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TOOL FOR STRIPPING WIRE AND MAKING AN INSULATED  
WRAPPED CONNECTION

2,836,837

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2 Sheets-Sheet 1

FIG. 1

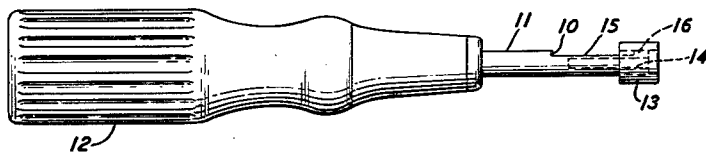


FIG. 2

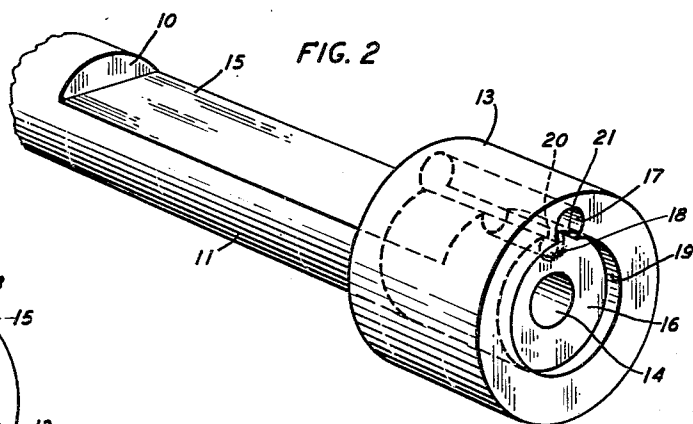


FIG. 3

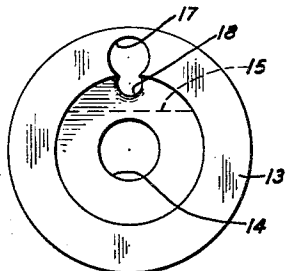
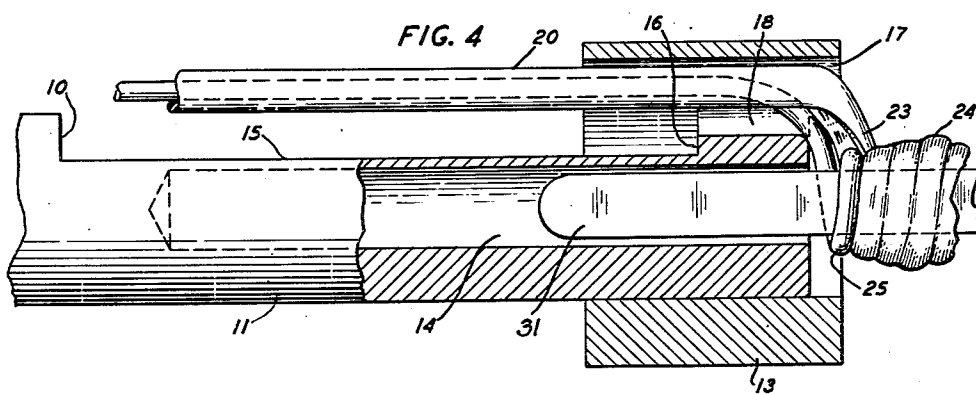


