handles 40, 40′. The handles are pivoted to the die blocks at 38, 38′ and their sidewalls 42, 42′ extend inwardly from these pivotal axes to a movable pivot pin 46.

As shown best in FIG. 7, pin 46 extends through an axially extending slot 48 in the enlarged lower portion of the previously identified anvil block 50 and is held in position by means of suitable lockwashers 52. The height of slot 48 is such that the handles 40, 40′ will be pivoted through a substantial arc from the position of FIG. 5 during relative movement of the pin 46 to the upper end of the slot 48. It is during such movement of the handles and the pin 48 that the die blocks 26, 26′ are moved from their open positions to their closed positions as will be described below.

The upper surface 54 of the anvil block 50, which supports a connector 2 during the crimping operation has a transversely

extending notch intermediate its ends as shown at 56. A U-shaped insert 58 is mounted in this notch by means of a pin 59 and has upwardly extending arms 60, 60' which function as cutter bars in cooperation with inwardly extending slots 62, 62' on the opposed sides 34, 34' of the die sections. Slots 62, 62' extend upwardly and laterally to the upper end of the die sections as shown at 64, 64' to permit the wires 20, 22 to be positioned between the die sections and pulled through the slots by the operator. The width of the arms 60, 60' is substantially equal to, and slightly less than, the width of the slots 62, 62' so that the slots and arms cooperate with each other to shear the wires during relative movement of arms into the slots.

In order to retain the wires in the tool while the operator moves the handles 40, 40' towards each other, resilient blocks 68, 68' are mounted adjacent to the ends of the die sections and spaced from the ends by suitable spacers 66, 66'. These resilient blocks 68, 68' and spacers 66, 66' are held in position by means of the previously identified pins 28, 28' which extend through aligned openings in the spacers and the resilient blocks and have suitable lockwashers on their ends as shown in FIG. 7. The blocks 68, 68' have downwardly extending wire-receiving slots 70, 70' on their upper sides which are in alignment with the central axis of the composite die 26, 26'. Metallic U-shaped wire separators 72, 72' are mounted in these slots and extend into the resilient materials 68, 68' of the blocks so that the operator may locate the wires 20, 22 on one side or the other side of the axis of the tool. Such locators are particularly desirable where more than two wires are being connected, for example, where it is desired to connect two wires extending from the left to a single wire extending from the right as viewed in FIG. 7. To make such a connection, the operator would position one of the wires extending from the left on one side of the separator 72 and the other wire on the other side of the separator.

In use, the parts will, at the beginning of the operating cycle, be in the positions of FIG. 5 with the die sections 26, 26' spaced apart and with the anvil block 50 in its lowermost position. The operator first positions an electrical connector 2 on the upper surface 54 of the anvil block 50 by lowering the connector downwardly through the gap separating the surfaces 30, 30' of the anvil blocks. He then positions the wires in the notches 70, 70' with their end portions extending axially to the center of the tool then laterally through either of the upper portions 64, 64' of the slots 62, 62'. Under some circumstances, the operator may find it most convenient to lace both of the wires through one of the slots rather than to lace one wire through one of the slots and one wire through the other slot as shown in FIG. 5. The precise circumstances under which the tool is being used will determine the most convenient lacing method for the operator.

The operator then moves the handles 40, 40' from their fully open to their fully closed positions (FIG. 6). During initial movement of the handles, the jaw sections 26, 26' pivot about their axes 28, 28' until their surfaces 30, 30' are against each other at which time the pin 46 will have reached the upper limit of its travel within the axially extending slot 48 of the lower portion of the die block. During this initial portion of the cycle, the cutter bars 60, 60' move relatively into the slots 62, 62' and shear the wires in planes defined by the sides of the arms and the side walls of the slots. The scrap wire trimmed from the wire ends will then fall, or can be removed from, the tool.

Upon further arcuate movement of the handles 40, 40' towards each other, the anvil block 50 moves relatively upwardly towards the surface portions 32, 32' of the die sections and raises the connector until the trimmed wire ends are located between the sidewalls 8 of the connector. These sidewalls are then bent inwardly by the convergent surfaces 34, 34' and by the curved surface sections 32, 32' of the die to crimp the connector onto the trimmed wire ends as shown in FIGS. 2 and 6. The operator then opens the handles thereby to lower the die block and move the die sections 26, 26' from their closed positions to their open positions. The crimped connection can then be removed upwardly through the gap between the die sections.

