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HYDRAULIC CRIMPING TOOL FOR CRIMPING T-TAP CONNECTORS

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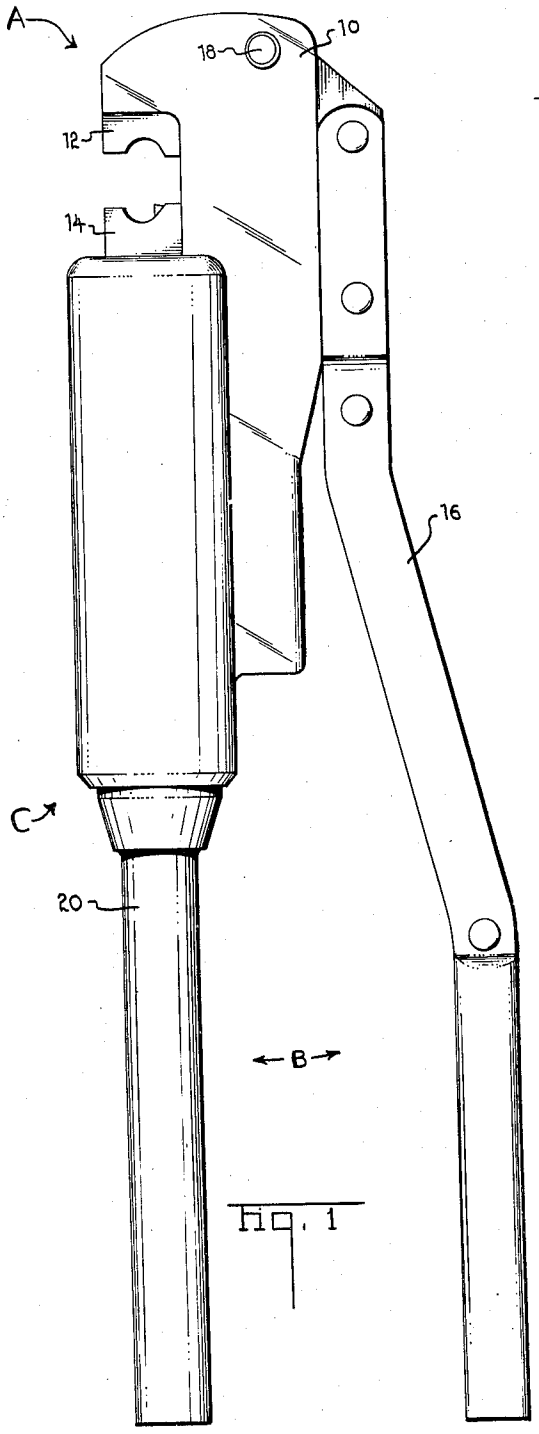


