

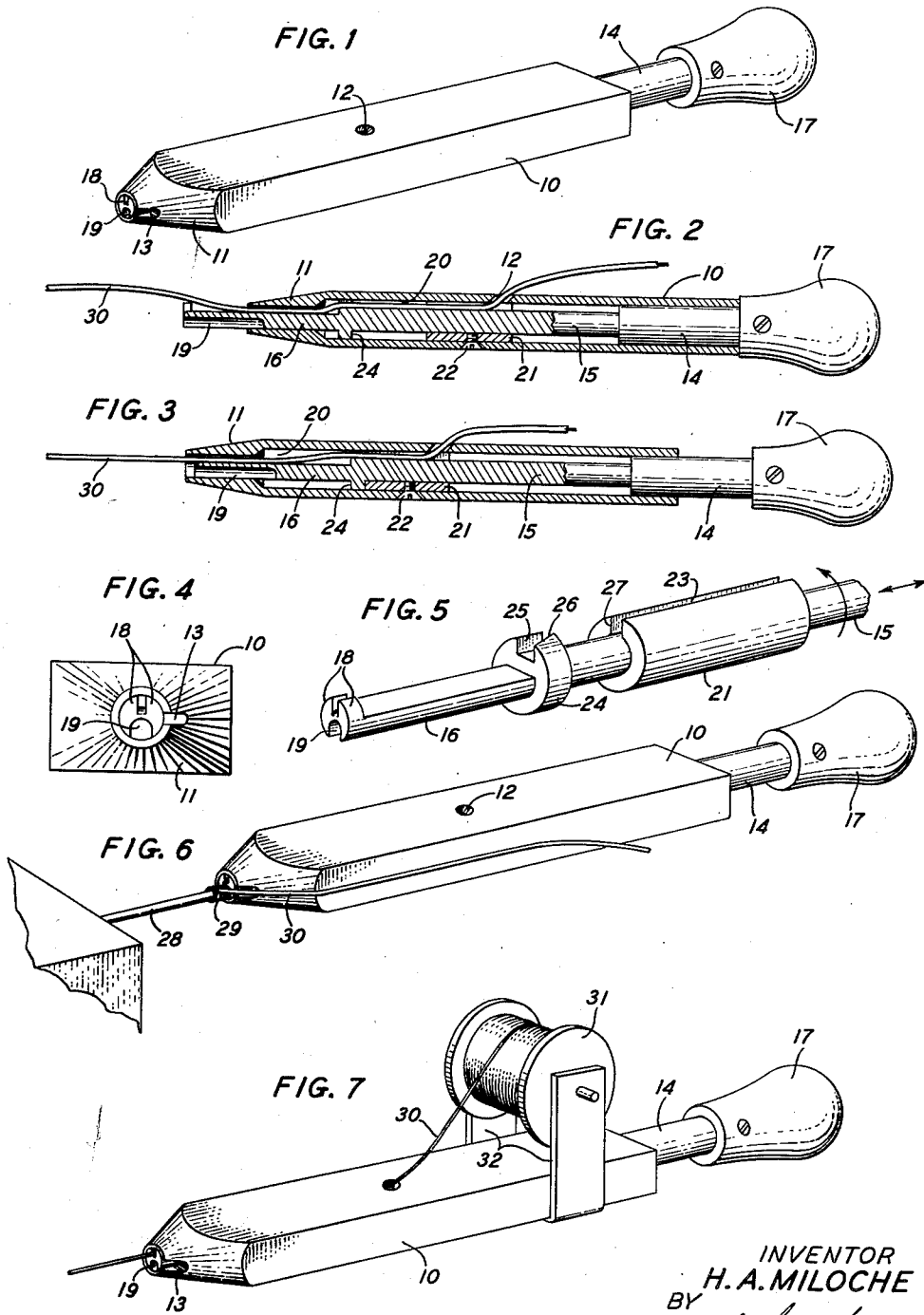
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WIRING TOOL

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## WIRING TOOL

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This invention relates to wiring devices and more particularly to tools for electrically connecting insulated conductors to electrical terminals.

