

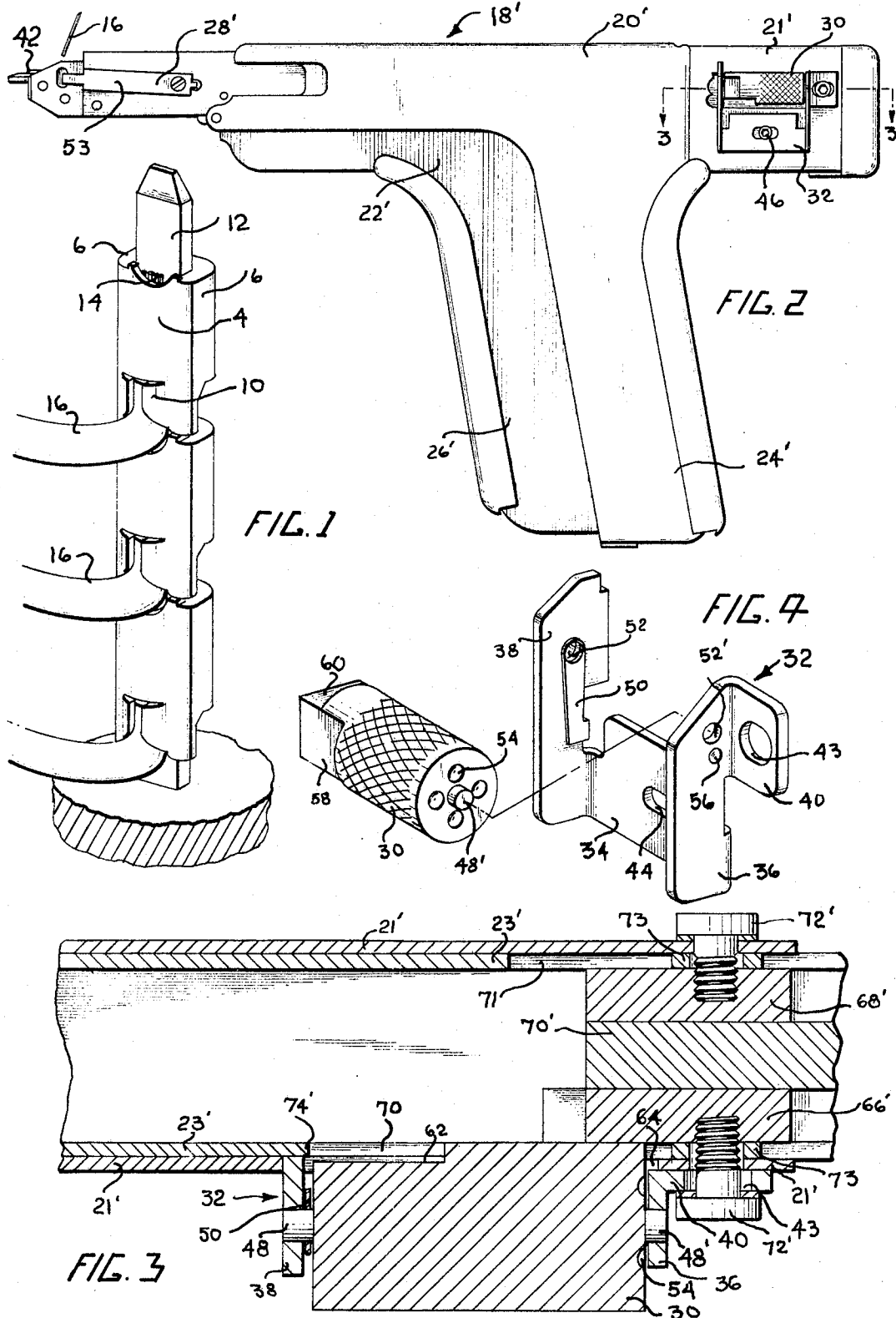
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3,479,719

TOOL FOR MAKING CLIP-TYPE ELECTRICAL CONNECTIONS

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TOOL FOR MAKING CLIP-TYPE ELECTRICAL CONNECTIONS

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2 Claims

ABSTRACT OF THE DISCLOSURE

Hand tool for making clip-type electrical connections has two concentrically arranged housings which are telescopically movable with respect to each other when the terminal clip is pushed onto the terminal post. Tool has selective stop which determines final position of clip on post in form of a cylinder rotatably mounted on the outside surface of the outer housing and extending through aligned openings in the outer and inner housings. Stop has a plurality of shoulders which are located such that the inner housing moves relatively against one of the shoulders during the telescoping movement of the housing to prevent further movement of the terminal clip along the terminal post.

