United States Patent

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[54] **HAND WIRE WRAPPING TOOL WITH AN ORIENTATION AND CAM FEATURE**
2 Claims, 6 Drawing Figs.

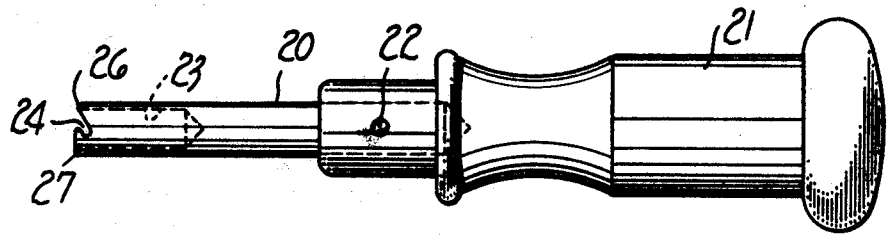
[52] **U.S. Cl.** **140/124,** 242/7.17
[51] **Int. Cl.** **B21f 15/00**
[50] **Field of Search** 140/93, 117, 118, 124; 29/203; 242/7.06, 7.17

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Primary Examiner—Lowell A. Larson
Attorneys—H. J. Winegar, R. P. Miller and S. Gundersen

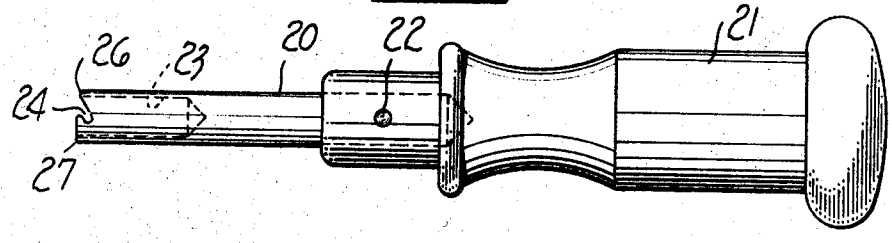
ABSTRACT: A hand tool wraps a wire about a terminal, having a slot for receiving the wire. Embodied in the tool is a hollow-nosed shank where the nose has an oblique slot and an indentation, diametrically opposed to each other, for initially contacting the wire after placing the shank over the terminal to provide a perpendicular orientation of the tool with the wire. During the wrapping operation lobes on the nose of the shank ride over the wire to impart a helical wrap of wire about the terminal.



