United States Patent

Tumilty

[15] **3,696,482**

[45] **Oct. 10, 1972**

[54] WIRE WRAPPING TOOL

[72] Inventor: **Thomas George Tumilty,** Bramalea, Ontario, Canada

[73] Assignee: **Northern Electric Company Limited,** Montreal, Quebec, Canada

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[52] **U.S. Cl.** .....**29/33 F,** 140/124, 242/7.17

[51] **Int. Cl.** **B21f 15/00**

[58] **Field of Search** .....29/33 F; 140/124; 81/9.5 R; 242/7.17

[56] **References Cited**

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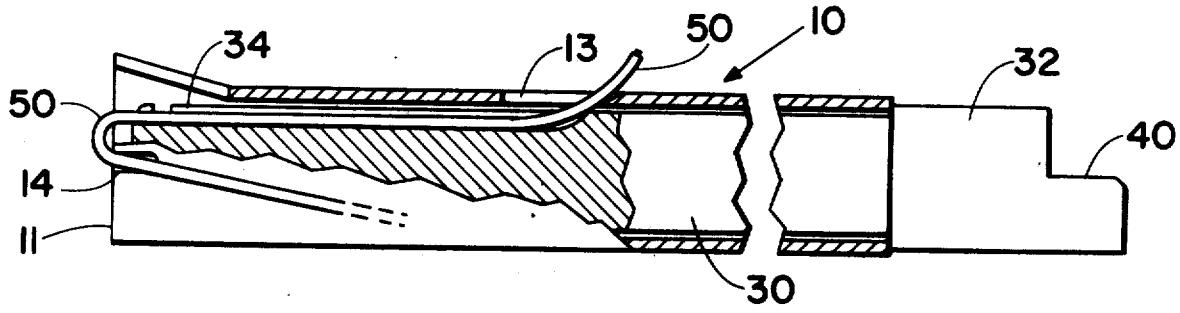
Primary Examiner—Francis S. Husar

Attorney—Sidney T. Jelly

[57] **ABSTRACT**

Wire wrapping tool for wrapping wires on terminal posts, and similar uses, the tool having a bit rotatable in a sleeve. The bit has a groove extending longitudinally from its front end and the sleeve has an aperture cooperating with the inner end of the groove. The wire to be wrapped is fed along the groove until the wire end comes out through the aperture. Two opposed cutting edges are formed in the groove near the outer end of the groove to cut through the insulation of the wire. As the bit is rotated to wrap the wire the wire end is sheared by interaction of the groove and aperture, and insulation is peeled off the wire as it is pulled along the groove between the cutting edges.

