

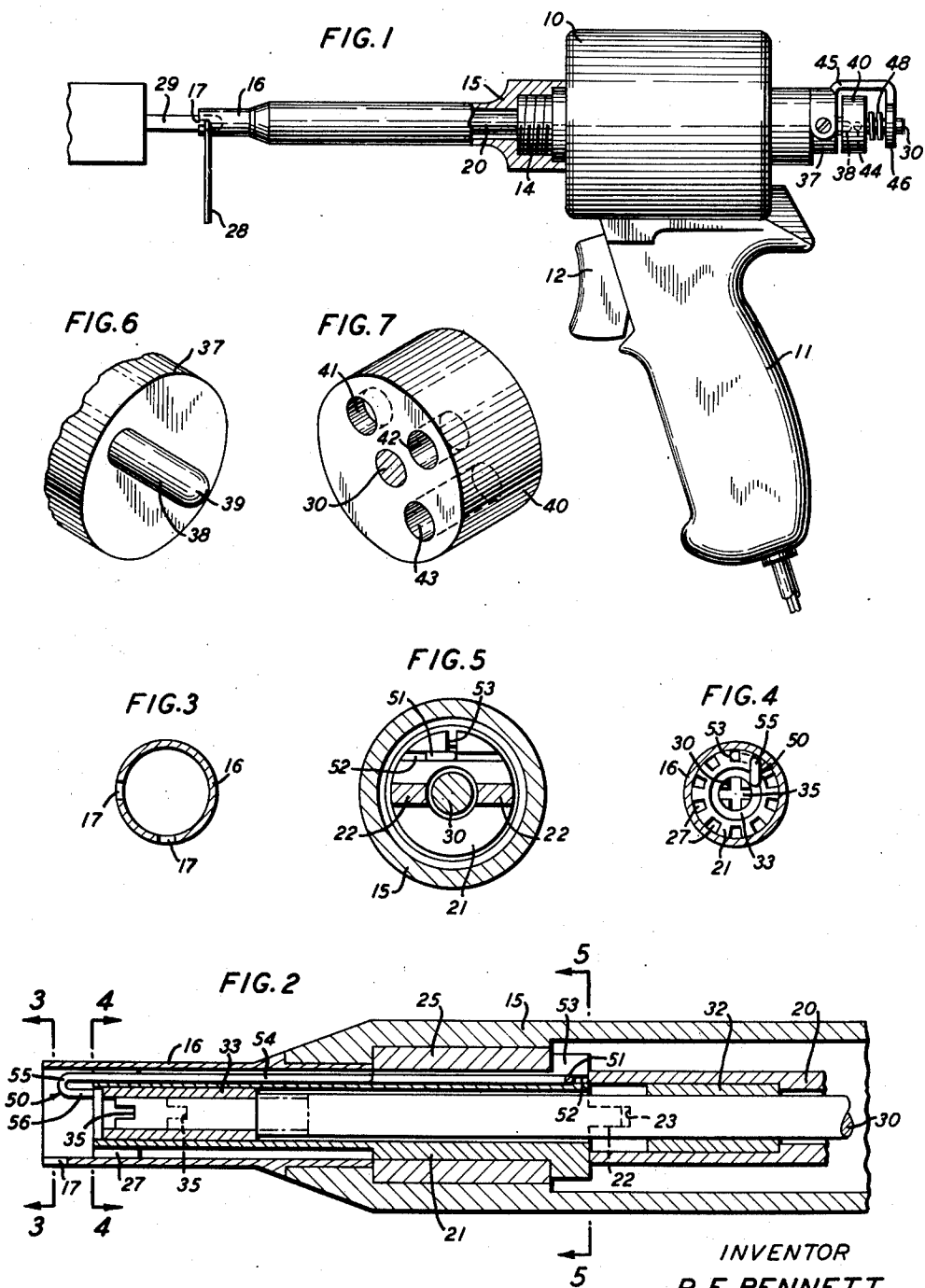
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APPARATUS FOR WRAPPING STRANDS ON TERMINALS

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APPARATUS FOR WRAPPING STRANDS ON
TERMINALS

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This invention relates to apparatus for wrapping strands on articles and more particularly to apparatus for wrapping the leading ends of electrical conductor wires on terminals.

In forming electrical connections between lead wires and terminals manually, the wrappings are rarely uniform and are occasionally undesirably loose resulting in unsatisfactory electrical connections.

An object of the invention is to provide an apparatus for uniformly wrapping strands tightly on articles.

With this and other objects in view, the invention comprises an apparatus for wrapping strands on articles including a hollow rotatable wrapping element having longitudinal apertures to receive portions of a given length of a strand to tightly wrap the strand about an article held by a stationary holder disposed in the wrapping element.

