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S. A. SHEPHERD ETAL

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DEVICES FOR WRAPPING AND REMOVING WRAPPED CONNECTIONS

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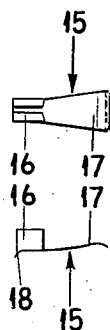
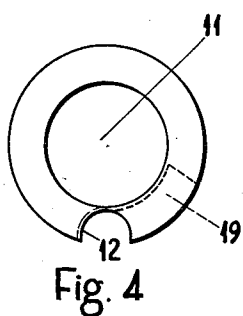
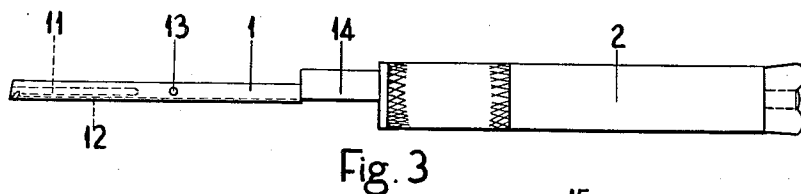
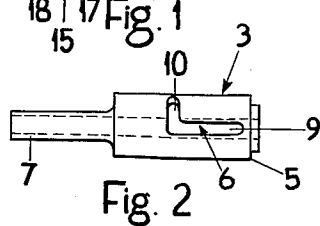
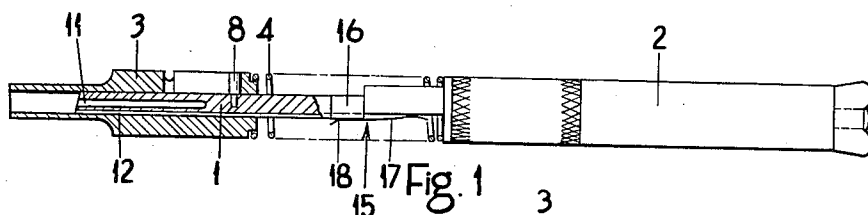


Fig. 5

Fig. 6

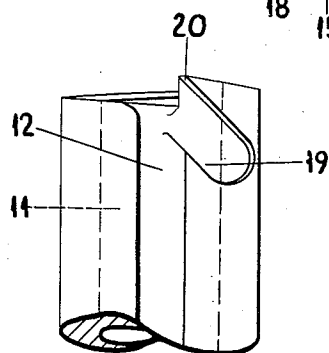


Fig. 7

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DEVICES FOR WRAPPING AND REMOVING WRAPPED CONNECTIONS

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This invention relates to devices for wrapping and removing wrapped connections.

In The Bell System Technical Journal for May 1953, page 525 et seq. there is described a method of forming a so-called "wrapped" electrical connection. Connections in this general form are referred to in this specification and the term "wrapped connection" when used in this specification should be taken to mean a connection which makes use of the method described in the above-mentioned periodical.

According to the present invention a device for wrapping and removing wrapped connections comprises a spindle having at one end a hole which extends lengthwise of the spindle to receive a terminal on which a connection is to be wrapped (or from which a connection is to be unwrapped), means arranged to supply wire to said end of the spindle whereby when the spindle is rotated the wire is wrapped round the terminal to form a wrapped connection, a sleeve which encircles the spindle, and a projection on said end of the spindle such that when the end of a terminal on which a wrapped connection has been formed is inserted in said hole, said end of the spindle is pressed against the wire forming the connection, and the spindle is rotated in the opposite sense to that use in forming the connection, the end of the wire adjacent said end of the spindle is caught by said projection and forces thereby applied to the connection whereby the diameter of the turns of wire forming the connection is increased so that the wire contacts the inner surface of the sleeve and can then be removed from the terminal.

