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2,741,436

WIRE WRAPPING TOOL FOR FINE WIRES

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FIG. 1

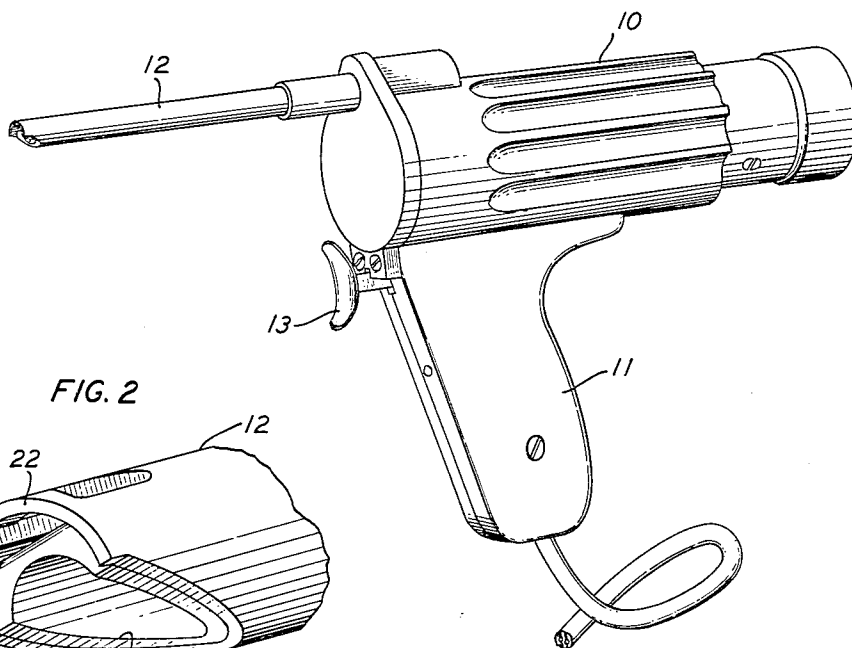


FIG. 2

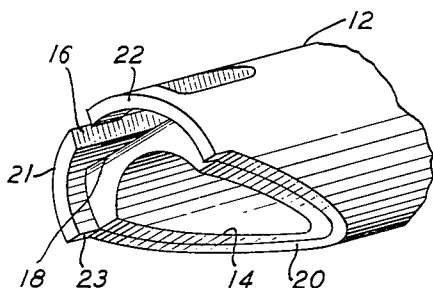


FIG. 3

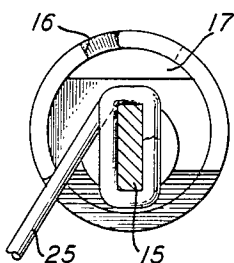


FIG. 4

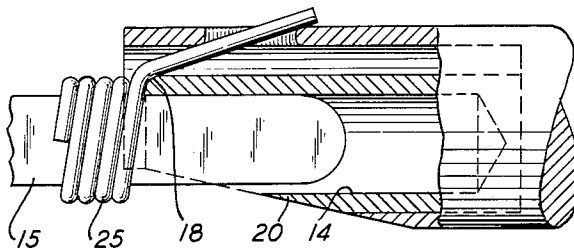


FIG. 5

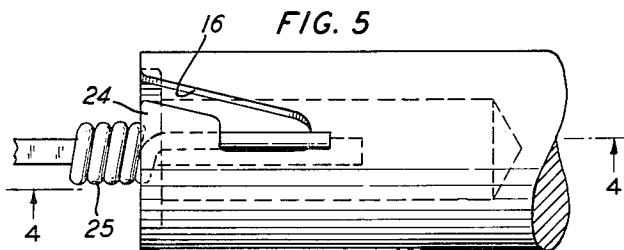
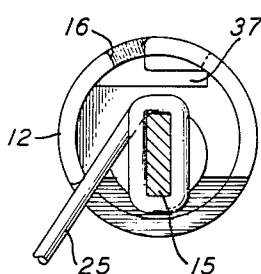


FIG. 6



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WIRE WRAPPING TOOL FOR FINE WIRES

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11 Claims. (Cl. 242-7)

This invention relates to wiring tools and more particularly to wiring tools that are capable of making a wrapped wire connection on a terminal, on another wire or on a similar conductor.

As set forth more fully in the applications of Hickman-Mallina-Reck, Serial No. 753,066, filed June 6, 1947, now Patent 2,585,010, issued February 12, 1952, Mallina, Serial No. 109,308, filed August 9, 1949, now abandoned, and Mallina, Serial No. 294,607, filed June 20, 1952, a good electrical connection can be made by wrapping a wire on a suitably shaped terminal or other similar conductor. These connections may be soldered where it appears desirable, but in general are good connections as wrapped with no need for solder.