An alternative embodiment of the invention 74 (FIGS. 8—12) comprises an apparatus for connecting the corresponding wires of two twisted pairs of wires 76, 78 to each other in a single operation, the pair 76 comprising wires 80, 82 and the pair 78 comprising wires 84, 86. As with the previously described embodiment, all of the individual wires are trimmed concomitantly with the connecting operation as will become apparent as this description proceeds. It should be mentioned at this point that the wires used in telephone cables are commonly provided as pairs with the two wires of each pair being helically intertwined. Since telephone cable splicing operations require that the individual pairs of wires in one cable section be spliced in separate electrical connections to the individual pairs of wires in adjacent cable sections, it is desirable to be able to connect a pair of wires to another pair of wires in a single operation.

The pair-splicing apparatus 74 (FIG. 8) may be mounted on a pedestal 88 so that its upper end will be located conveniently to the cable ends being spliced and readily accessible to the operator. In the embodiment of FIG. 8, a pneumatic cylinder, described below, is mounted in the pedestal 88 and is controlled by a conventional foot-operative valve 90 having a supply line extending to a supply of compressed air. A prismatic housing 92 is mounted on the upper end of the pedestal 98 by means of a base 160, this housing having sides 94, 94' and faces 96, 96'. Two crimping mechanisms, which are similar in many respects to the crimping mechanisms of the tool of FIG. 3, are contained in the housing 92 in side by side relationship. In the description which follows, the crimping mechanisms which appear on the left of FIG. 9 will be described in detail and the same reference numerals, differentiated by prime marks, will be used for corresponding structural elements on the two sides of the center line of the apparatus.

The crimping mechanism on the left of FIG. 9 thus comprises a die block 98 pivotally mounted intermediate its ends on a stationary shaft 100 which extends between the sides 94, 94' of the housing 92. The other die block on the left-hand crimping mechanism is similarly mounted on a stationary shaft 103, these two die blocks having opposed surfaces 104, 106 at their upper ends which are disposed against each other when the die sections are in their closed positions with respect to each other (FIG. 10). Curved surfaces 108, 110 are provided immediately beneath surfaces 104, 106 and the opposed sides 112, 114 of the two die sections are again spaced apart when the die sections are closed by an amount sufficient to accommodate the anvil block 132.

A slot 116 extends inwardly from the lower end of the die section 98 and a pin 118 extends through this slot. Two spaced-apart links 120 are pivotally mounted on pin 118 and are pivoted at their lower ends to a pin 122 on each side of the cam roller 128. Additional spaced-apart parallel links 124 are pivoted to the pin 122 on each side of the cam roller and are pivoted at their other ends to a fixed pin 126 extending between the sides 94, 94' of the housing. Cam roller 128 bears against the surface of a cylindrical cam block 130 which moves upwardly during the operating cycle from the position of FIG. 9 to the position of FIG. 11. It will be apparent from the contour of the surface of this cam bloc, that such upward movement results in a straightening of the toggle mechanism comprising the links 120, 124 and clockwise pivotal movement of die section 98 as viewed in FIG. 9. During such clockwise pivoting of the die section 98, the die section 102 swings through a counterclockwise arc to move the two die sections 98, 102 from their open positions to their closed positions. The mechanisms for swinging the die section 102 through a counterclockwise arc will be described below. During subsequent downward movement of the cam block 130, the die section 98 is swung through a slight counterclockwise arc by a spring means 125 extending between the links 124

and a fixed point on the base 160 of the housing. This spring means also functions to hold the cam roller 128 against the surface of the cam 130 throughout the operating cycle.

The anvil block 132 and its counterpart 132' extend, yoke fashion, from a cylindrical shank 152 which is slidably mounted in a recess 154 of a piston-rod adapter 156, and coupled to this adapter by a lost motion pin-slot coupling as shown at 157. A pin 134, extends axially through anvil block 132 and into vertically extending slots 136, 136' in the sides 94, 94' of the housing to assist in guiding the anvil block along a straight line path towards the crimping die. The upper surface of the anvil block 132 is provided with a transversely extending slot intermediate its ends in which an insert 138 is mounted by means of a suitable pin as shown. The spaced-apart arms 140, 142 of this insert are adapted to enter slots 144, 146 in the die block sections 98, 102 to shear the wire ends as previously described. Again, the upper ends of these slots 148, 150 are enlarged and extend through the top surfaces of the die blocks to facilitate lacing of the wires through the apparatus.