9 Claims, 10 Drawing Figures



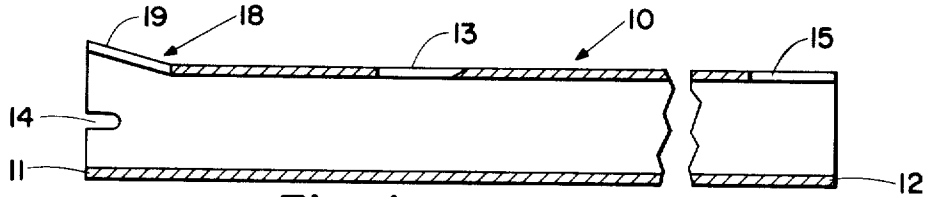


Fig. 1

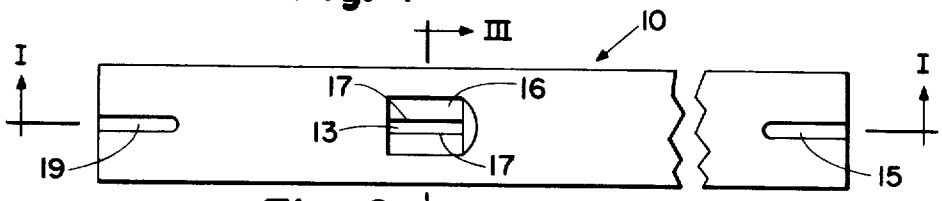


Fig. 2

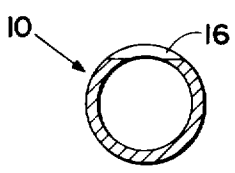


Fig. 3

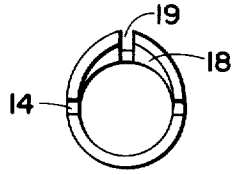


Fig. 4

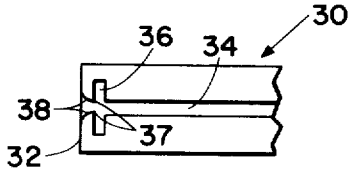


Fig. 6

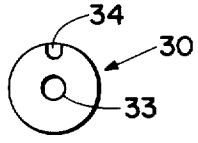


Fig. 7

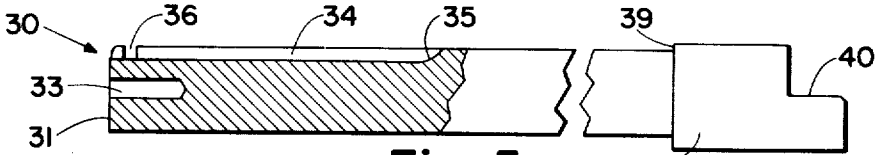


Fig. 5

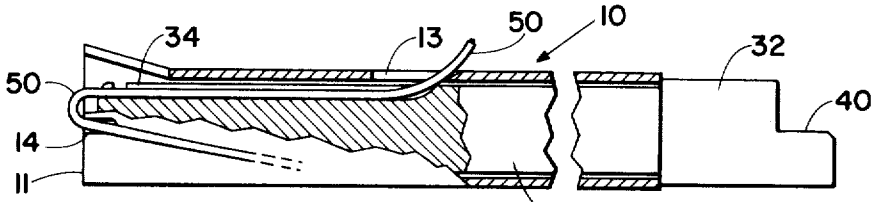


Fig. 8

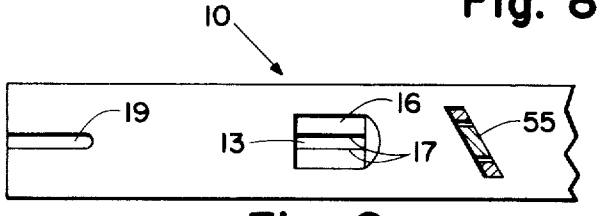


Fig. 9

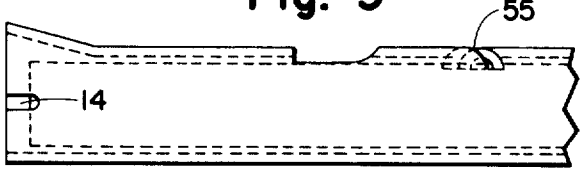


Fig. 10

WIRE WRAPPING TOOL

This invention relates to tools for wrapping wires around a member particularly around a terminal post.

To reduce labor costs it has become a normal method of connecting wires to terminal posts by wrapping the bared wire round a terminal post mechanically by a tool, the wire wound under high stress conditions to produce a permanent attachment. Generally the post has a cross-section which provides a plurality of relatively sharp corners, or ridges, for example square or star-shaped. The wrapping is very quick, avoids the use of solder and flux and also it is possible to position the terminal posts very close together as no access for a soldering gun is necessary. The wrapping tool is very small in diameter.

However, as at present used, wrapping tools have a disadvantage in that it is necessary to strip the insulation off the wire before insertion in the tool for winding.

The present invention provides a tool for wrapping a wire on a terminal post, or other similar member, which tool strips the insulation from the wire as it is wrapped, cuts the wire to the correct length for the proper number of wraps and wraps the wire in one operation. The tool can be used for manual or power-driven applications.