FIG. 4



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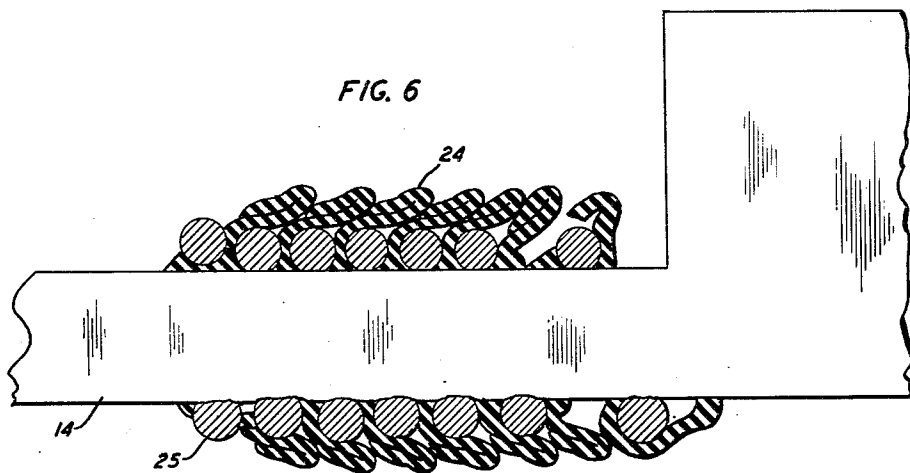
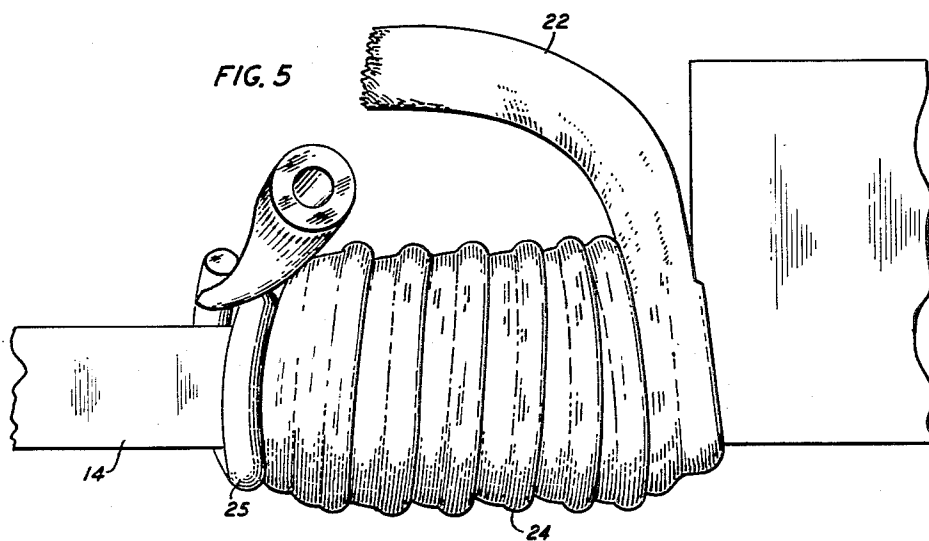
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## TOOL FOR STRIPPING WIRE AND MAKING AN INSULATED WRAPPED CONNECTION

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3 Claims. (Cl. 7—14.1)

This invention relates to wiring tools and wrapped wire connections and more particularly to tools capable of making an insulated wrapped connection on a terminal or the like.

This invention pertains generally to wiring tools of the type disclosed in Patent 2,585,010 granted February 12, 1952, to C. N. Hickman et al. and to wrapped connections of the general type shown in the application of R. F. Mallina, Serial No. 294,607 filed June 20, 1952, now Patent 2,759,166 issued August 14, 1956. In the making of connections of this type, it is customary to completely strip the insulation from a portion of the wire prior to wrapping the wire on the terminal or other conductor. Combination tools which accomplish this stripping or skinning operation, in conjunction with the wrapping step, are disclosed for example in Patent 2,682,063 granted June 29, 1954, to H. A. Miloche and in the applications by F. Reck, Serial No. 234,643 filed June 30, 1951, now Patent 2,743,502 issued May 1, 1956, and Serial No. 388,082 filed October 26, 1953, now Patent 2,765,684 issued October 9, 1956, and E. Belek et al. Serial No. 477,333 filed December 23, 1954. Tools of this type consequently produce a connection comprising several turns of bare wire with the insulated portion of the wire terminating close to or within the initial turn made on the terminal. It is evident that where terminals and conductors are arranged in a close spaced array relatively slight deflections of terminals and conductors will result in undesired electrical circuits through the contacting of adjacent uninsulated wrapped connections.