More specifically the apparatus includes a motor with a hollow shaft operatively connected to a hollow wrapping element to drive the element about the axis of the shaft. The wrapping element in the present embodiment of the invention has a plurality of parallel grooves whereby the strand or electrical conductor wire may be fed readily into the open end of a housing, covering both the element and the hollow shaft, and find one of the many grooves into which it may be fed a given distance providing a length of the wire to be wrapped about the terminal. The housing is provided with notches at its outer end extending at right angles with respect to each other whereby the wire adjacent the leading end portion may be held firmly during wrapping of the leading end portion onto the terminal. A holder in the form of a rod extends through the motor, the hollow shaft thereof and the wrapping element providing a notched end to receive the outer end of the terminal holding the terminal against rotation during the wrapping operation. The position of the holder with respect to the outer end of the wrapping element may be varied to vary the position the wire is to be wrapped on the terminal. Another feature includes a resilient pressing element positioned to engage the wire leaving the groove in the wrapping element to press the wire tightly onto the terminal and to bend the trailing end of the wire down upon the terminal.

Other objects and advantages will be apparent from the following detailed description when considered in conjunction with the accompanying drawing, wherein

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Fig. 1 is a side elevational view of the apparatus, portions thereof being shown in section;

Fig. 2 is an enlarged fragmentary sectional view of a portion of the apparatus;

Fig. 3 is a vertical sectional view taken along the line 3-3 of Fig. 2;

Fig. 4 is a vertical sectional view taken along the line 4-4 of Fig. 2;

Fig. 5 is a vertical sectional view taken along the line 5-5 of Fig. 2; and

Figs. 6 and 7 are isometric views of portions of the holder varying means disposed at the back of the motor.

Referring now to the drawing, attention is first directed to Fig. 1 which illustrates a motor 10, this motor in the present embodiment of the invention being electrically driven. The motor 10 is supported by a handle 11 which houses the conventional switch (not shown) actuated by a trigger 12 to stop and start the motor. At one side of the motor, a stationary threaded member 14 supports a housing 15 including an outer member 16 which is provided with notches 17 disposed at right angles with respect to each other in the outer end thereof.

The motor 10 is provided with a hollow shaft 20 to be rotated during energization of the motor 10. A wrapping element 21 has tongue-like portions 22 receivable in notches 23 in the adjacent end of the hollow shaft 20 completing a positive connection between the wrapping element and the shaft whereby the wrapping element will rotate with the shaft about the axis of the shaft. A bearing 25 is mounted in the housing 15 to support the wrapping element 21. A given length of the wrapping element 21 is provided with a plurality of longitudinally extending apertures or grooves 27 circularly positioned to readily receive a given length of the leading end of a strand or electrical conductor wire 28 to be wrapped about an article such as a terminal 29. It will be noted by viewing Fig. 4 that the housing 15, particularly the portion 16 thereof closes the outer portions of the grooves or apertures 27.

A holder 30 in the form of a rod extends through the motor 10, the hollow shaft 20, the hollow wrapping element 21 as well as bearing-like members (not shown) within the motor, a bearing member 32 in the hollow shaft 20 and a bearing member 33 in the hollow wrapping element 21. The outer end of the holder 30 positioned in the bearing 33 is reduced in size from the main portion of the holder and is provided with a cross-like notch 35 whereby the apparatus

may be readily disposed in engagement with terminals positioned vertically or horizontally with respect to their cross-sectional contours.

In the present embodiment of the invention, the holder 30 extends through a stationary member 37 of the motor 10 which supports a pin 38 having a rounded end 39. An adjusting wheel 40 disposed concentric with the holder 30 and firmly mounted thereon by suitable means such as a pin or set screw 44 has apertures 41, 42 and 43 of different depths and ninety degrees apart to receive the pin 38. A bracket 45 mounted on the stationary member 37 has an apertured portion 46 to receive the outer end of the holder. A spring 42, disposed concentric with the holder and interposed between the hand wheel 40 and the apertured portion 46 of the bracket 45 normally urges the hand wheel with the holder to the left (Fig. 1) a distance governed by the selected aperture registering with the pin 38. The shallowest aperture 41 will allow the holder 30 to be disposed in the position shown in the broken line position in Fig. 2, while the apertures 42 and 43 of increasingly greater depths will allow the holder to be positioned nearer the adjacent end of the wrapping element, one of which is shown in solid lines in this figure.

A resilient pressing element 50 in the form of a wire is carried by and rotated with the wrapping element to press the various portions of the wire leaving the wrapping element in close engagement with the article or terminal. The pressing element begins with a bent portion 51 disposed in a notch 52 in the inner end of the wrapping element 21 to hold the pressing element against rotation. A given length of the pressing element extends through a longitudinal groove 53 of the wrapping element which is offset from the aperture 27 through which another portion 54 extends, this portion ending in a loop 55 with an inwardly extending portion 56 positioned to engage all portions of the leading end of the wire as it leaves the wrapping element to firmly press these portions into intimate engagement with the terminal.