BACKGROUND OF THE INVENTION

Clip-type electrical connections are ordinarily made by means of a tool having a reciprocable clip pushing device which pushes a terminal clip along a predetermined path, against a transversely extending conductor, and onto the post. During movement of the clip, the end portion of the wire is stripped of its insulation and the stripped wire end is dragged by the clip onto the post. Where only one clip-type connection is made between a conductor and a terminal post, the clip is ordinarily moved to a location adjacent to the base or lower end of the post. Where several clip-type connections are made to a single terminal post, the clips are stacked one above the other on the post. Since the clips are quite often relatively small, it is desirable to provide on the tool a stop device for abruptly stopping movement of the clip onto the post when it has reached the desired location. A stop of this type should be selective so that the first clip will be positioned close to the base of the post and subsequent clips will be stacked in spaced relationship to previously applied clips. The present invention thus relates to an improved selective stop by means of which the location of the clip on the post can be accurately controlled.

The disclosed embodiment of the invention is particularly intended for use with tools of the type disclosed in U.S. Patents 3,249,992 and 3,220,099. Hand tools of these types generally comprise inner and outer housing members which are telescopically movable with respect to each other. The clip pushing device is secured to the outer housing member in a manner such that upon such telescopic movement of the two housings, the clip is moved relatively through the tool, over the mandrel on the end of the tool, and onto the terminal post.

SUMMARY OF THE INVENTION

In accordance with the disclosed embodiment of the invention, a cylindrical barrel-like member is rotatably mounted on the surface of the outer housing of a tool of the type shown in U.S. Patent 3,220,099 in a manner such that it projects through aligned openings in the outer and inner housings and intersects the path of movement of the inner housing. This stop member is provided with a plurality of transversely extending shoulders located at different distances from the end of the stop. Any one of the several shoulders can be positioned in the path of move-

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ment of the inner housing by rotatably indexing the barrel thereby to stop the relative movement of the housings with respect to each other at different locations.

In the drawings:

FIGURE 1 is a perspective view of a terminal post having three clip-type connections thereon;

FIGURE 2 is a side view of a tool having a selective stop in accordance with the invention;

FIGURE 3 is a view taken along the lines 3—3 of FIGURE 2; and

FIGURE 4 is an exploded perspective view of the stop in accordance with the invention.

The disclosed embodiment of the invention is provided on a tool of the type disclosed in the above-identified Patents 3,249,992 and 3,220,099. Accordingly, the tool 18' will be described only to the extent necessary for an understanding of the instant invention with the understanding that additional details of the structure of the tool are set forth in the above-identified patent. In the interest of simplicity, the structural elements of the tool described (with the exception of the adjustable stop) are identified by the same reference numerals, differentiated by prime marks, as are used in the above noted Patent 3,220,099.

Referring first to FIGURE 1, a clip-type electrical connection between a wire 16 and a post 12 are made by means of an open-sided clip having a web 4 and sidewalls 6 which extend laterally from the web and are reversely curled so that they bear against one side of the post. The stripped end 14 of the wire 16 is contained between the inner surface of the web 4 and the surface of the post 12 with the insulated portion of the wire emerging from confined relationship through an insulation support or wire guide at the lower end of the clip as shown at 10. When several clip-type connections are made to a single post as shown in FIGURE 1, it is desirable that the tool used to make the connections be controlled in a manner such that when the first connection is made, the clip is moved to a location adjacent to the lower end of the post. The tool should then move the second clip to a location immediately above the lowermost clip but should not move it into engagement with the clip because of the possibility of damage to the clip or the electrical connections. The third clip must also be stopped at a location spaced above the second clip.