Thus in accordance with one feature of the invention there is provided a tool for wrapping wire on to a terminal or similar member, comprising a sleeve and bit in the sleeve, the bit rotatable relative to said sleeve and said member;

the bit comprising; a forward end and a rearward end; an axial bore in said forward end to receive said member; a transverse groove extending adjacent said forward end; a longitudinal groove extending axially on the periphery of the bit from the forward end and extending across said transverse groove, the longitudinal groove of a width rearward of the transverse groove sufficient to accept the wire with insulation in place, and the width of the longitudinal groove from said forward end to the transverse groove sufficient to accept the wire without the insulation; the corners at the intersection of the transverse and longitudinal grooves nearest to said forward end adapted to form cutting edges to strip insulation from the wire passing along said longitudinal grooves;

the sleeve comprising; a forward end and a rearward end; an aperture extending through the sleeve a distance from said forward end approximately equal to the length of wire to be wrapped; at least one longitudinal slot extending through the sleeve and axially thereof from said forward end and spaced circumferentially from said aperture, the length of the slot sufficient to accept the wire and retain it while wrapping;

the arrangement such that when the bit is positioned within the sleeve, a wire can be inserted along the longitudinal groove of the bit rearward of the transverse groove, the end of the wire extending through the aperture in said sleeve, the cutting edges on said bit cutting the insulation of the wire on pulling of the wire down in the forward part of the longitudinal groove, the whole so constructed and arranged that, on rotation of the bit relative to the sleeve, and member, the end of the wire extending through the aperture in the sleeve is sheared, and the wire is wound round the member by the action of said longitudinal slot in said sleeve, the cutting edges

stipping the insulation from the wire as the wire is drawn along the longitudinal groove in said bit.

In a further feature an additional slot may be formed in the sleeve and an additional groove in the bit extending at an angle to the longitudinal axis of the bit and sleeve, the additional slot and groove cooperating to shear a wire laid in said slot.

The invention will be readily understood by the following description of certain embodiments, by way of example only, in conjunction with the accompanying drawings in which:

FIG. 1 is a longitudinal cross-section through a sleeve, on the line 1—1 of FIG. 2;

FIG. 2 is a plan view of a sleeve;

FIG. 3 is a cross-section on the line 3—3 of FIG. 2;

FIG. 4 is a view on the forward end of the sleeve of FIG. 2;

FIG. 5 is a side view of a bit, with the forward end in cross-section;

FIG. 6 is a plan view of the forward end of the bit illustrated in FIG. 5;

FIG. 7 is a view on the forward end of the bit illustrated in FIG. 5;

FIG. 8 is a transverse cross-section through an assembled tool;

FIG. 9 is a plan view of an assembled tool illustrating a modification to provide a wire cutting facility; and

FIG. 10 is a side view of the tool illustrated in FIG. 9.

FIGS. 1 and 2 illustrate a sleeve 10 having a forward end 11 and rearward end 12. An aperture in the form of a longitudinal slot 13 extends through the sleeve and, as will be seen later, the distance of the slot 13 from the forward end 11 determines the length of wire wound on the terminal post or other member. Formed in the front end are two axially extending slots 14. Slots 14 hold the wire during rotation of the bit relative to the sleeve and terminal post and wind the wire around the post. Only one slot 14 need be provided. At the rear end 12 there is formed a further axially extending slot 15. Slot 15 is for location of the sleeve in the actuating tool, which may be manually operated or power driven. Other forms of location can be used.

Slot 13 cooperates with the bit, in a manner to be described, to cut the wire at a predetermined length. The edges of slot 13 therefore act as cutting edges. A convenient way of forming slot 13, to give efficient cutting edges, is to machine a flat across the sleeve. This is illustrated in FIGS. 2 and 3 —FIG. 3 being a cross-section through the sleeve at the slot 13. A flat 16 is machined across the sleeve of such a depth that the slot 13 is at a width to enable the wire, including the insulating cover, to pass through. Cutting edges 17 are thus formed.

