ELECTRICIAN'S TOOL FOR SECURING GROUNDING CLIPS

Filed Oct. 17, 1966

INVENTOR
CARMEN G. MATTEO

BY
Robert E. Vondie
ATTORNEY.
ABSTRACT OF THE DISCLOSURE

A tool including a handle having a hole extending inwardly through one end, a stem extending outwardly from said one handle end and having on one side a groove defining an extension of the handle hole, and a finger on the handle extending from this handle end in laterally spaced facing relation with respect to the stem.

This invention relates generally to electricians' tools, and is especially concerned with a tool for grounding switch and outlet boxes and the like.

As is well known to those versed in the art, switch and outlet boxes must be grounded, in accordance with wiring codes and laws. A grounding clip has come into commercial usage to simplify the box-grounding operation previously requiring the winding of a grounding wire about a screw, and tightening of the screw. Grounding clips of this type are disclosed in U.S. Patent No. 3,021,581, which clips are formed for simultaneous reception of a grounding wire and a wall of the electrical box.

While the use of grounding clips has simplified prior procedures, and has resulted in more reliable grounding, the engagement of such clips in their grounding relation with a box has heretofore presented a difficult manipulative operation to the electrician.

Accordingly, it is an important object of the present invention to provide a tool for applying grounding clips to electrical boxes, which greatly simplifies the operation, being substantially instantaneous and requiring only one hand of the user by the instant tool.

It is another object of the present invention to provide a tool of the type described wherein a grounding clip and wire may be readily inserted into the tool, and together applied to an electrical box in a greatly expedited manner assuring reliable grounding.

It is still a further object of the present invention to provide a tool having the advantageous characteristics mentioned in the preceding paragraphs, which tool is extremely simple in construction, involving no moving parts, the tool being durable and reliable throughout a long useful life, and capable of economic manufacture for sale at a reasonable price.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings, which form a material part of this disclosure.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts, which will be exemplified in the construction hereinafter described, and of which the scope will be indicated by the appended claims.

In the drawings:

FIGURE 1 is a perspective view illustrating the operative procedure employing a tool in accordance with the teachings of the present invention;

FIGURE 2 is a perspective view similar to FIGURE 1, illustrating completion of the grounding operation;

FIGURE 3 is a partial sectional view taken generally along the line 3—3 of FIGURE 1, enlarged for clarity;

FIGURE 4 is a partial longitudinal view taken generally along the line 4—4 of FIGURE 3;

FIGURE 5 is a longitudinal elevational view illustrating one side of a tool of the present invention apart from a grounding clip;

FIGURE 6 is a partial longitudinal elevational view of the tool of FIGURE 5, illustrating the other side of the tool;

FIGURE 7 is an end view of the instant tool, as from the left-hand end of FIGURES 5 and 6;

FIGURE 8 is a partial longitudinal sectional view taken generally along the line 8—8 of FIGURE 5, enlarged for clarity;

FIGURE 9 is a longitudinal sectional view taken generally along the line 9—9 of FIGURE 8;

FIGURE 10 is a longitudinal sectional view taken generally along the line 10—10 of FIGURE 8; and

FIGURE 11 is a transverse sectional view taken generally along the line 11—11 of FIGURE 8.

Referring now more particularly to the drawings, and specifically to FIGURES 1 and 2 thereof, a tool of the instant invention is there generally designated 20, and illustrated in operative association with an electrical junction box, as a switch or outlet box 21. In FIGURE 1 a clip 22 is held by the tool 20 and being applied over an edge of the box wall 23, with a ground wire 24 engaged in the clip. The clip 22 is best seen in FIGURES 2 and 3, and by reference to said prior U.S. patent, as being generally of U-shaped configuration including a pair of facing spaced legs 25 and 26 connected together at one end by a bight portion 27. The free ends of the legs 25 and 26 may be bent obliquely outward, as at 30 and 31 to facilitate their sliding engagement on opposite sides of the box wall 23. The bight portion 27 may be formed with a thru opening 28; and, one leg 26 of the clip may be deformed outward, as by a semicylindrical formation 29 providing on the inner side of leg 26 a longitudinally extending groove opening through the bight portion cutout 28. Thus, as best seen in FIGURE 2, the grounding wire 24 is adapted to be received in and extend along the inner side of the groove-defining formation 29, with the wire projecting through and beyond the opening or cutout 28. It will thus appear that the grounding wire 24 is held by resilience of the clip 22 in firm electrical contact with the box wall 23. The tool 20 includes an elongate body 35, say of generally cylindrical external configuration, and may taper, as at 36, toward an end section 37. The end section 37 is disposed in end-to-end relation with the body section 35, and may combine therewith to define a handle, as will appear presently. The body section 35 has formed extending inward through its reduced end 40 a blind bore or hole 41 provided with internal screw threads 42.

The end section 37 may be generally cylindrical, of a diameter approximating that of the body-section end 40, but is formed with a chondal section removed defining a flat 43. As best seen in FIGURE 8, the flat 43 may taper slightly from the inner end 44 of the end section 37 to the outer end 45 of the end section. Further, the inner end 44 of the end section 37 is provided with a central extension or shank 46 having external screw threads 47 for threaded engagement in the hole 41, as seen in FIGURES 8-10. In this condition, the threaded shank 46 and internal screw threads 42 in the hole 41 combine to define a connection means connecting the body section 36 and end section 37 with their respective ends 40 and 44 in facing relation.