Devices are known in the art for forming a connection, mechanically strong and electrically of low and uniform resistance, between a conductor and a terminal by wrapping or winding a portion of the conductor about the terminal. Illustrative of such devices are those disclosed in the applications Serial No. 752,895, filed June 6, 1947, of H. A. Miloche and Serial No. 753,006, filed June 6, 1947, of C. N. Hickman et al., now Patent 2,585,010, issued February 12, 1952. Such known devices, however, when employed with insulated conductors entail the cutting of the conductor to length and the removal of the insulation from a portion thereof, both as separate operations, prior to and separate from the affixing of the conductor to the terminal. This entails problems of storing and handling wires of a variety of lengths or considerable expenditure of time in preparing the conductor for the wrapping operation.

One general object of this invention is to improve wiring devices of the general type above described. Another object of this invention is to facilitate and expedite the forming of connections between an insulated conductor and a terminal.

In one illustrative embodiment of this invention, a wiring tool comprises a shell or housing and a spindle or shaft within the shell or housing, extendible therefrom and rotatable with respect thereto, the shell and spindle being adapted to receive and cooperatively hold an end portion of the conductor to be affixed to the terminal. The spindle is provided in one end with a recess or slot for engaging or receiving the terminal, this recess being eccentric with respect to a conductor positioning groove or slot, whereby upon rotation of the shaft, the conductor is wrapped about the terminal.

In accordance with one feature of this invention, the spindle is mounted for axial movement relative to the housing and the shell and spindle are provided with cooperating members for crushing or mutilating the insulation on the conductor and for trimming the conductor to length. More specifically, in accordance with one feature of this invention, the spindle is provided with claws defining with the inner wall of the housing a wire guiding and insulation stripping orifice and adapted to engage an insulated conductor threaded into the tool and to cooperate

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with the shell to crush the insulation upon axial displacement of the spindle in the direction inwardly of the shell. The spindle and shell are provided also with portions or collars having grooves or slots for receiving the conductor and having also cooperating edges for severing the conductor upon rotation of the spindle relative to the shell or housing.

The invention and the above noted and other features thereof will be understood more clearly and fully from the following detailed description with reference to the accompanying drawing in which:

Fig. 1 is a perspective view of a wiring tool illustrative of one embodiment of this invention;

Fig. 2 is a longitudinal sectional view of the tool illustrated in Fig. 1 with the spindle or shaft in extended position and a length of wire threaded into the tool;

Fig. 3 is a longitudinal sectional view similar to Fig. 2 but with the spindle or shaft in its retracted position;

Fig. 4 is a front end elevational view of the tool shown in Fig. 1;

Fig. 5 is a perspective view to an enlarged scale illustrating details of the insulation crushing and conductor severing elements of the tool;

Fig. 6 is a perspective view illustrating the formation of a wrapped connection between a conductor and a terminal with a tool constructed in accordance with this invention; and

Fig. 7 is another perspective view illustrating another embodiment of this invention.

Referring now to the drawing and particularly to Figs. 1 to 5, the wiring tool therein illustrated comprises a shell or housing 10 which may be of rectangular section as shown, the shell or housing having a cylindrical bore therein and having also a tapered end or nose portion 11. The shell is provided with an aperture 12 and the nose portion 11 thereof is provided with a slot 13 the function of which aperture and slot will appear hereinafter.

Extending into the housing or shell and axially and rotatably movable therein is a spindle or shaft having a cylindrical head or end portion 14 slidably fitted within the shell, an intermediate cylindrical portion 15 of smaller diameter than the end portion 14 and a semicylindrical end portion 16. The spindle has affixed thereto a suitable handle illustrated at 17 for facilitating rotation and longitudinal motion thereof.

The semicylindrical end portion 16 of the spin-

dle is provided with a pair of claws or projections 18 defining a wire guiding groove or slot therebetween and also with a recess or slot 19 which may be eccentric with the spindle. The intermediate portion 15 of the spindle is slidably fitted within a sleeve 21 firmly affixed to the shell 10 as by a screw 22, the sleeve having therein a longitudinal slot or groove 23. The spindle is provided with an enlarged portion 24, having therein a slot or groove 25. The enlarged portion 24 and sleeve 21 have respectively cooperating cutting edges 26 and 27.

