HYDRAULICALLY ACTUATED CABLE CUTTER AND INDENTOR

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References Cited

UNITED STATES PATENTS
2,254,613 9/1941 Matthesse .................. 81/301 X
2,431,970 12/1947 Swartz .................. 30/186
2,729,063 1/1956 Hoadley .................. 81/301 X
2,815,646 12/1957 Swanson .................. 81/301 X
3,008,234 11/1961 Mattera .................. 30/228

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ABSTRACT

Hydraulically actuated tool for cutting cables and indenting cable connecting sleeves. The tool comprises a hydraulic power cylinder, a tool head integral with one end of the cylinder. The toolhead is formed as a hook for receiving a cable to be cut or a sleeve with two cable ends therein to be crimped. Anvils of different sizes may be mounted in the toolhead to accomodate cables of various thicknesses to be cut. A tool component is secured to a piston slidable in the hydraulic power cylinder. The cylinder is provided with means for admitting hydraulic fluid under pressure for displacing the cylinder and the tool component in the direction of the tool head. The tool component is adapted to receive a cutting blade or a crimping head.

1 Claim, 11 Drawing Figures
This invention relates to cutting, punching and crimping tools and more particularly to such tools which are hydraulically actuated.

The present invention, is an improvement of the invention described and shown in U.S. Pat. No. 3,008,234 of Nov. 14, 1961, of the same inventor.

Heretofore various hydraulically actuated tools have been proposed and some particularly adapted for cutting of wire and multi-wire conduits or cables.

Certain of these known hydraulically actuated tools have disadvantages in excessive weight, cumbersomeness, excessive bulk prohibiting use in restricted spaces, and difficulty in conversion of the tool for multiple purposes to perform various operations on various size tables.

The present invention provides a hydraulically actuated tool which is light in weight, compact, readily usable in restricted space and easily and conveniently employed for various purposes including cutting, punching, and crimping, particularly for multistrand cable and wire.

The present invention comprises a plurality of adaptors for crimping cables of various thicknesses without requiring a separate tool for each cable size.

The adaptors are of special construction, thus permitting easy removal of a cramped cable connector and the ends of cables connected thereby.

It is accordingly an object of the present invention to provide a novel light weight, compact, rugged and powerful hydraulically actuated tool which can be used in restricted space.

Another object is to provide such a tool which is easily converted to perform various tasks such as cutting, punching, and crimping cable connectors of various sizes.

Another object is to provide such a tool having novel components readily associated therewith for cutting, punching, or crimping.

Other and further objects of the present invention will appear from the following description of an illustrative embodiment thereof.

This invention is capable of various mechanical forms and the following illustrative embodiment thereof should in no way be construed as defining or limiting the present invention.

In the accompanying drawings, in which like reference characters indicate like parts, an embodiment of the present invention is shown in cross sectional elevation in FIG. 1 to illustrate the arrangement of elements of the basic tool;

FIG. 2 is a partial enlarged view of the head of the tool with cutting anvil attached;

FIG. 3 is an exploded perspective view of the cutter or cutting blade and the cutter holding block;

FIG. 4 is a perspective of the cutting anvil;

FIG. 5 is a side view of the cutting anvil shown in FIG. 4;

FIG. 6 is an enlarged view of the tool head with the crimping block and the U-shaped crimping adaptor attached;

FIG. 7 illustrates, in perspective, U-shaped adaptors for crimping cables of various thicknesses;

FIG. 8 is a perspective view of the indentor block;

FIG. 9 is partial view of the tool head showing the indentor block in operating position;

FIG. 10 shows the indentor block as it is being retracted.

FIG. 11 is a detailed showing of the anvil securing means.

Referring now to the drawing in detail, the tool according to the invention comprises a cylinder 20, a hollow retractor fitting 22, threaded on one end of the cylinder at 24 and a tool head 26, integral with the other end of the cylinder. A connecting fitting 23 for a suitable source of hydraulic fluid under pressure, is screwed into the retractor fitting at 25. A piston 28 having a hollow axial bore 30, is slidable in cylinder 20. The piston is formed with an inwardly extending peripheral flange 31. A rod 32 of a smaller diameter than bore 30, and having a flange 34 is secured to screw 35 which is provided with an oil passage bore 39. A helical compression spring 37 is interposed between rod 32 and wall of cylinder bore 30. The spring 37 normally biases the piston 28 in the direction of the retractor fitting 22 (towards the right in FIG. 1). The retractor fitting 22 is threaded at its free end 23 to connect bore 30 to a suitable source of hydraulic fluid under pressure, not shown. A suitable sealing ring 33 is mounted on piston 28. Piston 28 is provided with a stud 29. A peripheral groove 36 is provided in stud 29 to receive a set screw 56 of the tool components, as will be described below.

Head 26 is provided with an elongated hook portion 38 having an interwound hook 40, which is spaced from tongue 42. Hook portion 38, hook 40 and tongue 42 are so arranged as to provide a generally rectangular opening 44 in tool head 26, having rounded ends at 46 and 48. Access to opening 44 is gained through mount 50 formed by the space between hook 40 and tongue 42. Tool head 26, hook extension 38, hook 40 and tongue 42 are slotted in the axis of cylinder 20 as at 52 to receive the tool components, as will be described below.