In the embodiment illustrated, the forward end 11 of the sleeve 10 is enlarged for part of its circumference, at 18. This enables the wire to be more easily inserted. This is seen in FIGS. 1 and 4. An additional longitudinal slot 19 is formed at the forward end in alignment with slot 13 to further assist insertion of the wire.

FIG. 5 illustrates a bit 30 which is fairly close fit in the sleeve 10. The bit 30 is rotatable in the sleeve, and has a forward end 31 and a rearward end 32. The forward end has an axial bore 33 in which the terminal post or other member is received. A longitudinal groove 34 extends from the forward end 31. Groove 34

is of a length that its end 35, remote from the forward end of the bit, underlies the slot 13 in the sleeve 10, when the bit is in position in the sleeve. A transverse groove 36 extends across the longitudinal groove 34 a short distance from the forward end 31. As will be seen more clearly in FIG. 6, groove 36 divides groove 34 into two parts. The rearward part of groove 34, that is the part rearward of the transverse groove 36, is of a width sufficient to accept the wire inclusive of insulation. The forward part of groove 34, that is the part extending from the forward end 32 to the transverse groove 36 is of a width which is slightly less than the rearward part of the groove conveniently of a width to accept the wire with the insulation removed.

Corners 37, formed at the intersection of grooves 34 and 36, nearest the forward end 31, form cutting edges which cut and slit the insulating on the wire. The cutting edges can be improved by chamferring the forward part of slot 34, as seen at 38 in FIG. 6. Such chamferring also enables the wire to leave slot 34 more easily and without damage.

The rearward end 32 of the bit 30 is enlarged in diameter to provide a buttress surface 39 against which the rearward end of the sleeve will abut. The rearward end also has a formation for engagement by the actuating tool — in the present example half the diameter of the bit is removed, as at 40, to provide a stepped end which will engage with a cooperating formation in the actuating tool.

FIG. 8 illustrates a tool comprising sleeve 10 and bit 30 assembled, and with a wire 50 inserted. The wire has been inserted and lies in the groove 34 with the end of the wire extending through slot 13 in the sleeve. The wire has been pulled down in the forward end of the groove 34 and the cutting edges formed by the corners 37 (FIG. 6) have cut the insulation of the wire. The main portion of the wire 50 is pulled back, passing through one of the slots 14. The tool is positioned over a terminal post, or similar member, the post extending into the bore 33.

In the embodiment illustrated in FIG. 8, it is assumed that the bit 30 will be rotated, with the sleeve 10 held stationary. Thus, of course, the terminal post or other member is stationary. After insertion of the wire 50 and pulling down between the the cutting edges, the wire is placed in one of the slots 14. Operation of the actuating tool —not shown— rotates the bit 30. The first slight rotation of the bit severs the wire 50 at the slot 13, the wire being forced against the cutting edges 17 (FIG. 2) of the slot 13 by the groove 34. Continued rotation causes the wire to be wrapped round the terminal post, drawing the wire 50 along the groove 34. As the wire is drawn along the groove 34, the insulating is stripped from the wires by the cutting edges formed by corners 37 (FIG. 6). The distance from the cutting edges formed by the corners 37 to the position at which the wire is severed by the cutting edges 17 determines the length of wire which is stripped of insulation, and also the length of bared wire wrapped round the terminal post. While the actual positions at which the wire is severed by the cutting edges 17 can vary along the length of the slot 13, the variation in the stripped length of wire is minimal and only amounts to about half a turn round the terminal post. Insertion of the next wire end pushes out the stripped insulation.

While it is possible for the terminal post, or other member, to rotate, with the bit 30 held stationary or rotated in an opposite direction, and the sleeve rotated with the terminal post, generally it will be the bit which is rotated and the terminal post and sleeve stationary.