A device for wrapping and removing wrapped connections, the device being in accordance with the present invention will now be described by way of example with reference to the accompanying drawing in which:

FIGURE 1 shows a side elevation of the device partly in section,

FIGURE 2 shows a side elevation of a first part of the device of FIGURE 1,

FIGURE 2 shows a side elevation of a second part of the device of FIGURE 1,

FIGURE 4 shows an enlarged end elevation of said first part of the device,

FIGURE 5 shows a plan view of a third part of the device of FIGURE 1,

FIGURE 6 shows a side elevation of said third part of the device and,

FIGURE 7 shows an enlarged side elevation of a portion of said first part of the device.

Referring now to FIGURE 1 of the drawing, the device comprises a spindle 1 which is rigidly attached to a handle 2, the spindle 1 being encircled by a sleeve 3 which is moveable longitudinally of the spindle 1 against the action of a helical spring 4 which is constrained between one end of the handle 2 and the adjacent end of the sleeve 3.

Referring to FIGURE 2 of the drawing, the sleeve 3 is formed with a shoulder 5 against which the spring 4 (FIGURE 1) bears, an L-shaped slot 6 and a part 7 having a reduced external diameter. Referring now to FIGURE 1 also, the slot 6 co-operates with a pin 8 in the spindle 1 so that the sleeve 3 can be brought

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into either of two equilibrium positions relative to the spindle 1; a forward position, shown in FIGURE 1, in which the pin 8 rests against the end 9 of the slot 6, and a retracted position (not shown), in which the spring 4 is partially compressed and the sleeve 3 is rotated relative to the spindle 1 so that the pin 8 enters the side arm 10 of the slot 6 and is retained therein. In the retracted position the end of the spindle 1 and of the sleeve 3 remote from the handle 2 lie, at least approximately, in the same plane.

Referring now to FIGURE 3 of the drawing, which shows the spindle 1 and the handle 2 only, and also FIGURE 4 which shows the end of the spindle 1 remote from the handle 2, the spindle 1 has a central hole 11 formed therein, the hole 11 extending approximately half the length of the spindle 1, and also a groove 12 which extends almost the whole length of the spindle 1. The hole 11 is of circular cross-section and the groove 12 of segmental section, the groove 12 being opened to the outer surface of the spindle 1. The hole 13 in the spindle 1 which receives the inner end of the pin 8 (FIGURE 1) is beyond the inner end of the hole 11 and is set at an angle so as not to break into the groove 12.

The part of the spindle 1 adjacent the handle 2 is of increased diameter to assist in locating the spring 4 but is milled flat on the side where the groove 12 is situated, to form a flat surface 14 symmetrically positioned relative to the groove 12, the surface 14 being milled to such a depth as to clear the depth of the groove 12.

Referring now to FIGURES 5 and 6 of the drawing together with FIGURE 1, there is provided on the spindle 1 a spring clip 15 which has a part 16 which encircles the spindle 1 adjacent the surface 14 and a part 17 which bears on the surface 14. That part of the clip 15 which closes the open side of the groove 12 is deformed as indicated at 18 for a purpose which will be apparent hereafter.

Referring now to FIGURE 7 of the drawing, the end of spindle 1 remote from the handle 2 is not flat but follows the shape of a helix, the parts of the spindle 1 of least and greatest length being adjacent the groove 12 as shown. In the part of the greatest length is provided a groove 19 which runs out of the side of the groove 12 at an angle of some 45 degrees. The groove 19 is of similar cross-section and depth to the groove 12 and does not break into the hole 11. The groove 19 has the effect of leaving a projection 20 at the end of the spindle 1.

Referring again to FIGURE 1 of the drawing, the method of using the device is as follows: a piece of wire which is to be employed in making the wrapped connection is cut to the required length and straightened and, with the sleeve 3 in the retracted position, one end of the wire is inserted in the end of the groove 12 remote from the handle 2 and pushed into the groove 12 until the inner end of the wire is held by the part 17 of the clip 15. During this operation the possibility of the end of the wire missing the clip 15 by passing outside the part 16 is prevented by the deformation 18 which catches the wire if it tends to wander from the groove 12 in this manner.