In the use of the wiring tool, it is loaded with the spindle or shaft in the extended position, an insulated conductor 30 being threaded through the aperture 12, the grooves or slots 23 and 25, the passage way 20 between the spindle and the shell, and over the claws 18. For this operation the spindle extends from the shell as illustrated in Fig. 2. The spindle then is withdrawn into the shell whereby the claws 18, together with the front edge of the tapered portion 11 of the shell, crush the insulation upon the conductor, the conductor being forced between the claws as shown in Fig. 3.

The conductor 30 is then fitted into the slot 13 and the tool placed against the terminal 28 as illustrated in Fig. 6, with the terminal 28 positioned in the recess 19. Then the spindle is rotated by manipulation of the handle 17. Upon such rotation of the handle, the conductor 30 is severed by the cooperative shearing action of the cutting edges 26 and 27 upon the collar 24 and sleeve 21 respectively. Upon further rotation of the spindle the wire of the conductor is wrapped around the terminal 28 as indicated at 29, the insulation previously crushed as described hereinabove being removed from the wire as the wire is withdrawn from the passage way 20 by the wrapping operation.

The other end of the wire thus connected is now inserted into the tool from the front with the spindle or shaft extended, over claws 18, and into passage way 20 and is similarly skinned and wrapped.

It will be noted that the wiring tool enables cutting, stripping and wrapping of the conductor in one continuous operation whereby the fabrication of wrapped connections is simplified and expedited.

In the embodiment of this invention illustrated in Fig. 7 a storage reel 31 for the conductor 30 is mounted upon the shell 10 as by brackets 32.

Although specific embodiments of this invention have been shown and described, it will be understood that they are but illustrative and that various modifications may be made therein without departing from the scope and spirit of this invention.

What is claimed is:

1. In a wiring tool, the combination of a shell, a spindle capable of longitudinal and rotary motion within said shell, means for actuating said spindle, said shell and spindle being spaced to define a passage way for receiving a wire, means for shearing the wire comprising a pair of notched washers on said spindle and said shell, means for stripping the wire comprising a forked claw on said spindle, and means cooperating with said claw for wrapping the wire on a terminal simultaneously with said stripping, said means comprising a notched portion in said shell and an apertured portion in said spindle.

2. A wiring device for cutting and stripping an insulated wire and for wrapping a stripped por-

tion thereof on a terminal, comprising an elongated hollow, outer member and an elongated, inner member housed for movement therein, said outer member having portions fitting around the inner member to guide and constrain its motion, and other portions spaced from adjacent portions of the inner member to define a wire receiving passage, means on adjacent ends of said members defining a wire guiding orifice for bare wire, said means actuatable toward each other by relative movement of said members for mutilating wire insulation, a terminal receiving recess in the inner member adjacent said orifice, adjacent means on the outer and inner member respectively defining, when in contact, wire cutting means operable by relative movement of said members, said means on each member being substantially equally spaced on its member, whereby the relative movement that mutilates the insulation puts the cutting means in contact, and means for imparting relative movement to said members.

3. A wire wrapping tool comprising a housing, a spindle in said housing, and rotatably and longitudinally movable with respect thereto, said spindle having a reduced portion spaced from said housing to define therewith a passage for an insulated wire, normally spaced, juxtaposable, cooperating elements on adjacent ends of said housing and spindle respectively, defining when juxtaposed, a wire guiding, insulation mutilating and stripping orifice; and normally spaced, juxtaposable cooperating members on adjacent, intermediate parts of the housing and spindle respectively, said members including normally aligned wire receiving slots comprising a continuation of the wire passage, and adjacent wire cutting edges, the distance between the element and the member on both the housing and the spindle being substantially the same, whereby said elements and said members, are simultaneously juxtaposed by longitudinal movement of the spindle.