The piston-rod adapter 156, which slidably receives the shank 152 is secured to the upper end of a piston rod 158 of a pneumatic piston-cylinder 162 contained in the pedestal 88. As previously noted, compressed air si supplied to this piston-cylinder under the control of a foot operated valve 90 so that the operator need only depress this foot valve after he has laced the wires through the apparatus to carry out the operating cycle.

Referring to FIG. 12, the pivotal movement of the die sections 102, 102' towards their counterparts 98, 98' is achieved by means of links 164, 166, 164', 166'. The link 166 is pivotally mounted at its left-hand end on the projecting end of a pin 167 which extends through the die section 98 immediately above the pivotal axis 100 of this die section. The right-hand end of the link 166 is of reduced thickness and overlaps the left-hand end of the link 164. A pin 172 mounted in the die section 102', above the axis 103 of this die section, extends through an elongated slot 176 in the link 164 and into the end 170 of the link 166. It will thus be apparent that the arcuate movement of the die section 98 about its pivotal axis 100 will be transmitted by means of the link 166 to the die section 102' which will also move along an arcuate path. The die section 102 is pivoted by means of a pin 174 to the end 168 of the link 164, the right-hand end of this link, as viewed in FIG. 12, being pivotally mounted on the projecting end of a pin 165 in the die section 98' above the pivotal axis 100' of this die section. The arcuate movement of the die section 98' will thus be transmitted by means of the link 164 to the die section 102 during initial upward movement of the piston rod 158. The overlapping ends of the two links 164, 166 are of reduced thickness, as noted above, and the slot 176 is provided to permit movement of the link 164 leftwardly while the die section 102' is swinging through a clockwise arc under the influence of the link 166. Similar links 164', 166' are provided on the right-hand side of the die sections as viewed in FIG. 12 so that balanced forces will be transmitted to the inner or adjacent die sections 102, 102' from the remote die sections 98, 98'.

Blocks 178, 178' and 180, 180' of resilient rubbery material are mounted on each side of the housing 92 and in alignment with each of the die sections. These blocks are, as with the previous embodiment, provided with downwardly extending slots adapted to receive the wires and may have U-shaped separators therein similar to the separators 72. As with the previously described embodiment, the wires can be wedged into the slots in these blocks between the separators and the surfaces of the slots to resiliently hold the wires while the crimping operations are being carried out.

In use, the apparatus 74 will normally be positioned adjacent to the ends of two multiconductor cable sections which the operator is splicing to each other. The operator will first grasp a pair 76 from one cable sections, position one of the wires in the block 80 with its end extending between the die sections 98, 102 thence laterally through either of the slots 148, 150. The other wire will be positioned in the retainer block 178 with its end portion extending between the die sections 98', 102' and again with its tip portion extending laterally through the slot 150'. He will then select a pair 78 from the other cable section and similarly position the two wires 84, 86 of this pair in the two dies. Positioning of the wires in the two crimping mechanisms is affected by moving the wires downwardly through the gap which is provided between the opposed surfaces 104, 106, and 104', 106'.

After the operator has inserted connectors into the crimping mechanisms and laced the wires as shown in FIG. 8, he depresses the foot switch 90 to supply compressed air to the piston-cylinder 162 thereby to drive the piston rod 158 upwardly. During initial upward movement of the piston rod from the position of FIg. 9 to the position of FIG. 10, the die sections 98, 102 and 98', 102' move relatively towards each other and the cutter bars 140, 142 and 140', 142' move relatively into the corresponding slots of the die sections. The wires will be trimmed in planes defined by the sides of the cutter bars and the die sections, and the scrap wire may be removed manually or will fall to the ground. Upon further upward movement of the piston rod 158, the connectors supported on the upper surfaces of the anvil blocks are carried against the upper surfaces of the now closed dies and the connectors are crimped onto the trimmed wire ends as shown in FIG. 11. When the piston rod returns to its normal position (FIG. 9) the gaps between the opposed surfaces of the two die sections are again opened and the completed crimped sections can be removed from between the die sections.