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FIG-1



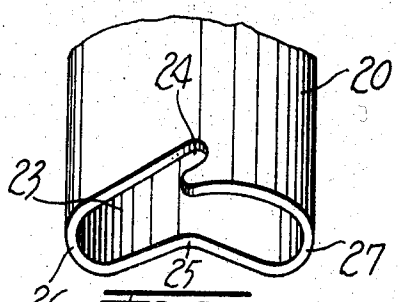


FIG-2

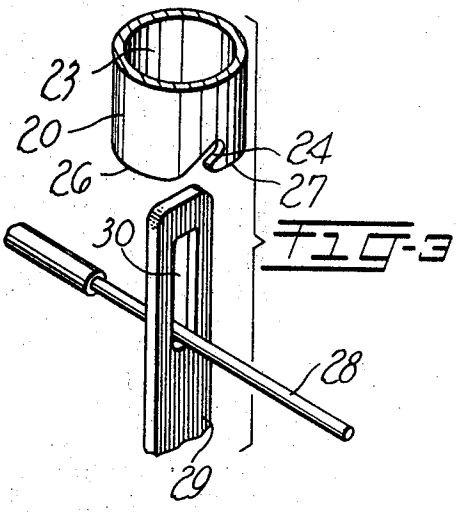


FIG-3

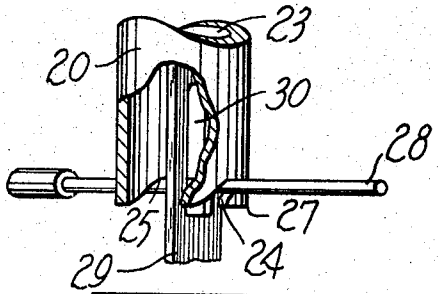


FIG-4

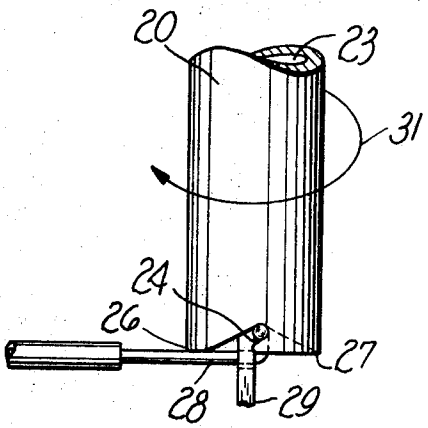


FIG-5

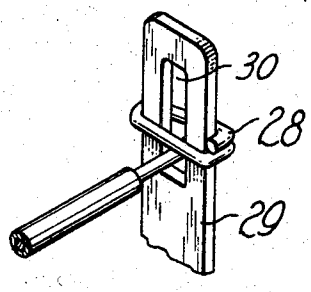


FIG-6

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HAND WIRE WRAPPING TOOL WITH AN ORIENTATION AND CAM FEATURE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to wire wrapping tools and more particularly to tools that first are oriented perpendicularly with the wire to be wrapped, and then through a cam action impart an axially displaced or helical wrap to the wire about the terminal.

2. Technical Considerations and Prior Art Problems

In making solder connections between electrical components or wires and terminals that are found on tube sockets, terminal strips, connectors or the like, it is generally desirable to provide the wire to be connected with a wrap about the terminal prior to soldering for making a better electrical connection. Conventional terminals are equipped with a notch or hole through which the wire is inserted before applying the wrap and the subsequent solder.

Heretofore, the wrapping operation had been done by hand, wherein the wrap was constructed through the use of pliers gripping the end of the wire and twisting the wire about the terminal. In this manual operation torsional forces were formed as the pliers pulled the wire outward and around the terminal to secure a tight wrap of the wire about the terminal. With a thin terminal, the torsional component of wrapping, in many cases, imparted a bend or twist in the terminal that required straightening. Difficulty was also encountered in manipulating the pliers for forming a neatly wrapped and secure connection of the wire to the terminal. In addition, the hand manipulation of pliers does not lend itself to repeatability of character and quality of successive connections.

SUMMARY OF THE INVENTION

The present invention contemplates a wire wrapping tool which is simple in design and economical to manufacture, that first orients the tool perpendicular with a wire and then using a cam action imparts a single, generally, helical wrap of wire about a slotted terminal prior to soldering the connection. More particularly, the wrapping tool is designed with a hollow-nosed shank, that receives the terminal, and an oblique slot on the peripheral edge of the shank that engages a portion of the wire to be wrapped. Diametrically opposed to the slot is an indentation on the peripheral edge of the shank which when contacting the wire, together with the slot, orients the tool in a perpendicular fashion with the wire.

Between the slot and the indentation, and on opposite sides, are a pair of lobes that extend axially from the shank which when the shank is rotated while contacting the wire, imparts an axial cam action to the tool for forming a helical wrap of wire about the terminal without twisting the terminal.

DESCRIPTION OF THE DRAWINGS

The nature of the invention and its advantages will appear more fully from the following detailed description taken in conjunction with the appended drawings, wherein:

FIG. 1 is a side elevational view of a wrapping tool that includes the features and principles of the invention;

FIG. 2 is an enlarged perspective view of the nose of the wrapping tool illustrating the construction of a slot, an indentation and a pair of lobes;

FIG. 3 is a perspective view illustrating the positioning of the tool with respect to the terminal and wire prior to making a wrapped connection;

FIG. 4 is a perspective view, with a cutaway section, depicting the tool over the terminal and illustrates the perpendicular orientation of the tool with the wire when the wire is engaged in the slot and indentation;

FIG. 5 is a perspective view of the tool, terminal and wire illustrating a cam action derived from a lobe riding on the wire during rotation of the tool; and

FIG. 6 shows a connection wrapped by the tool.

DETAILED DESCRIPTION

Referring to FIGS. 1 and 2 of the drawing, the tool comprises a shank 20 attached to a handle 21 with a pin 22 to make a cohesive unit. The nose of shank 20 has a hollow bore 23 deep enough to cover the wire receiving hole of a terminal to be wrapped. The nose of the shank 20 has an oblique slot 24 at the peripheral edge, and an indentation 25 diametrically opposed to the slot 24, where the depth of the slot 24 and indentation 25 are equal. Interposed on the peripheral edge between the slot 24 and the indentation 25, and on opposite sides, are two lobes 26 and 27 extending axially outwards and forming a smooth curving edge about the nose of shank 20. The total difference in dimension between the bottom of the slot 24 or indentation 25 and the top of the lobes 26 and 27 is slightly greater than the diameter of a wire 28 to be wrapped about the terminal 29. The dimension of the bore 23 should be equal to the largest diametrical dimension of the terminal 29 plus twice the diameter of the wire 28 and plus a small clearance.