Fig. 1

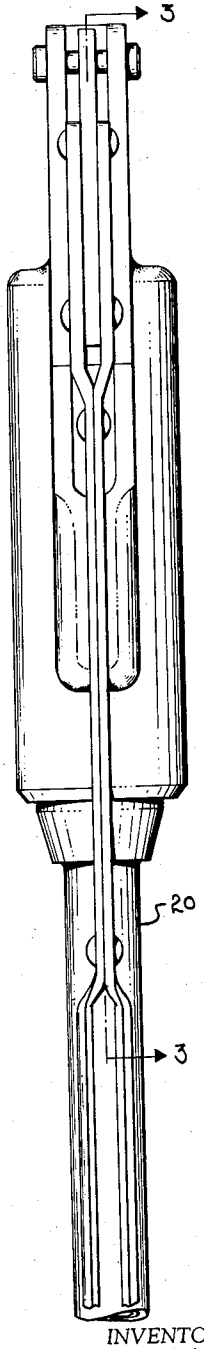


Fig. 2

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Fig. 3

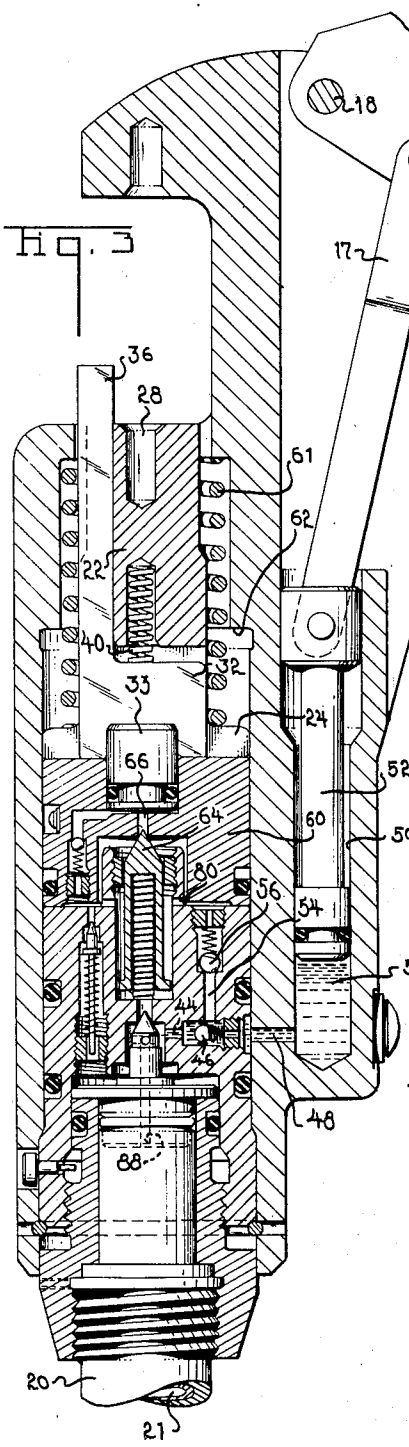
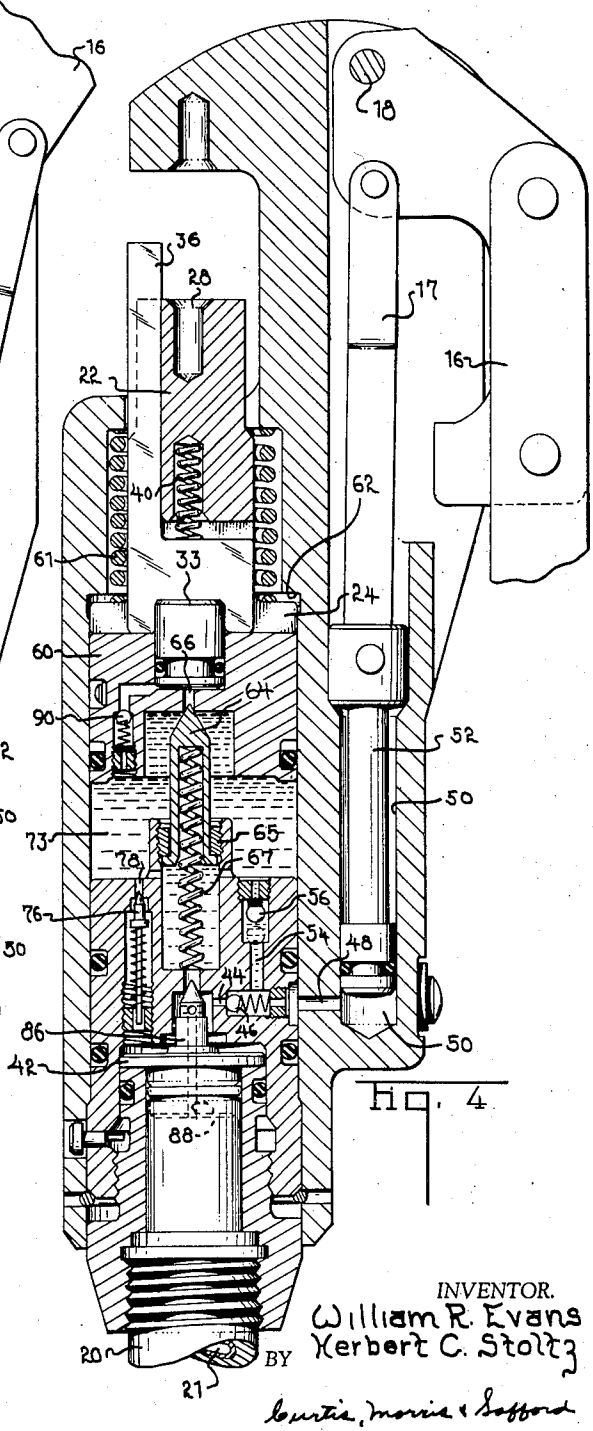