It is, therefore, an object of this invention to insulate wrapped connections.

More specifically, an object is to produce a wrapped electrical connection having an outer covering of insulation sufficient to function as a buffer against electrical contact, in the event of terminal deflection.

A further object is to facilitate the making of an insulated wrapped connection by providing a tool requiring only a simple rotational motion after first inserting a wire into the tool and positioning the tool over a terminal.

In a specific embodiment of this invention a wiring tool comprises a spindle or shaft having a centrally disposed, substantially axial opening in the forward end thereof and means on the other end for rotating the tool. The forward or head end of the tool includes an integral sleeve member protruding beyond the shaft end and having therein a longitudinal bore parallel to the shaft axis for receiving an insulated wire portion. The intersection of this bore with the inner periphery of the sleeve extension provides a pair of opposed sharp edges, either of which, depending upon the direction of tool rotation, serve to slit the insulation as the wire is drawn thereover by the wrapping operation. Another longitudinal bore of lesser diameter in the shaft parallels and overlaps the sleeve bore and provides a clearance radius for the wire as it is drawn toward the terminal.

As the tool is rotated to make a tight coil of wire

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around a terminal, the wire is progressively slit just prior to its being coiled, thus enabling an electrical connection of bared wire on the terminal surrounded by a covering formed from the longitudinally slit insulation.

One feature, therefore, of the tool of this invention is its simplicity of construction and the absence of any relatively moving parts.

Another feature of this invention is that the wrapped connection is insulated with the covering originally applied to the wire without the addition of any material.

A further feature of the wrapped connection of this invention is the durability and continuity of the insulating covering produced thereon.

These and other advantageous features and objects of this invention will be apparent from a more complete understanding obtained from the following detailed description taken in view of the drawing in which:

Fig. 1 is a side elevation view of the tool of this invention;

Fig. 2 is a perspective view of the head portion of the shaft in greater detail;

Fig. 3 is an end view of the operating end of the tool;

Fig. 4 is a side view, partially in section, of the operating end of the tool positioned over a terminal in the course of wrapping a wire thereon and showing a portion of the wrapped connection having an outer covering of insulation;

Fig. 5 is an elevational view of the insulated connection of this invention; and

Fig. 6 is a longitudinal section taken along the center line of the connection of Fig. 5.

As indicated in Fig. 1, the tool of this invention may comprise a shaft 11 mounted in a suitable handle 12 not unlike that of the ordinary screw driver. It will be apparent from the following explanation that a tool of this type is readily adaptable to portable power drives of the electric or pneumatic type. Also indicated are an integral sleeve 13 on the end of the shaft 11, the terminal receiving opening 14 in the shaft, and the clearance flat 15 in the intermediate portion of the shaft, leaving a cylindrical section 16 at the end. The operating details of the tool are depicted in greater detail in Figs. 2, 3, and 4 in which like numerals indicate identical features where appropriate.

The sleeve 13 which protrudes slightly beyond the end of the shaft 11 has a longitudinal hole 17 therethrough which overlaps a longitudinal recess 18 of smaller diameter through the cylindrical end portion 16 of the shaft 11. Referring to Fig. 2, the intersection of the sleeve hole 17 with the inner periphery 19 of the sleeve forms a pair of opposed edges for slitting the plastic covering or the like forming the wire insulation. Dimensionally, the upper hole 17 is slightly larger, and the lower hole 18 slightly smaller in diameter than the outside diameter of the insulated wire.

For example, a typical embodiment of the tool of this invention comprises a shaft 11 of three-sixteenths of an inch diameter rod. The terminal receiving opening 14 is 72 mils in diameter, providing sufficient clearance to accept terminals generally used in communications equipment. For use with #24 (A. W. G.) wire having a wire diameter of 20 mils and a diameter over insulation of between 36 and 45 mils, the upper or sleeve hole 17 into which the wire is loaded has a diameter of 50 mils, while the diameter of the shaft recess 18 is 30 mils. The amount by which the sleeve extends beyond the shaft is about 50 mils.