4. A wiring tool for cutting and stripping an insulated wire and for wrapping a stripped portion thereof on a terminal; comprising a housing, a spindle mounted in the housing for rotational and longitudinal movement with respect thereto, said spindle having an end portion extending inwardly from one end of the housing and spaced from the housing to define a wire receiving passage, said end portion also being extendable from the housing; a wire guiding slot and a terminal receiving recess on said end of the spindle, said slot and recess being diametrically located; said wire guiding slot being of sufficient width to receive only uninsulated wire, the edges of said slot adjacent the end of the housing comprising with said end an insulation mutilating means, two adjacent grooved members on the spindle and the housing respectively, the grooves thereof forming a continuation of the wire receiving passage, respective adjacent edges of said grooves comprising a wire cutting shear when said grooved members are in contact with each other, and means on the spindle for rotatably or longitudinally moving said spindle.

5. A wiring tool comprising a housing, a spindle mounted in the housing for rotational and longitudinal movement with respect thereto, said spindle having an end portion spaced from the housing to define a wire receiving passage, a wire guiding slot and a terminal receiving recess on said end of the spindle, said wire guiding slot being of sufficient width to receive only uninsu-

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lated wire, the edges of said slot adjacent the end of the housing comprising with said end and insulation mutilating means, two adjacent grooved members on the spindle and the housing respectively, respective edges of said grooves comprising a wire cutting shear when said grooved members are in contact with each other, and means on the spindle for rotatably or longitudinally moving said spindle.

6. A wire wrapping tool comprising a housing, a spindle mounted in the housing for rotational and longitudinal movement with respect thereto, said spindle having an end portion spaced from the housing to define a wire receiving passage, a terminal receiving recess on said end of the spindle, a slot on said end of the spindle, said slot being of sufficient width to receive only uninsulated wire and defining with said housing an insulation mutilating and stripping means, and a wire wrapping guide; two adjacent grooved members on the spindle and the housing respectively, respective edges of said grooves comprising a wire cutting shear when said grooved members are in contact with each other, and means on the spindle for rotatably or longitudinally moving said spindle.

7. A wiring tool for cutting and stripping an insulated wire and for wrapping a stripped portion thereof on a terminal; comprising a housing, a spindle mounted in the housing for rotational and longitudinal movement with respect thereto, said spindle having an end portion spaced from the housing to define a wire receiving passage, a wire guiding slot and a terminal receiving recess on said end of the spindle, said wire guiding slot being of sufficient width to receive only uninsulated wire, two adjacent grooved members on the spindle and the housing respectively, the grooves thereof forming a continuation of the

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wire receiving passage, respective edges of said grooves comprising a wire cutting shear when said grooved members are in contact with each other, and means on the spindle for rotatably or longitudinally moving said spindle.

8. A wiring tool for cutting and stripping an insulated wire and for wrapping a stripped portion thereof on a terminal; comprising a housing, a spindle mounted in the housing for rotational and longitudinal movement with respect thereto, said spindle having an end portion extending inwardly from one end of the housing and spaced from the housing to define a wire receiving passage, a wire guiding slot and a terminal receiving recess on said end of the spindle, said wire guiding slot being of sufficient width to receive only uninsulated wire, two adjacent grooved members on the spindle and the housing respectively, the grooves thereof forming a continuation of the wire receiving passage, respective edges of said grooves comprising a wire cutting shear when said grooved members are in contact with each other, and means on the spindle for rotatably or longitudinally moving said spindle.

#### References Cited in the file of this patent

#### UNITED STATES PATENTS

| Number       | Name                | Date           |
|--------------|---------------------|----------------|
| 30 479,487   | Cadwell -----       | July 26, 1892  |
| 716,051      | Kelley et al. ----- | Dec. 16, 1902  |
| 717,553      | Depew et al. -----  | Jan. 6, 1903   |
| 861,915      | Struss -----        | July 30, 1907  |
| 951,454      | Reichhelm -----     | Mar. 8, 1910   |
| 35 1,084,103 | O'Rourke -----      | Jan. 13, 1914  |
| 1,641,822    | Mattson -----       | Sept. 6, 1927  |
| 2,407,233    | Greer et al. -----  | Sept. 10, 1946 |
| 2,507,059    | Suman -----         | May 9, 1950    |