Projecting from the outer end 45 of the end section 37 is a rigid elongate extension or stem 50. The stem 50 may be of generally semicylindrical external configuration, having one side flat, as at 51, the flat side being adjacent to the flat 43 of the end section 37, while the cy-
lindrical surface 52 of the stem is remote from the flat 43. The flat stem surface 51 may have its outer end region smoothly curved or beveled, as at 53.

Generally centrally through the end section 37 is formed a thru opening or passageway 55 longitudinally through the shank 46, as at 56, and opens through the shank end remote from the end section, as at 57. The passageway 55 opens through the nonfacing or outer end 45 of the end section 37, as at 58; and, the flat side 51 of the stem 50 is formed with a longitudinally extending groove 59 which defines a generally semi-cylindrical extension of the passageway or hole 55. Thus, in the assembled condition shown in FIGURES 8-10, the body-section hole 41, passageway 56, 55, and groove 59 combine to define a continuous hole or passageway from the interior of the body section opening longitudinally outward through the outer open end of groove 59.

A finger 60, say in the form of a resilient leaf spring or strip is disposed along the flat 43 of end section 37, extending longitudinally of the handle 35, 37, and projecting longitudinally outward beyond the outer end 45 of the end section in parallel faced spacing relation with the flat side 51 of stem 50. The spring finger or strip 60 may be formed adjacent to its outer end with a depression 61 extending inward toward the stem 50, for a purpose appearing presently. At the inner end of the spring finger or strip 60 there is provided a transversely extending securement portion 62, which integral with the remainder of the strip, and formed with a cutout or notch 63, best seen in FIGURE 11. The transverse securement portion 62 is engageable between the facing ends of sections 35 and 37, with the notch 63 receiving shank 46; and upon tightening of the threaded connection means 46, 42, the securement portion 62 is firmly anchored or clamped between the handle sections. The inner end of strip 60 may be connected to the securement portion 62 by a bent portion 64, whereby the spring finger 60 is afforded added resilient deflectability away from the stem 50. That is, in its normal condition, the spring finger 60 may bear against the flat 43, while being resiliently deflectable away from the stem 50.

In practice, it is only necessary to insert a clip 22 into the space between stem 50 and finger 60, with the clip formation 29 engaged in the stem groove 59, and the clip bight portion 27 against the end-section surface 45. A wire to be grounded may then be inserted along the concave side of clip formation 29, through the opening 28 of the clip bight portion, and thence through passageway 55, 56 and into hole 41, to the desired extent. In this condition, the tool may be grasped in the hand of a user, as by the handle 35, 37, and moved toward the edge of a box wall to engage the wall 23 edgewise into the clip 22 between the clip legs 25 and 26, as seen in FIGURE 3. That is, the legs of the clip 22 are distended by this forced engagement, and fractionally grasp the box wall so that withdrawal of the tool 20 leaves the clip engaged on the box wall and forcibly holding the grounding wire 24 in its grounding connection with the box. Of course, the above-described procedure is repeated, as required.

From the foregoing, it is seen that the present invention provides a tool for securing a grounding clip to an electrical box which fully accomplishes its intended objects and is well adapted to meet practical conditions of manufacture, distribution and use.

Although the present invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be made within the spirit of the invention and scope of the appended claims.

What is claimed is:

1. A tool for securing a grounding clip to an electrical box, said tool comprising an elongate handle, said handle being provided with a hole extending longitudinally inwardly through one handle end, a stem on said handle extending longitudinally outwardly from said one handle end on one side of said hole, said stem being formed with a longitudinal groove defining an extension of said hole and opening through the outer end of said stem, and a finger on said handle extending longitudinally outwardly therefrom on the other side of said hole in laterally spaced facing relation with respect to said stem, whereby a grounding clip is adapted to be held between said stem and finger with a grounding wire passing through the clip into said hole.

2. A tool according to claim 1, said finger being resiliently distensible away from said stem for fractionally retaining a clip in its held condition.

3. A tool according to claim 1, said stem being rigid with respect to said handle and having its groove facing toward said finger for conforming engagement with a wire-receiving formation of a clip.

4. A tool according to claim 1, said handle being sectional and comprising a body section, an end section in end-to-end relation with said body section, and connection means detachably connecting said sections in said end-to-end relation.

5. A tool according to claim 3, said finger comprising a resilient strip extending freely and outwardly beyond said end section, and a transverse securement portion on said strip anchored in clamped relation between said body and end sections.

6. A tool according to claim 5, said connection means comprising a headed shank on one section, the other section having an internally threaded shank-receiving cavity, said securing portion having a nutch receiving said shank and being secured in said clamped relation by threaded engagement of said shank in said cavity.

7. A tool according to claim 6, said hole extending through said end section and shank.

References Cited

UNITED STATES PATENTS
3,087,235 4/1963 Porter 29—206
3,224,082 12/1965 Moulin 29—203
3,279,044 10/1966 Roper 29—278 X

THOMAS H. EAGER, Primary Examiner.

U.S. Cl. X.R.

29—206, 278