Fig. 4



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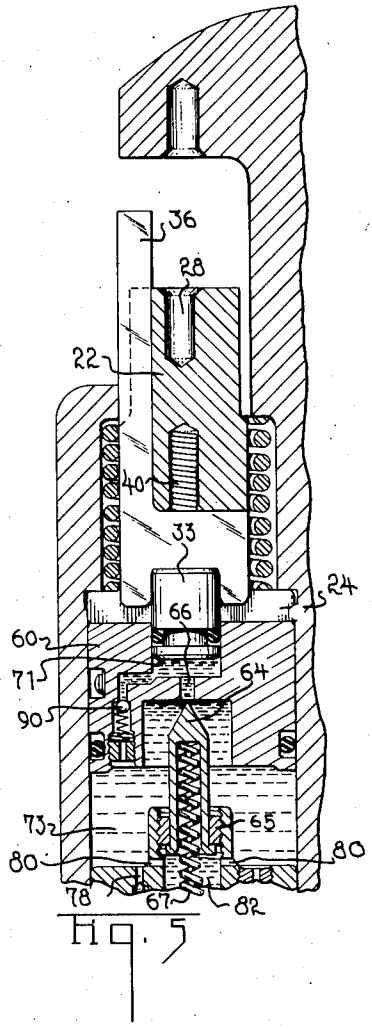


Fig. 5

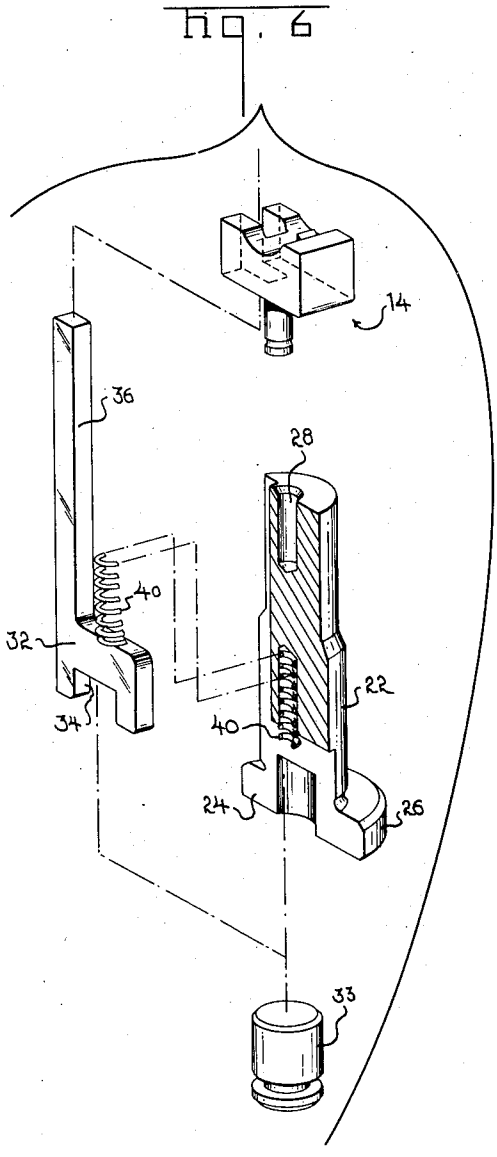


Fig. 6

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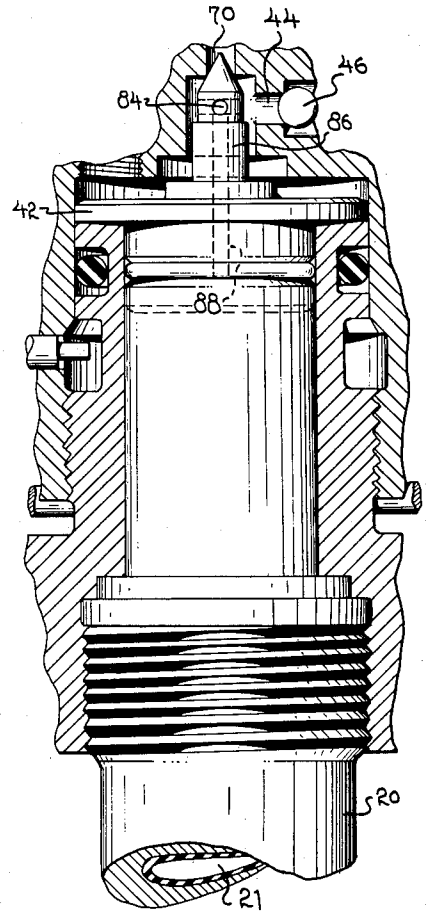


