Aug. 11, 1959 M. LAZAR ET AL 2,898,790

MULTI-STROKE TOOL

Filed May 29, 1957

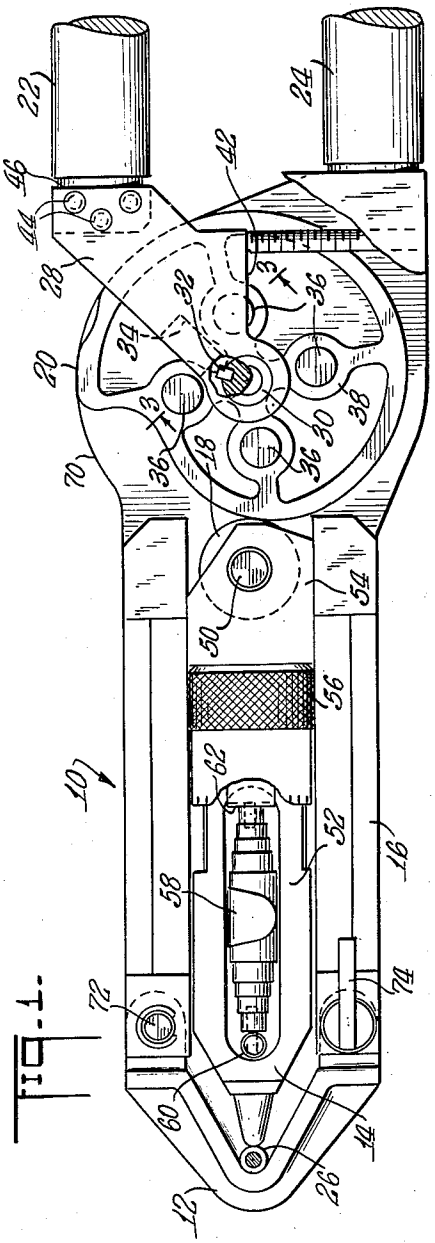


Fig. 1.

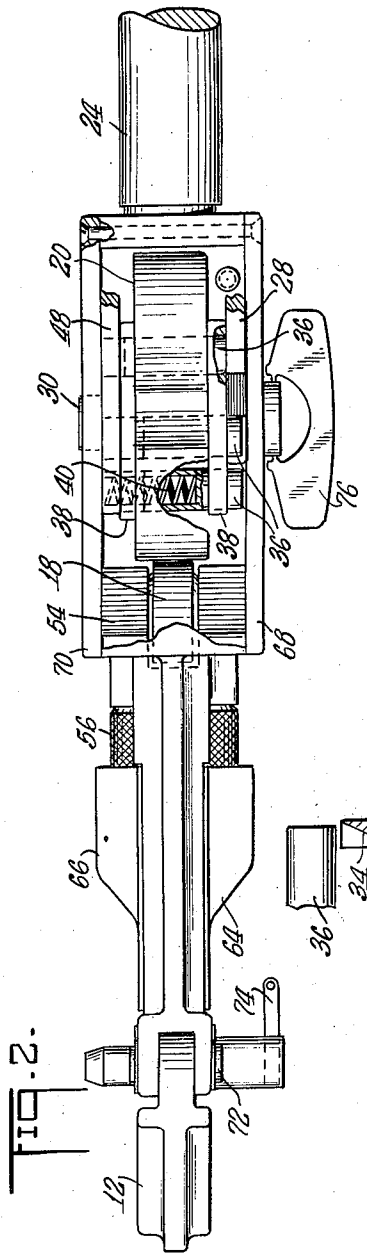


Fig. 2.

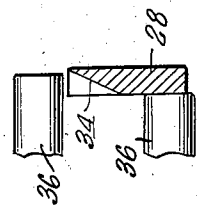


Fig. 3.

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MULTI-STROKE TOOL

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2 Claims. (Cl. 81—15)

Our invention relates to a multi-stroke tool wherein an electrical connector may be manually compressed.

Hitherto, the crimping of insulated connectors required a high input force when single action tools were employed or power equipment suitable for a variety of connector sizes were used.

The principal object of the present invention resides in the design of a multi-stroke compression tool wherein a plurality of low input force strokes may be employed, in place of a single action high input force tool.

Other objects are to provide a form of ratchet and cam tool for accomplishing the foregoing object, wherein the movable jaw of the tool is successively advanced until the connector has been crimped to a conductor, and the completed connection released from the grip of the tool; to provide means in the tool for adjusting the position of the movable jaw to enable connectors of various sizes to be accommodated in the tool; and to provide a tool having the foregoing characteristics that is relatively simple to manufacture, and easy to manipulate by an unskilled operator.

These and other objects of the invention are accomplished and new results achieved as will be apparent from the device pointed out in the claims and illustrated in the accompanying drawing in which:

Fig. 1 is a side elevation of our tool, partly in section;

Fig. 2 is a top plan view of the same; and

Fig. 3 is a sectional view of the ratchet lever taken on line 3—3 of Fig. 1.