In many wiring operations it is required to cut off a length of wire from a spool. This can be done with the tool according to the present invention, without the need of an extra tool. The wire is bent into a loop of approximately 180°, and the bight of the loop pushed through the slot 13 in the sleeve 10, the wire extending into the groove 34. On rotation of the bit, by the actuating tool, the bight of the loop will be sheared by the cutting edges 17.

An alternative way of cutting off a length of wire is illustrated in FIGS. 9 and 10, showing a modification to the tool described above. An additional slot, or groove 55 is cut across the tool, extending through the sleeve and into the bit. The slot, or groove 55 is at an angle to the longitudinal axis of the tool and is wide enough to receive the covered wire. To cut the wire it is positioned in the slot 55 and rotation of the bit shears the wire.

What is claimed is:

1. A tool for wrapping wire onto a member, such as a terminal post, comprising: a sleeve and a bit in the sleeve and rotatable relative to said sleeve and said member;

the bit comprising; a forward end and a rearward end; an axial bore in said forward end to receive said member; a transverse groove extending adjacent said forward end; a longitudinal groove extending axially on the periphery of the bit from said forward end and extending across said transverse groove, the longitudinal groove of a width rearward of the transverse groove sufficient to accept the wire with insulation in place, and the width of the longitudinal groove from said transverse groove toward said forward end sufficient to accept the wire without the insulation; the corners at the intersection of the transverse and longitudinal grooves nearest to said forward end adapted to form cutting edges to strip insulation from the wire passing along said longitudinal groove;

the sleeve comprising; a forward end and a rearward end; an aperture extending through the sleeve a distance from said forward end approximately equal to the length of wire to be wrapped; at least one longitudinal slot extending through the sleeve and axially thereof from said forward end and spaced circumferentially from said aperture, the length of the slot sufficient to accept the wire and retain it while wrapping;

the arrangement such that when the bit is positioned within the sleeve a wire can be inserted along the longitudinal groove of the bit rearward of the transverse groove, the end of the wire extending through the aperture in said sleeve, the cutting edges on said bit cutting the insulation of the wire on pulling of the wire down in the forward part of the longitudinal groove, the whole so constructed and arranged that, on rotation of the bit relative to the sleeve, and member, the end of the wire extending through the aperture in the sleeve is sheared, and the wire is wound round the member

by the action of said longitudinal slot in said sleeve, the cutting edges on said bit stripping the insulation from the wire as the wire is drawn along the longitudinal groove in said bit.

2. A tool as claimed in claim 1, said aperture in the sleeve comprising a slot extending axially of the sleeve.

3. A tool as claimed in claim 1, said bit including a formation on the rearward end for engagement by an actuating tool.

4. A tool as claimed in claim 1, the rearward end of the bit enlarged in diameter, and an abutment surface on the enlarged portion, the abutment surface facing towards the forward end of the bit and adapted to be engaged by the rearward end of the sleeve.

5. A tool as claimed in claim 1, wherein the forward end of the sleeve is enlarged, in alignment with said aperture.

6. A tool as claimed in claim 1, including a further longitudinal slot in said sleeve, extending axially at said forward end in alignment with said aperture.

7. A tool as claimed in claim 1, wherein the forward portion of the longitudinal groove increases in width from the corners at the intersection of longitudinal and transverse grooves, to form a radiused exit from the longitudinal groove.

8. A tool as claimed in claim 1, including a further transverse groove in the bit and a transverse slot in the sleeve, the groove and slot extending at an angle to a plane normal to the longitudinal axis of the tool, the groove and slot cooperating whereby a wire can be positioned in the slot and groove, relative rotation of bit and sleeve shearing the wire.

9. A tool as claimed in claim 8, said further transverse groove formed rearward of the longitudinal groove, and the transverse slot formed rearward of said aperture.

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