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HYDRAULICALLY OPERATED CONNECTOR
CRIMPING TOOL

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1 Claim. (Cl. 81-15)

This invention relates to tools for crimping electrical connectors onto conductors. Particularly it concerns tools of the type operated by fluid pressure.

Fluid operated crimping tools are generally heavy, bulky, and difficult to hold while making the crimped connection. The present invention provides a fluid operated crimping tool that is light, compact and easily held while making the crimp. In spite of its compactness, the tool of the instant invention incorporates a dual set of pistons, one having a long stroke and the other having a short stroke. The pistons are so arranged that the length of the short stroke increases the length of the long stroke.

Other objects and attainments of the present invention will become apparent to those skilled in the art upon 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.

Figure 1 is a plan view of a tool incorporating the principles of this invention, as shown in open or inoperative position;

Figure 2 is a view similar to Figure 1 showing the tool in closed or operative position.

A device illustrating one form of the invention, as shown in Figure 1, includes a body member 10, which constitutes a fluid cylinder. Plate members 12 and 14 close opposite ends of the cylinder. A piston 16 is slidably mounted centrally of the cylinder for axial travel therein. Piston rod 18 is secured to the piston 16 and is guided in an aperture 20 in plate 12. An aperture 22 in the plate 14 permits entrance of fluid into the cylinder 10, against the working face of the piston 16. The device shown in Figure 1 includes a spring 24 which bears against the non-working face of the piston, to return the piston to the inoperative position shown in Figure 1.

A valve structure, generally designated "V," located at one end of the cylinder, controls the flow of fluid through the aperture 22. The valving means will be disclosed in greater detail further on in the specification.

The plate member 12 closing the other end of the cylinder has projecting walls which form a second cylinder 26 of smaller diameter than the first cylinder 10. The projecting ends of the walls are fitted with a hollow cap 28 having a yoke 30 at one end thereof.

A second piston 32 is hollow and has a hollow piston rod 34 extending from it. The piston and piston rod are axially movable and a spring 36 yieldingly retains the piston in the inoperative position shown in Figure 1. The hollow chamber 38 is filled with fluid and suitable sealing rings are provided.

A pair of cooperating dies 40, 40' is secured to the hollow piston rod 34 and the yoke 30, respectively, so that relative movement of these members brings the dies into crimping relationship.

The valving structure includes a valve casing 50 with an inlet-outlet port 52 secured to a fluid supply (not

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shown). A spring operated needle valve 54 within the casing is actuated toward or away from a valve seat 55 by a slidable operating member 56. The member 56 is operated by cam 58, carried by handle 60. The spring 62 returns the needle valve, actuating member and handle to inoperative position.

During the operational cycle, movement of the handle 60 in a clockwise direction (Figure 2) causes the cam 58 to urge the member 56 against the valve 54. The valve 54 is moved away from the valve seat 55 to permit compressed air into the system. Release of the handle (Figure 1) permits the needle valve to return to its closed position against the valve seat 55 under the action of spring 62. Exhaust air is bled through the sliding member 56 and escapes to the atmosphere through a port 64 in the sliding member. It is noted that the abutment of the end of the needle valve and the sliding member closes the exhaust path during the operating cycle.

Operation

The tool is initially in the position shown in Figure 1. A connector is inserted between the dies and a conductor threaded into the connector. Actuation of the handle 60 causes operating member 56 to displace needle valve 54, admitting fluid pressure into the chamber 10, against the working face of the piston 16. The piston 16 is driven upwardly against the spring 24. Upward travel of the piston rod 18 causes it to enter the upper chamber 38 and displace the fluid therein. The displaced fluid operates against the working face of piston 32, driving it upwardly to close the dies 40, 40'. This effects the crimped connection. Release of the handle 60 permits fluid to bleed out of the chamber 10 and springs 24 and 36 return their respective pistons to the initial position. This opens the dies and permits the crimped connection to be withdrawn.

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.

I claim:

A tool for crimping electrical connectors including, a cylinder forming assembly having a fixed die at one end, a hollow piston slidable in the cylinder and carrying a die on one end which protrudes from the cylinder, whereby the dies are in cooperative relationship, an opening in the other end of the piston in fluid communication with the cylinder, means normally urging the piston away from the fixed die, a body of liquid in the hollow piston adapted to flow into the cylinder, a chamber coaxial with the first cylinder, a wall separating the chamber and the cylinder, an aperture in said wall, a second piston slidable in the chamber, means urging the second piston away from the wall, a piston rod extending from one side of the second piston through the aperture in the wall, means for directing fluid pressure against the working face of the second piston to urge it toward the wall, and means for venting the fluid pressure at the completion of the stroke, whereby the piston rod enters the hollow piston and replaces the fluid therein to cause the fluid to drive the piston toward the fixed die.

References Cited in the file of this patent

UNITED STATES PATENTS

1,007,349	Gerdau	Oct. 31, 1911
2,396,359	Smith et al.	Mar. 12, 1946
2,696,850	Peterson	Dec. 14, 1954