Referring more in detail to the drawing, reference numeral **10** designates our multi-stroke tool comprising in part the fixed jaw **12**, the movable jaw or indentor **14**, the frame **16**, the cam follower **18** for driving the indentor, the cam **20**, the movable handle **22** for rotating the cam, and the stationary handle **24** for supporting the frame and inserted connector **26**.

The cam is operated by a ratchet mechanism comprising the ratchet plate **28** rotatably mounted to the cam shaft **30** which is locked to cam **20** by the key **32**. The cam plate is tapered as at **34** to engage successively the cam pins **36** which are positioned in cam bosses **38** provided in the sides of cam **20**. A spring **40** is positioned in each of the pins to urge the cam pins outwardly. Thus the ratchet plate when moved counter-clockwise as seen in Fig. 1 engages each cam pin at taper **34** driving the cam pin inwardly and passing the pin until the cam pin passes the edge **42**. At this point, the pin is outwardly projected by the spring **40** to engage the ratchet plate at edge **42** when the plate is moved clockwise. This rotates the cam **20** for the same arc that the ratchet plate is moved clockwise. Four cam pins are provided in the example illustrated thus requiring a 90 degree angle of rotation for each oscillation of the movable handle **22** to which the ratchet plate is attached by rivets **44**. The ratchet plate forms a U-shaped construction, being connected by bar **46** to a similarly formed cam pin supporting plate **48** against which the springs **40** react.

The cam plate operates against cam follower **18** which

is rotatably supported as at shaft **50** in the end of the indentor **14**.

The indentor is made adjustable to provide for a wide variety of connector sizes. This is accomplished by separating the indentor into a head portion **52** and a follower supporting block **54** which are spaced apart by a selector sleeve **56** upon which the connector sizes are indicated. By rotating the sleeve **56**, on the head portion, the effective length of the indentor may be changed. A spring **58** keeps the ram head seated in the selector sleeve.

One end of spring **58** is secured to the frame **16** by means of pilot pin **60**. The rear end of the spring **58** is secured to the indentor by means of pilot **62**. In this manner the follower of the indentor is constantly pressed against the cam.

Plates **64** and **66** are screwed to the frame to cover the indentor mechanism while plates **68** and **70** are similarly secured to cover the cam mechanism and to support cam shaft **30**.

The stationary jaw is preferably hinged to the frame at pivot pin **72** and secured by retaining pin **74**.

Key **76** may be added to permit the cam to be rotated to any desired position without movement of the handles.

The cam is shaped to provide the desired mechanical advantage required for moving the indentor die and indenting the connector.

When the selector is rotated to the proper connector size, the connector is inserted and ready for indentation, and the movable handle is oscillated causing the pins to be alternately depressed in their respective bosses and engaged by the ratchet lever to rotate the cam and operate the indentor. After four strokes starting from the portion of the cam illustrated in Fig. 1, the indentor is progressively advanced to the proper position for indenting the connector whose size is marked by the selector.

The indentor is lifted with the left hand while the selector is rotated to the desired size designation. The indentor is then released, the connector inserted and the movable handle oscillated until the connection is made.

We have thus described our invention, but we desire it understood that it is not confined to the particular forms or uses shown or described, the same being merely illustrative, and that the invention may be carried out in other ways without departing from the spirit of the invention and, therefore, we claim broadly the right to employ all equivalent instrumentalities coming within the scope of the appended claims, and by means of which objects of our invention are attained and new results accomplished, as it is obvious that the particular embodiments herein shown and described are only some of the many that can be employed to attain these objects and accomplish these results.

We claim:

1. A compressing tool comprising a frame, movable and fixed jaws in said frame, a cam follower operating said movable jaw, a cam rotatably secured to said frame and engaging the cam follower, said cam having a plurality of projections, a ratchet lever pivoted to said frame and successively engaging said projections to rotate said cam and thereby actuate said movable jaw toward said fixed jaw and means for sliding said ratchet over an end of each projection for engaging a side of said projection wherein the projections extending from said cam are outwardly spring biased and the ratchet lever is provided with a tapered surface for causing the projections to be inwardly moved against the action of the springs.

2. A compressing tool comprising a frame having a fixed jaw, a movable jaw in said frame, a cam follower operating said movable jaw and being relatively adjustable with respect thereto, a cam rotatably secured to said frame and engaging the cam follower, said cam having a plurality of outwardly positioned spring biased pins, a ratchet

lever pivoted to said frame and having a tapered surface on one edge for causing the pins to be inwardly moved against the action of the springs to permit the ratchet lever to pass over the pins, said ratchet lever successively engaging a side of each pin when moved in the reverse direction to cause the rotatable cam to operate the cam follower and movable jaw, thereby moving the movable jaw towards said fixed jaw.

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