The device is now brought up to a terminal (which may in fact be two or more terminals in contact with one another) about which the wire is to be wrapped, the end of the terminal being arranged to enter the hole 11. The outer end of the wire is then held whilst the device is rotated about its longitudinal axis in a clockwise direction whereby the wire is wrapped around the terminal. When the other end of the wire emerges from the groove 12 the wrapped connection is complete and the device may be removed from the terminal.

To remove the connection the device is used with the

sleeve 3 in the forward position. Again the device is brought up to the terminal so that the end of the terminal enters the hole 11 and the end of the spindle 1 bears against the outermost turn of the wire forming the wrapped connection. The device is then rotated in an anticlockwise direction. When the projection 20 catches the end of the wire forming the wrapped connection this end is forced into the groove 19. Continued rotation of the device therefore causes forces to be applied to the wire tending to unwrap it from the terminal. This tendency is to some extent restrained by the presence of the sleeve 3 and the final result is, therefore, that the diameter of the turns of wire forming the wrapped connection is increased until the wire is in contact with the inner surface of the sleeve 3 and can readily be removed from the terminal.

We claim:

1. A device for wrapping turns of wire as a connection on a terminal and for increasing the diameters of said turns when it is desired to remove the wire wrapping from the terminal, said device comprising a spindle which is rotatable about its longitudinal axis and which has an outer end surface, said spindle having a hole which extends longitudinally of the spindle from said outer end surface and which is adapted to receive the terminal, and said spindle also having a groove which extends longitudinally of the spindle from said outer end surface and which is adapted to receive a wire which is to be wrapped around said terminal, said groove being offset from said hole so that when said spindle is rotated in one direction relative to said terminal said wire is drawn from said groove and is wrapped around said terminal, a sleeve which encircles and is a longitudinally sliding fit on said spindle and which has an outer end, means to retain said sleeve in a first position in which the outer end of said sleeve projects outwards beyond the outer end surface of said spindle a sufficient distance to substantially completely encompass the wrapped connection, means to retain said sleeve in a second position in which the outer end of said sleeve lies in substantially the same plane as the outer end surface of said spindle, a projection formed on the outer end surface of said spindle, and a recess in the outer side surface of said spindle, said recess being positioned adjacent said projection and extending rearwardly from the outer end surface of said spindle and being shaped to receive the end of a wire that has been wrapped on said terminal when said spindle is rotated in the other direction relative to said terminal.

2. A device in accordance with claim 1 wherein the

outer end surface of the spindle follows the shape of a helix, the parts of said spindle of least and greatest length being adjacent the groove with the part of least length trailing with respect to rotation in said one direction.

3. A device for wrapping turns of wire as a connection on a terminal and for increasing the diameters of said turns when it is desired to remove the wire wrapping from the terminal, said device comprising a spindle which is rotatable about its longitudinal axis and which has an outer end surface having the shape of a helix, said spindle having a hole which extends longitudinally of the spindle from said outer end surface and which is adapted to receive said terminal, said spindle having a first groove which extends longitudinally of the spindle from said outer end surface and which is adapted to receive a wire which is to be wrapped around said terminal, said groove being offset from said hole so that when said spindle is rotated in one direction relative to said terminal said wire is drawn from said groove and wrapped around said terminal, the parts of said spindle of least and greatest length being adjacent said groove, and said spindle also having a second groove which extends from said outer end surface at an angle to said first groove, said second groove running into said first groove at said outer end surface on the side of said first groove where said spindle is of greatest length whereby said second groove is separate from the outer end surface of the spindle and does not disturb the helical continuity thereof, said side being leading with respect to rotation in said one direction, said second groove being shaped to receive the end of a wire that has been wrapped on said terminal when said spindle is rotated in said one direction relative to said terminal, a sleeve which encircles and is a sliding fit on said spindle and which has an outer end, means to retain said sleeve in a first position in which the outer end of said sleeve projects outwards beyond the outer end surface of said spindle a sufficient distance to substantially completely encompass the wrapped connection, and means to retain said sleeve in a second position in which the outer end of said sleeve does not project outwards beyond the outer end surface of said spindle.

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