Referring to FIG. 3 of the drawing, in connecting the wire 28 to the terminal 29, the wire 28 is first inserted into a wire receiving hole 30 formed in the terminal 29 with enough wire protruding to complete one wrap about the terminal 29. The shank 20 is positioned as shown over the terminal with the slot 24 above the wire portion to be wrapped. The tool is then lowered over the terminal and twisted slightly to engage the wire 28 in the slot 24.

Referring to FIG. 4 of the drawing, when the tool is lowered over terminal 29 and the projecting end of wire 28 is engaged in slot 24, the shank 20 contacts the wire 28 at both the slot 24 and the indentation 25 which orients the tool perpendicular to wire 28.

Referring to FIG. 5 of the drawing, as the shank 20 is rotated in direction 31 from the initial position (FIG. 4) the lobe 26 moves over the wire 28 to raise the shank 20 along its axis to overlie the wrapped wire over the unwrapped wire.

The tool, on reaching 180° of rotation, avoids engaging the slot 24 with the unwrapped wire through the rigidity of wire 28 in slot 24 generally maintaining the prior level, and the curved end of slot 24 which avoids catching wire 28. Once past the slot 24 the tool rides over wire 28 on lobe 27 which maintains the wrap level attained through lobe 26 past the second contacting of wire 28 with the edge of terminal 29. On completion of 360° of rotation the indentation 25 again contacts the unbent portion of the wire 28 returning the wrapped wire to the original starting position. The rotation 31 of shank 20 is accomplished by hand turning the handle 21, but the turning of the tool may be accomplished by attaching the shank to a motor driven rotary head with just sufficient torque to bend the wire.

Referring to FIG. 6 of the drawing, an axially displaced wrap of wire 28 on terminal 29 formed by the tool is illustrated. The wrap of wire 28 is generally considered terminated after one and one-fourth turns around terminal 29 prior to soldering the connection. If the wire is skinned to proper length before wrapping with tool, no snipping of the wire end will be required.

It is to be understood that the above-described arrangement of parts, construction and cooperation of elements are simply illustrative of an application of the principles of the invention and many other modifications may be made without departing from the invention.

I claim:

1. In a tool for wrapping a wire about a terminal wherein the wire extends transversely on opposite sides of the terminal:

a sleevelike shank for receiving the terminal;

said shank having an oblique slot extending inward from a peripheral edge for receiving a free end section of the wire which extends on one side of the terminal;

said shank having an indentation on the peripheral edge, diametrically opposed and of equal depth as the slot for

contacting a section of the wire on the opposite side of the terminal to orient said shank perpendicular to the wire;

said shank having a symmetrical pair of axially extending curved ridges disposed on diametrically opposite sides of the periphery interposed between the slot and the indentation for imparting a camming action to the shank; and

means for rotating said shank about the terminal to engage the wire in said indentation whereafter further rotation of said shank wraps a convolution of wire about the terminal, while the pair of opposed ridges impart equal axial motion to said shank during the rotation to produce an axial displacement that results in an inherent helical wrapping of wire around the terminal.

2. In a hand operated tool for wrapping a wire about a terminal having a wire-receiving hole therein:

a handle;

a cylindrical shank secured to said handle, said shank having a hollow nose end for insertion of the terminal with a wire extending transversely through the wire-receiving hole;

said shank having a slot extending at an oblique angle from a forward edge of said hollow nose end for engaging and seating a section of the wire at the bottom of said slot;

said shank having an indentation extending from said edge at a point diametrically opposed to said slot for contacting another section of the wire to orient said shank in a perpendicular direction with respect to the wire; and

a pair of symmetrical curved ridges axially extending from diametrically opposite sides of said shank and interposed between said slot and said indentation for imparting a camming action against the wire during rotation of said handle to impart equal axial motion to said shank to seat a portion of the wire in said slot, and helically wrap the wire about the terminal.