One form of wiring apparatus which has been used for making wrapped connections comprises a rotatable spindle having a substantially axial opening for receiving a terminal or like conductor, and an orifice radially spaced from this opening for receiving and guiding a wire that is to be wrapped on the terminal. A rounded edge having a radius suitable for the size of wire being used is located between the orifice and the terminal opening to aid in controlling the wire during wrapping. The wire receiving orifice may be, for example, a drilled hole in the spindle spaced from and substantially parallel to the terminal receiving opening, a longitudinal slot or groove in the surface of the spindle cooperating with a sleeve or other like means in which the spindle rotates or for other similar means.

One object of this invention is to make good wrapped connections with very fine wires.

Another object of this invention is to improve the spindle configuration in a manner to facilitate application thereof to a terminal.

A feature of this invention lies in a wire wrapping spindle having a relatively wide slot for receiving a wire and a more restricted slot connected to the wide slot for guiding the wire during wrapping.

A further feature of this invention involves a wire guiding orifice of a configuration that is capable of handling several wires for simultaneous wrapping.

A still further feature pertains to a spindle having a cut-away portion, whereby the wiring tool may be laterally, rather than axially, applied to a terminal, thus making for easier location of the tool on the terminal.

Other and further objects and features of this invention will appear more fully and clearly from the following description of illustrative embodiments thereof, taken in connection with the appended drawing in which:

Fig. 1 is a perspective view of a wiring tool equipped with a wiring head in accordance with one embodiment of this invention;

Fig. 2 is an enlarged perspective view of the tip of the wiring head of Fig. 1;

Fig. 3 is an end view of the same wiring head showing also a terminal and a partially wrapped connection;

Fig. 4 is a sectional view taken on line 4-4 of Fig. 5;

Fig. 5 is a plan view of the end of the wrapping head

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showing a terminal and a partially wrapped connection; and

Fig. 6 is a view similar to Fig. 3 showing another embodiment of the invention.

As shown in Fig. 1, the wiring tool comprises a housing 10 having a handle 11 and a wrapping head or spindle 12. The tool is provided with an operating means or trigger 13 for controlling the operating mechanism in the housing 10. This operating mechanism may take any suitable form such as, for example, that shown in the application of F. Reck, Serial No. 15,834, filed March 19, 1948, now Patent 2,649,121, issued August 18, 1953.

As is more clearly shown in Figs. 2, 3, 4, and 5, the end of the wrapping head or spindle 12 is provided with a substantially axial opening 14 for receiving a terminal 15. As may be seen in Figs. 2 and 4, the terminal receiving opening 14 is not exactly coaxial with the spindle 12, the axis of the opening being slightly offset radially from and parallel to the axis of the spindle. Radially spaced from the opening 14 is a wire receiving and guiding orifice comprising a receiving slot 16 and a guiding slot 17. The receiving slot 16 is made relatively wide with respect to the wire to be wrapped in order to facilitate insertion of the wire therein. The wire receiving slot 16 is in direct communication with the wire guiding slot 17, which may be tapered, as shown in Fig. 3, in order to guide wires of different diameters.

The portion of the spindle between the guiding slot 17 and the opening 14 is constructed with a rounded edge, as at 18, to aid in controlling the wire during wrapping. This portion of the spindle has a surface substantially tangent to the radius of the terminal receiving opening 14.

A portion of the spindle is cut away for example on a bevel, as shown at 20, to provide lateral entry to the terminal receiving opening 14. This expedient allows the placing of the spindle down on a terminal which is easier than inserting a terminal into the end of an opening, particularly if the terminal and opening are of relatively small cross section. A relatively rectangular or stepped cut-away spindle may also be used instead of the beveled spindle.

The end of the spindle adjacent the beveled portion 20 and comprising projections 21 and 22, besides defining the slots 16 and 17, also includes other features of the tool. One of these is the surface 23 of the projection 21 which faces sufficiently toward a terminal in the opening 14 to catch the final end of a wrapped wire as it emerges from the guiding slot 17, to smooth said wire end down against the terminal as shown in Figs. 3 and 6. The projection 22 includes the hook portion 24 which aids in guiding the wrapping wire from the slot 16 to the guiding slot 17.

In the operation of this tool a wire, such as 25 is inserted in the slot 16 and pulled under the hook portion 24 to seat it in the slot 17 at a location determined by its diameter. The tool is then applied to the terminal 15 and operated to wrap the wire 25 on the terminal. As previously noted, the last turn is smoothed down by the surface 23 of projection 21.

At times it is desirable to simultaneously wrap several connections on the same terminal. This may be done because the slot 17 is deep enough to accommodate several wires. However, by providing the wire wrapping head or spindle with a wire guiding slot, such as 37 of Fig. 6, which slot is uniform in width, a plurality of wires of the same size may be better accommodated and simultaneously wrapped on the terminal 15.