Fig. 7

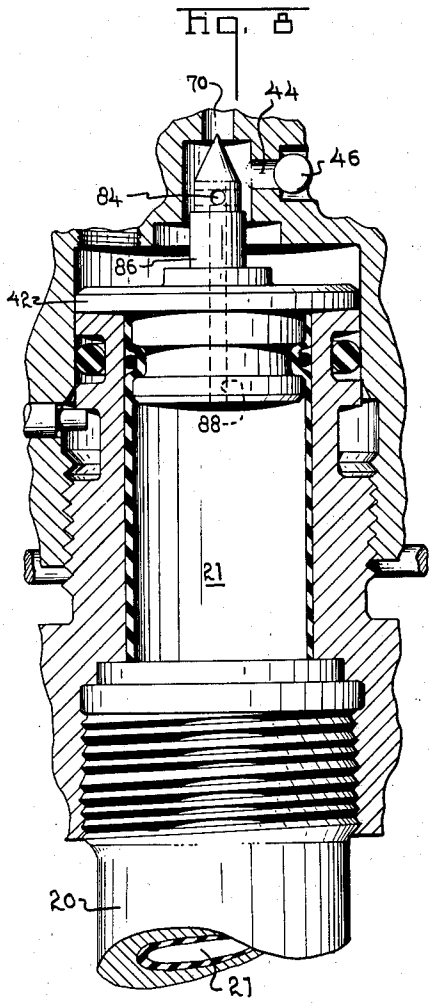


Fig. 8

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United States Patent Office 2,968,202 Patented Jan. 17, 1961

2,968,202

HYDRAULIC CRIMPING TOOL FOR CRIMPING T-TAP CONNECTORS

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Filed Apr. 11, 1958, Ser. No. 727,910

2 Claims. (Cl. 81—15)

This invention relates to a tool for crimping electrical connectors onto conductors. It includes the type of tool wherein a set of crimping dies forges the connector onto the conductor and then a second set of crimping dies locks the connector in place. Such a tool is shown in the patent application No. 634,756, filed January 17, 1957, now patent No. 2,863,346, by Martin Klingler and Robert Cobaugh. However it is equally applicable to a single crimp type of tool.

It is an object of this invention to provide a hydraulic tool having one handle pivoted at the end of the tool. This increases the mechanical advantage without increasing the size since the entire length of the tool may be employed as leverage for the handle. Also the pumping ram is arranged so as to be disposed parallel to the longitudinal axis of the tool whereby a fairly large ram may be employed without adding bulk to the tool.

Other objects and attainments of the present invention will become apparent to those skilled in the art upon a reading of the following detailed description when taken in conjunction with the drawings in which there is shown and described an illustrative embodiment of the invention; it is to be understood, however, that this embodiment is not intended to be exhaustive nor limiting of the invention but is given for purposes of illustration in order that others skilled in the art may fully understand the invention and the principles thereof and the manner of applying it in practical use so that they may modify it in various forms, each as may be best suited to the conditions of a particular use.

In the drawings:

Figure 1 shows a plan view of a tool embodying principles of this invention;

Figure 2 is a side view of the tool shown in Figure 1;

Figure 3 is a sectional view taken along plane 3—3 in Figure 2;

Figure 4 is a view similar to Figure 3 showing the dies and hydraulic system during the crimping cycle;

Figure 5 is a fragmentary view similar to Figure 4 showing the dies and hydraulic system in final position;

Figure 6 is an exploded view of the movable die assembly;

Figure 7 shows the hydraulic control mechanism in a closed position; and

Figure 8 shows the hydraulic control mechanism in an open position.