FIG. 13 schematically shows a further embodiment of the invention which is adapted to form a crimped connection as shown in FIG. 14 in which the two wires 196, 198 overlap each other in the crimped connector 194. In this instance, the wires are in parallel side-by-side relationship on each side of the web portion of the metallic channel section of the connector. In accordance with this embodiment, the anvil block 184 has two spaced-apart cutter arms 190, 192 mounted on its opposite sides adjacent to its ends. The die sections 186, 188 may be pivotally mounted as previously described so that they are adapted to move from an open position as shown in FIG. 13 to a closed position immediately prior to the crimping operation. The cutter bar 190 mounted on the left-hand end of the anvil block is adapted to enter a slot 185 adjacent to the left-hand end of the die section 188. The cutter bar 192 on the right-hand end of the anvil block 184 is similarly adapted to enter a slot 193 on the right-hand end of the die section 186. In the use of this embodiment, the wire extending from the left in FIG. 13 is positioned between the cutter bar 190 and the die section 186 and laced through the slot 193. The wire extending from the right is positioned between the cutter bar 192 and the die sections 188 and laced through the slot 185. Upon relative movement of the die sections 186, 188 towards each other, the cutter bars 190, 192 will enter the slots 185, 193 respectively and the ends of the wires will be trimmed in the planes of the slots 185, 193. In the operation of this embodiment, it is essential to position the wires on the sides of the cutter bars 190, 192 which will avoid cutting of the wires where they enter the apparatus.

While it has been found to be preferable to provide for arcuate movement of both die sections of the crimping die of the embodiment of FIG. 3, and to provide for arcuate movement of both die sections of both dies of the embodiment of FIG. 8, it is within the scope of the invention to have one of the die sections fixed and to make provision for arcuate or other lateral movement of only the other die section. Such an arrangement would provide a gap at the upper side of each die when the movable die section is in its remote or open position relative to the fixed die section. The wires in the connector could thus be positioned in the apparatus as described above and the crimped connections could be removed. One type of crimping tool having two die sections, each of which has one movable part is disclosed in FIG. 13 of application Ser. No. 704,561, filed Feb. 12, 1968 by Henry William Demler, Sr.

It will be understood that the principles disclosed schematically in FIG. 13 can be used with either a single-head hand tool of the type shown in FIG. 3 or with a pair-at-a-time apparatus of the type shown in FIG. 8.

Changes in construction will occur to those skilled in the art and various apparently different modifications and embodiments may be made without departing from the scope of the invention. The matter set forth in the foregoing description and accompanying drawings is offered by way of illustration only.

We claim:

1. Apparatus for trimming the ends of wires and crimping an open U-type electrical connector onto the trimmed ends, said apparatus comprising:

a die and anvil, said die and anvil being normally spaced apart and being relatively movable in a first direction towards and away from each other, said die and anvil being adapted to crimp said connector onto said wires upon movement in said first direction;

said die comprising two sections, said sections being relatively movable laterally of said first direction between open and closed positions, said die sections having opposed sides which are against each other in said closed position with a gap remaining between said die sections when said sections are in said open position;

transversely extending slot means in at least one of said die sections, said slot means intersecting said opposed side and one side adjacent to said opposed side, said one side being on the opposite side of said die from said anvil; and

cutter bar means normally disposed in said gap and movable relatively into said slot means upon movement of said die sections towards each other; whereby upon locating said wires between said die and anvil with end portions of said wires extending through said slot means, and upon movement of said die sections towards each other, said wires are trimmed in the plane of said slot means and the trimmed ends of said wires are located between said die and anvil, and upon movement of said die and anvil relatively towards each other, said connector is crimped onto said trimmed wire ends, the resulting crimped connection being removable from said apparatus upon subsequent movement of said die sections to said open position.