What is claimed is:

1. A wrapping head for a wiring tool comprising a rotatable spindle having an elongated terminal receiving

opening therein, the axis of said opening being parallel to and slightly offset from the axis of the spindle, the end of said spindle having a cut-away portion at least part way across said opening to allow lateral entry thereto, the remainder of the spindle end comprising two projections defining between them a wire receiving slot on the opposite side of the spindle to the cut-away portion, the portion of the spindle that defines a portion of the opening and separates the opening and the slot having a plane surface facing the slot, the plane of which surface is substantially tangent to a circle centered on the axis of the opening, said plane surface merging adjacent the outer extremity of the spindle into a convex wire-directing edge located inwardly of said projections, one of said projections having a surface that defines with said plane a slot merging with the wire receiving slot and serving as a wire guiding slot, the other of said projections having a surface adjacent the outer edge of the cut-away portion of the spindle and facing toward the opening to engage and smooth down the end of a final turn of wrapping wire, and means for rotating said spindle.

2. A wiring wrapping tool for fine wire comprising a rotatable spindle having adjacent an end thereof and extending to said end, a wire receiving slot considerably wider than the diameter of the wire to be wrapped, a wire guiding slot in direct communication with the wire receiving slot, a terminal receiving opening in said spindle and spaced from said slots, a ledge separating the guiding slot and the opening and having a face on the opposite side thereof to the opening defining one side of the wire guiding slot, said ledge having a convex edge for aiding in guiding the wire during wrapping, said wire guiding slot being of a width comparable to that of the wire to be wrapped, and means for rotating said spindle.

3. A wire wrapping tool, as in claim 2, in which the wire guiding slot is slightly wider than the diameter of the wire to be wrapped and of sufficient depth to accommodate and guide several wires for simultaneous wrapping.

4. A wrapping tool, as in claim 2, in which the wire guiding slot is at its portion adjacent the wire receiving slot, slightly wider than the diameter of the largest wire to be wrapped and is graduated in width to accommodate and guide wire of a range of smaller sizes.

5. A wiring tool for making wrapped connections with fine wire that comprises a rotatable spindle having a terminal receiving opening having its axis slightly offset radially from the spindle axis, and a wire receiving and guiding orifice radially spaced therefrom; said orifice comprising a relatively wide wire receiving slot in the surface of and extending to the end of said spindle and a narrower wire guiding slot inwardly of and in direct communication with the wide slot, and means for rotating the spindle.

6. A wire wrapping tool comprising a rotatable spindle having a terminal receiving opening slightly offset radially

with respect to the spindle axis, a wire receiving and guiding orifice radially spaced therefrom, and a cut-away portion on the opposite side of the spindle from the orifice; that part of the spindle adjacent the orifice comprising two projections defining the wire receiving part of the orifice, one projection also defining with a portion of the spindle that separates the opening from the orifice, the wire guiding part of the orifice, and the other projection having a surface faced with respect to the terminal receiving opening to smooth down the final end of a wrapped wire; and means for rotating the spindle.

7. A wire wrapping tool comprising a spindle having a beveled end, a terminal receiving opening in said beveled end and two projections adjacent the outer end of the bevel defining between them a wire receiving slot, one of said projections along with that portion of the spindle adjacent the opening and separating the opening from said wire receiving slot defining a wire guiding slot, said wire receiving slot being wide with respect to the diameter of the wire to be wrapped and said wire guiding slot having a width comparable to said diameter and means for rotating the spindle.

8. A wire wrapping tool, as in claim 7, in which the wire guiding slot is tapered.

9. A wire wrapping tool, as in claim 7, in which the wire guiding slot is of substantially uniform width.

10. A wire wrapping tool, as in claim 7, in which the wire guiding slot is of sufficient depth to accommodate and guide a plurality of wires.

11. A wire wrapping tool comprising a rotatable spindle, said spindle including in one end an elongated cylindrical terminal receiving opening having its axis slightly offset from that of the spindle, two projections extending longitudinally outward beyond said opening and defining between them a wire receiving slot projecting inwardly from the spindle surface and separated from the terminal opening by a wall portion having on one face a curved surface bounding part of said opening and on the other face a plane surface tangent to a cylinder coaxial with the terminal receiving opening, the edge of said wall portion adjacent the spindle end being rounded, one of said projections defining with the plane surface of said wall portion a wire guiding slot adjacent to and in communication with the wire receiving slot, said wire receiving slot being substantially wider than the diameter of the wire to be wrapped and said wire guiding slot but slightly wider than said diameter, and means for rotating the spindle.

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