The operation of the tool is indicated in Fig. 4. The end portion 20 of the insulated wire is fed into upper hole 17 from the terminal receiving end of the shaft to a suitable length which may be indicated by coincidence with the end 10 of the clearance flat 15. The tool is then

positioned with the terminal 31 housed within the central bore 14. Where the connection being made is the second one of a pair, the wire may be cut to the length required as indicated by the clearance flat dimension. It may be remarked that a continuous run of insulated wire interspersed with three or more of the connections of this invention may be accomplished readily by feeding the insulated wire into the sleeve bore 17 from the opposite or handle end. After completion of the first connection the insulated wire is paid out through the bore 17 to the next terminal where the tool is positioned over the terminal as before, and the connection made without severing the wire and so on with successive connections.

The standing part 22, as indicated in Fig. 5, i. e., that portion of the wire outside of the tool, is anchored as by hand against one side or the other of the terminal while the tool is rotated as desired, either right- or left-hand rotation may be used. Rotation of the tool causes the wire to be wrapped tightly about the centrally positioned terminal. As the wire is drawn out of the tool by the wrapping operation, it is drawn outwardly and down from the upper hole 17. The insulated wire is too large to fit entirely within the lower hole 18; but tends to squeeze down slightly while being pulled sideward against one of the slitting edges. In the right-hand or clockwise rotation of Fig. 4, the insulated wire is riding over the far, or left-hand slitting edge 21, upon which the insulation is slit longitudinally.

As depicted in Fig. 4, the exposed wire is wrapped against the terminal while the slit insulation 23, which tends to spread slightly, is wrapped in a pile-up configuration 24 on the outer surface of the wrapped wire. Figs. 5 and 6 depict the appearance of a completed connection in accordance with this invention. It will be noted that the last turn of wire 25 on the terminal 14 is not completely covered with insulation. However, the thickness of the insulating covering on the other turns of the connection provides a buffer of sufficient diameter to insure against contacts giving rise to short circuits as a result of terminal deflections or misalignments.

Fig. 6, depicting the connection of this invention in longitudinal section, shows the pile-up of the turns of slit insulation and indicates the manner in which the wrapping operation applies tension to the insulation and insures an adherent locked-together covering.

Connections made in accordance with this invention have been tested under heat and stress and found com-

pletely satisfactory. It may be remarked that elevated temperature of the order of 175° C. cause insulation of the plastic type, specifically polyvinylchloride, to flow slightly, thus adding to the mechanical strength of the insulation covering by, in effect, a further bonding. Although a specific embodiment has been disclosed, it is apparent that various modifications may be devised by those skilled in the art which may lie within the scope and spirit of this invention.

What is claimed is:

1. A wiring tool for making insulated wrapped wire connections on a terminal comprising a rotatable shaft including an intermediate flat portion, said shaft having a substantially axial terminal receiving opening and an integral sleeve extending beyond the end of said shaft, and an insulated wire receiving opening in said tool comprising conjointing longitudinal bores in said sleeve and said shaft, and insulation slitting edges defined by the intersection of said sleeve bore and the inner periphery of said sleeve extension.

2. A wiring tool for making insulated wrapped wire connections comprising a rotatable shaft having a substantially axial terminal receiving opening therein, said shaft having an intermediate cut-away portion and a cylindrical end portion having a longitudinal peripheral bore therethrough adjoining said cut-away portion, and an integral sleeve surrounding said cylindrical portion, said sleeve extending beyond the end of said shaft and having a longitudinal bore therethrough for receiving an insulated wire, said sleeve bore conjointing said bore in said cylindrical end portion, and means for slitting the wire insulation longitudinally during wrapping comprising a cutting edge defined by the intersection of said sleeve bore with the inner periphery of the extended portion of said sleeve.

3. A wiring tool in accordance with claim 2 in which said longitudinal bore in said cylindrical end portion of said shaft has a diameter slightly less than the diameter of the insulated wire being wrapped.

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