During the operation of the apparatus, the leading end portion of the strand or wire to be wrapped about the article or terminal 20 is fed by the operator into the end of the housing and by the provision of many apertures 27 disposed about the inner periphery of the housing, and positioned closely adjacent each other, it is not necessary that the operator hunt for an aperture into which this portion of the wire may be disposed. The wire is fed into the selected aperture until it abuts against the inner end of the aperture after which the wire is bent through the nearest notch 17 which serves to hold that portion of the wire against movement.

The feeding of the leading end portion of the wire into one of the grooves or apertures 27 of the wrapping element requires very little time and as soon as this has been accomplished, the operator places the apparatus over the end of an article or terminal 27 with the end thereof extending into the notch 35 of the holder 30. The operator may at that time press the trigger 12, energizing the motor to rotate the shaft 20 and the wrapping element 21. The length of wire in the aperture 27 of the wrapping element during rotation of the wrapping element will be wrapped about the terminal, pulling the leading portion of the wire from the aperture until the entire portion of the wire has been wrapped on the terminal. The location of these convolutions of wire

on the terminal away from the end of the terminal are varied by varying the position of the holder 30 relative to the outer end of the wrapping element. This is accomplished by moving the hand wheel 40 to the right from the position in which it is now disposed, freeing it from the pin 38 and rotating the hand wheel in a direction to position the selected aperture 41—42—43 in registration with the pin.

During the wrapping of the wire on the terminal, that is, as the wire leaves the wrapping element to form the respective convolutions on the terminal, all portions of the wire are engaged by the pressing element 50 which presses all portions of the wire closely adjacent the terminal, including the trailing end of the wire. This operation may be repeated and in so doing, wires of various gages may be uniformly and tightly wound about a terminal at varying positions with respect to the outer end of the terminal.

It is to be understood that the above described arrangements are simply illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. An apparatus for wrapping wire on a terminal comprising a motor, a hollow shaft extending centrally through the motor and driven thereby, a hollow wrapping element connected for rotation with the shaft with its axis in alignment with the axis of the shaft and having longitudinally extending apertures therein disposed at spaced positions about its axis to receive a portion of a given length of the leading end of a wire to be wrapped about a terminal, and a holder extending through the hollow shaft and into the wrapping element to hold the terminal against rotation during operation of the motor to rotate the shaft and wrapping element to wrap the said leading end portion about the terminal.

2. An apparatus for wrapping wire on a terminal comprising a motor, a hollow shaft extending centrally through the motor and driven thereby, a hollow wrapping element connected for rotation with the shaft with its axis in alignment with the axis of the shaft and having longitudinally extending apertures therein disposed circumferentially about its axis to receive a portion of a given length of the leading end of a wire to be wrapped about a terminal, a housing for the shaft and wrapping element secured to the motor and having an open end notched to support the wire, adjacent the said portion of the leading end, against movement, and a holder extending through the hollow shaft and into the wrapping element to hold the terminal against rotation during operation of the motor to rotate the shaft and wrapping element to wrap the said leading end portion about the terminal.

3. An apparatus for wrapping wire on a terminal comprising a motor, a hollow shaft extending centrally through the motor and driven thereby, a hollow wrapping element connected for rotation with the shaft with the axis in alignment with the axis of the shaft and having longitudinally extending apertures therein disposed circumferentially about its axis to receive a portion of a given length of the leading end of a wire to be wrapped about a terminal, a holder extending through the hollow shaft and into the wrapping element to hold the terminal against rotation during operation of the motor to rotate

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the shaft and wrapping element to wrap the said leading end portion about the terminal, and means to vary the position the leading end of the wire is wrapped on the terminal by varying the location of the adjacent end of the holder relative to the outer end of the wrapping element.

4. An apparatus for wrapping wire on a terminal comprising a motor, a hollow shaft extending centrally through the motor and driven thereby, a hollow wrapping element connected for rotation with the shaft with its axis in alignment with the axis of the shaft and having longitudinally extending apertures therein disposed circumferentially about its axis to receive a portion of a given length of the leading end of a wire to be wrapped about a terminal, a holder extending through the hollow shaft and into the wrapping element to hold the terminal against rotation during operation of the motor to rotate the shaft and wrapping element to wrap the said leading end portion about the terminal, and a bending element carried by the wrapping element to engage the extreme end of the said leading end portion of the wire to bend it close to the terminal.

5. An apparatus for wrapping strand material on a terminal comprising a hollow rotatable wrapping element having longitudinal apertures circumferentially disposed about its axis to re-

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ceive a portion of a given length of a strand, a holder coaxially disposed in the wrapping element to receive and hold a terminal against rotation, and means to rotate the wrapping element to wrap the said portion of the leading end of the strand about the terminal.

6. An apparatus for wrapping strand material on a terminal comprising a hollow rotatable wrapping element having longitudinal apertures circumferentially disposed about its axis to receive a portion of a given length of a strand, a holder coaxially disposed in the wrapping element to receive and hold a terminal against rotation, means to rotate the wrapping element to wrap the said portion of the leading end of the strand about the terminal, and a pressing element rotatable with the wrapping element to press the said portion of the strand into intimate engagement with the terminal.

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