Referring now to FIGS. 2-5, the head 26 is shown with piston 28 in cylinder 20, about to perform a cutting operation. Base 54 is mounted on stud 29 by set screw 56 and is provided with an axial slot 58 to receive knife blade 60. Set screws 62 are suitably mounted in base 54 and pass through suitable holes 66, blade 60, to secure blade 60 in slot 58. Blade 60 is provided with a pair of angularly ground, concave edges 68 joining in a sharp point 70. The hook 40 is formed with an arcuate flange 72, (shown in cross-section in FIG. 2), to receive arcuate flange 74 of anvil 76, formed with convex faces 78 (FIG. 4). The concave shapes of the blade and the anvil, respectively, result in a clean cut of the cable and prevent clogging. The anvil 76 is further provided with a stud 82 having a peripheral recess 84. The stud 82 is received in bore 83 of tool head 26. As shown in FIG. 11, ball 86, received in recess 84 and biased by spring 88, is suitably secured in transverse threaded bore 90 of hook portion 46 by screw 92, holds the anvil 76 in place. With blade 60 mounted in base 54 and with base 54 mounted on stud 29, as above described, the cable to be cut is placed on the anvil 76, as shown in FIG. 2. Hydraulic fluid under pressure is then applied to piston 28, moving piston 28 and knife blade 60 to the left (in the drawing). Knife blade 60 engages cable 80, forcing the same against the anvil 76 and the continued movement to the left, of knife blade 60 then shears and
cuts cable 80. Release of hydraulic pressure on piston 28, allows piston 28 to move to the right to its initial position for the beginning of a new cutting cycle.

FIGS. 6-10 illustrate the tool of the present invention employed for crimping. Crimmer head 96 is mounted on stud 29 and is secured in place by screw 98 and is provided with opposed flanges 100 and 102, seated in slots 104 and 106, respectively to guide head 96 during movement thereof in opening 44. Crimmer head 96 is provided with a crimper point 107. Several crimper heads (not shown) provided with indentor points of various sizes are provided for crimping connector sleeves, such as 108 (FIGS. 6 and 9) which join two ends of cables, such as 110. Interchangeable crimper anvils, such as 112 and 114, illustrated in FIG. 7 are provided for indenting sleeves 108. Each of the crimper anvils is provided with a pin 116 received in recess 83. The pin 116 is provided with a peripheral recess 118, which receives the ball 86 biased by the spring 88. The pin 116 is thus slidable in bore 83 to permit the movement back and forth of the crimper anvils for the purpose further described herein.

The interchangeable crimper anvils are made of spring steel. The legs 120, 122, 124, 126 of crimper anvils 112, 114 are normally spread in the positions shown in dotted lines in FIG. 7. To receive sleeves and cables of smaller diameters, crimper anvils such as 112, are formed with heavier walls and an inner arcuate face 128, which is of a smaller radius than face 130 of crimper anvil 114. To allow the legs of anvil 112 to move into the position shown in dotted lines in FIG. 7, the anvil 112 is formed with thin sections 132.

The crimping operation of the tool will be apparent from FIGS. 9 and 10 and the above description. When sleeve 108 is to be crimped upon wire or cable 110, the sleeve is placed over the wire. One of the crimper anvils such as shown in FIG. 7, of a width corresponding to that of the sleeve 108 is secured in the hook 40 by inserting pin 116 in bore 83. Crimmer head 96 is mounted on stud 29. The cable and sleeve are then placed in the crimper anvil and hydraulic pressure is applied to piston 28, moving the same to the left, in FIG. 6, the position also being shown in FIG. 9, to bring crimmer head 96 and point 107 into engagement with sleeve 108. Crimmer point 106 then acts to crimp sleeve 108 on cable 110. As the crimper point 106 moves forward it pushes the sleeve 108, cable 110 and anvil 114, whereby anvil 114 is contracted and comes into intimate engagement with the inner face of hook 40. At the same time, faces 134, 136 of the anvil act as stops for crimmer head 96. The crimmer head imbids itself into the sleeve 108 as far as the anvil will permit. Release of hydraulic pressure allows piston 28 to be moved back into its initial position, as shown in FIG. 10, under the action of spring 37. The pressure on anvil 114 is released, thereby causing legs 120 and 122 to spring back into the spread initial position shown in FIGS. 7 and 10 with pin 116 moving in the direction of the arrow (FIG. 11). To permit cable 110 and cramped sleeve 108 to be removed from the anvil 114 without difficulty or extra effort.

What is claim:

1. Hydraulically actuated tool comprising a cylinder, means for admitting hydraulic fluid under pressure to one end of said cylinder, a tool head integral with the other end of said cylinder, a hollow piston in said cylinder, said piston having an inwardly directed flange at its one end adjacent said means for admitting hydraulic fluid, as axial rod in said hollow piston secured to said means for admitting hydraulic fluid, an outwardly directed flange on the free end of said rod, a spring on said rod, mounted between said inwardly directed flange and said outwardly directed flange, for biasing said piston against the action of hydraulic fluid, said tool head terminating in a hook having a curved internal surface, a tongue extending from said tool head, spaced from and opposite of said hook, said tool head, said hook and said tongue forming an opening for the passage of a cable, said hook having a bore disposed in the axis of the movement of said piston, an anvil being mounted in said hook and a tool component mounted in said opening on the other end of said piston, means for securing said anvil in said hook, said tool component a blade mounted on the other end of said piston said blade being formed with a pair of concave cutting edges, said anvil having a pair of convex faces complementary to said pair of cutting edges and substantially wider than said pair of cutting edges.