As shown in Figure 1 the tool basically is comprised of three components, a head member designated A, a pair of handles designated B, and a body member designated C. The head member is generally C shaped as shown at 10, and has a pair of die members including one stationary die 12 and one movable die assembly 14 positioned therein. The die assembly represented at 14, as shown in Figure 6, is actuated by the hydraulic system.

A handle 16 (Figure 1) is pivoted as at 18, near one extremity of the head member 10. The other handle 20 extends longitudinally from the other end of the body member C. Handle 20 may be rotated about its own

axis to release the fluid after the crimp is completed as will be described later.

As shown in Figure 6 the driving means for the movable die assembly constitutes a ram 22, with a slot 24 therein. A bottom of the ram includes a plate-like piston 26, and the top of the ram includes a die holding means 28. The piston 22 contains the connector deforming die. A clinching or locking die 36 has an extensible member 32 which rides in the slot 24. The clinching die 36 extends along the side of the extensible member 32 and projects above it. A slot or recess 34 in the bottom of the clinching die accommodates an actuating piston 33. Spring member 40 holds the clinching die in inoperative or retracted position during the first part of the crimping cycle.

As shown in Figure 3, the handle 16 is secured (via link 17) to a ram 52 in a chamber 50. When the handle is moved outwardly the ram 52 is raised, thus forming a vacuum in the chamber 50. Fluid is sucked out of the reservoir 21 in handle 20, through a valve member 42, port 44, past spring loaded valve 46, through a port 48, and into chamber 50. As shown in Figure 4, inward movement of the handle forces fluid out of the chamber 50, at which time spring loaded valve 46 closes off the port 44. The fluid is thus forced back through the port 48 and upwardly through port 54. Another spring loaded valve 56 is overcome, and the fluid finds its way into the chamber 73 containing the piston 60.

Continued stroking of the handle 16 causes the fluid to operate against the working face of the piston 60 to move the piston 60 (and the die assembly 22, with it) against the action of spring 61. The piston 60 also carries another valve 64 which is longitudinally adjustable by means of adjusting screw 65, threadedly secured in the assembly. This valve remains seated in passageway 66 during the travel of piston 60 under the action of spring 67, but is adjusted to unseat when the piston 60 nears the upper limit of its travel (note Figure 5). This permits the fluid to operate against the working face of piston 33 thus actuating the clincher die 36. The piston 33 moves the clincher die upwardly in the slot 24 against the action of spring 40. As shown in the application referred to above, the clincher die locks the connector after the crimp is completed. An overload release valve 76 is included in the system so that any further pumping allows fluid to by-pass through port 78 and return to the reservoir.

When the crimp is completed and it is desired to release the dies, rotation of the handle 20 causes the valve 42 to unseat from the passageway 70. Opening the valve 42 permits fluid to escape from the system and return to the reservoir. The return spring 61 drives the piston 60 downwardly forcing fluid through port 80 (Figure 5), chamber 82, port 84 (located in valve 86, as shown in Figure 8) through a central passageway 88 in the valve piston 42, and thus back into the reservoir 21.

The clincher die is returned to its inoperative position by spring 40. The fluid in chamber 71 is forced through valve 90 and returns to the reservoir along with the fluid in chamber 73.

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. The actual scope of the invention is intended to be defined in the following claims when viewed in their proper perspective against the prior art.

We claim:

1. A hand tool for crimping electrical connectors including a body member having a head on one end there-

of, a fixed die located in said head, a pair of movable dies slidable in said body member, hydraulic means for actuating said movable dies, said hydraulic means including a reservoir containing operating fluid, means for actuating said fluid, a first chamber including a first piston and cylinder means for operating said dies simultaneously, a second chamber including a second piston and cylinder means for operating one of said dies only, and valve means operable from a closed position wherein it prevents flow of fluid from said first chamber to said second chamber to a second position wherein it permits flow of fluid from said first chamber to said second chamber, said valve means including a valve seat in said first piston, a valve body urged toward said valve seat and slidable in said tool body, and means for limiting travel of said valve body, whereby after the first piston has moved a distance equal to the length of travel of the valve body, further movement of the first piston opens the valve seat to permit fluid to flow into said second chamber.

2. The device of claim 1 wherein the means for actuating the fluid includes a first handle fixed to said tool body, and a second handle pivoted at the top of the tool head, and a link pivotally secured at one end to the movable handle, and at the opposite end to the hydraulic means.

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