A known type of hand tool 18' for making clip-type electrical connections as described more fully in U.S. Patent 3,220,099 comprises outer and inner housings 20', 22', these housings having handle extensions 24', 26' and being telescopically movable with respect to each other to cause movement of a clip-pusher (not specifically shown but described in the above-identified patent) relatively through the tool, through the forward extensions 28' of the inner housing, over the mandrel 42' at the end of the tool and onto the terminal post. Insulation is stripped from the wire end, which is inserted downwardly into the forward end of the tool, as indicated, and into the mandrel. The slug or stripped end of insulation which is left in the tool can be ejected by means of a suitable ejector 53'.

Referring to FIGURE 3, the inner and outer housing 20', 22' have rearwardly extending portions 23', 21' which project rightwardly, as viewed in the drawing, from the handle portions of the tool. Spacer blocks 66', 68', 70' are provided between the sidewalls of the inner housing portion 23' at the right hand end thereof and the clip pusher is secured to these spacer blocks in a manner described in the above-identified Patent 3,220,099. The outer housing portion 21' is secured to these spacer blocks by means of fasteners 72' which extend through holes in each side of the housing portion 21' through elongated slots 70, 71 in the sides of the inner housing portion 23' and which are threaded into the blocks 66', 68'. Spacers 73 are pro-

vided between the sides of the outer housing portion 21' and the blocks 66', 68' to prevent deformation of the outer housing walls and to permit the telescoping movement of the housing with respect to each other. By means of this arrangement, the clip pusher moves relatively leftwardly as viewed in the drawing when the outer housing is moved relatively leftwardly. The position at which the housings are stopped from further telescopic movement with respect to each determine the final positions of the clips on the terminal post.

The relative movement of the two housing members with respect to each other is controlled by means of a cylindrical selective member in the form of a drum 30 mounted in a bracket 32 secured against the side of the outer housing portion 21'. Bracket 32 has a base or web 34, parallel sides 36, 38 and an ear 40 which extends from the side 36. This bracket is secured to the side of the outer housing portion 21' by means of one of the fasteners 72' which extends through the opening 43 and a fastener 46 which extends through the opening 44 in the base 34. The drum 30 has integral trunnion portions 48, 48' which are received in holes 52, 52' in the flanges 36, 38. Drum 30 is biased rightwardly as viewed in FIGURE 3 by means of a leaf spring 50 mounted concentrically with respect to the hole 52 and bearing against the lefthand side of the stop as viewed in FIGURE 3. The drum may be retained in any given position of rotation by means of recesses 54 on its right hand side which are adapted to be entered by a dimple 56 in the flange 36 adjacent to the opening 52'.

The lefthand portion of the drum member 30 as viewed in FIGURES 3 and 4 is provided with chordal flats 58, 60, 62 which define leftwardly facing stop shoulders against which the inner housing is adapted to move. The radius of the drum member 30 is such that when it is mounted between the flanges 36, 38, it extends through an opening 64 in the outer housing and through the slot 70 in the inner and outer housing so that the shoulders defined by these flats are opposed to the side 74' of the slot 70 in the inner housing 23'.

Suitable numerical indicia are provided on the flats 58, 60, 62 to denote the position which will be occupied by the terminal clip being pushed onto the post. Thus, in FIGURE 2, the drum 30 is in a position such that the numeral 2 on one of the flats faces outwardly. The operator then knows that the drum is set such that the terminal clip being applied to the post will be in the number 2 position, that is, above the lowermost clip on the post.

In use, the operator can then examine the terminal post

to which he is about to make an electrical connection and determine whether the connection being made will be the first, second, or third connection to the post. He then sets the cylindrical stop 30 so that the numerical indicator of the position faces outwardly and is visible on the side of the tool. He then goes through the operating cycle described in detail in the above-identified patents to form the connection. The clip will, of course, be stopped at the proper location about the previously applied clip or clips.

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.

What is claimed is:

1. In a hand tool for making clip-type electrical connections and comprising inner and outer housings telescopically movable with respect to each other to move a terminal clip onto a terminal post, the improvement comprising stop means in the form of a drum mounted on the external surface of said outer housing and projecting inwardly of said tool beyond said inner housing, said drum having a plurality of flat surface portions defining stop shoulders positionable, upon rotation of said drum, on the path of movement of said inner housing thereby to stop telescoping movement of said housings and to locate a clip at a predetermined position on a terminal post to which it is being applied.

2. A device as set forth in claim 1 wherein the axis of rotation of said drum extends parallel to the direction of telescoping movement of said housings, said flat surfaces comprising chordal surfaces on said drum.

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