2. Apparatus as set forth in claim 1 including a second die and anvil disposed beside said die and anvil, said second die and anvil being cooperable to crimp a second electrical connector onto wire ends, said second die comprising two separable sections, at least one of said sections having slot means as set forth in claim 1, said apparatus having means for simultaneously moving said die sections of both of said dies relatively towards each other laterally of said first direction and subsequently moving both of said anvils relatively towards said dies, said apparatus being adapted to trim the ends of each wire of two pairs of wires and connect the corresponding wires of said two pairs to each other in separate electrical connections.

3. Apparatus as set forth in claim 1 wherein said slot means comprises two spaced-apart transversly extending slots in at least one of said die sections, said apparatus having a cutter-bar means movable into each of said slots upon movement of said die sections relatively towards each other.

4. Apparatus as set forth in claim 1 including wire holding means at each end of said die, said wire-holding means comprising means for resiliently holding said wires during operation of said apparatus.

5. Apparatus as set forth in claim 1 wherein said cutter-bar means is mounted on said anvil.

6. Apparatus as set forth in claim 1 wherein both of said sections of said die are movable laterally of said first direction.

7. Apparatus as set forth in claim 2 wherein both of said sections of both of said dies are movable laterally of said first direction.

8. Apparatus for electrically connecting the corresponding wires of two pairs of wires to each other, said pairs extending axially towards each other, said apparatus comprising:

first and second crimping die and anvil sets, said sets being in parallel spaced-apart relationship and being in the same orientation relative to their longitudinal axes;

each of said crimping anvils being adapted to support an electrical connecting device during crimping, each of said connecting devices being adapted to receive two conductors extending axially towards each other upon movement of said conductors laterally of their axes;

each of said dies being formed of two sections, said sections being divided in an axially extending plane;

said dies and anvils being movable relatively towards and away from each other in a first direction;

said sections of said dies being relatively movable laterally of said first direction between an open position and a closed position;

at least one of said sections of each of said dies having transversely extending slot means therein intermediate its ends;

cutter-bar means for each of said dies between said die sections, said cutter-bar means being movable relatively into the slot means of its associated die section upon movement of said die sections relatively towards each other; and

actuating means for moving said die sections from said open positions to said closed positions and for thereafter moving said dies towards said anvils; whereby upon positioning one wire of each of said pairs between each of said die sections when said die sections are open with end portions of said wires extending through said slot means and upon energization of said actuating means, said cutter bar means move into said slot means and said wires are trimmed in the planes of said slot means, and upon subsequent movement of said dies relatively towards said anvils, connectors disposed between said dies and anvils are crimped onto said wires, said connectors, after crimping, being removable from between said die sections after return movement of said die sections to their open positions.

9. Apparatus for trimming the ends of each wire of two pairs of wires and concomitantly connecting the corresponding wires of the two pairs to each other in separate electrical connections, said apparatus comprising:

first and second anvils for supporting connector devices during application of said connector devices to wires, said anvils being in parallel side-by-side relationship;

first and second applicator dies for cooperation with said first and second anvils respectively;

said dies each being divided along axially extending planes into remote and adjacent sections, said adjacent sections of said first and second dies being back to back and facing in opposite directions, said remote sections being on opposite sides of said adjacent sections;

said remote and adjacent sections of each die being relatively movable with respect to each other laterally of the axes of said dies between open and closed positions, whereby, said wires of said pairs can be moved laterally of their axes to locate said wires between said die sections, and connected wires can be removed from said apparatus when said die sections are in said open position;

severing means cooperable with each of said dies for selectively serving a wire extending axially into each die, said severing means being movable relatively past a transverse surface of its associated die to sever a wire disposed between said surface and said severing member; and

actuating means for moving said die sections from said open positions to said closed positions with concomitant severing of said wires and for subsequently moving said anvils and dies relatively towards each other to apply said connector devices to said wires.

10. Apparatus as set forth in claim 9 wherein said severing means for each of said dies comprises transversely extending slot means in at least one of said sections of each of said dies, said slot means extending inwardly in one of said die sections on a side which is opposed to the other of said die sections,

and cutter-bar means between said die sections, said cutter-bar means being movable relatively into said slot means to shear a wire extending between said cutter-bar means and said slot means.

11. Apparatus as set forth in claim 10 wherein said slot means for each of said dies comprises a slot in each of said sections, said cutter-bar means comprising two cutter-bars, said cutter-bars being disposed on opposite sides of said anvil and each being movable into one of said slots.