Aug. 22, 1944. E. LINDGREN 2,356,328

INSULATION CUTTING DEVICE

Filed July 10, 1943

FIG. 1

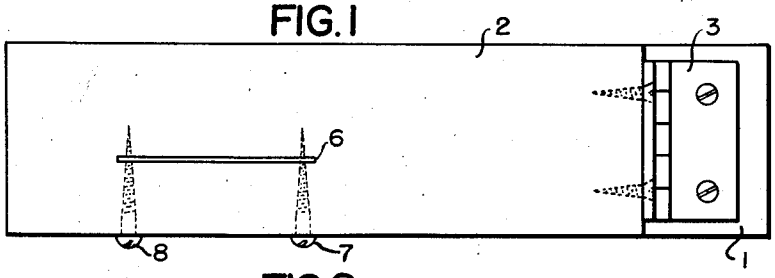


FIG. 3

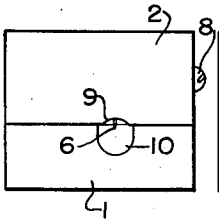


FIG. 2

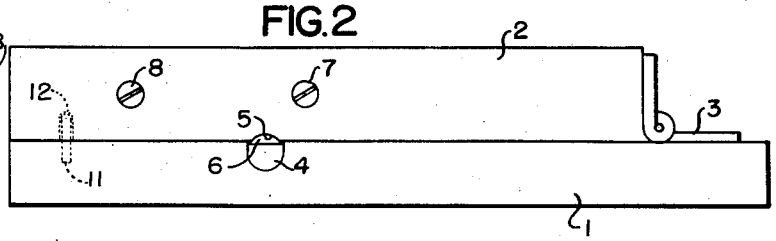


FIG. 4

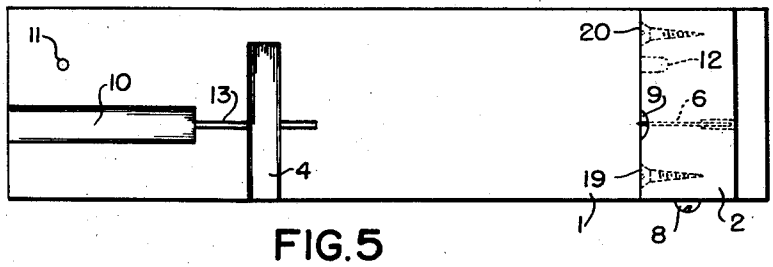


FIG. 5

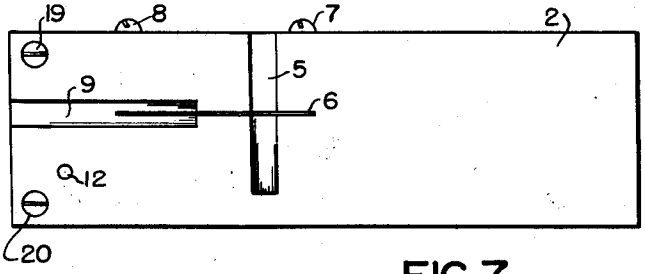


FIG. 6

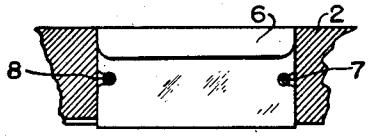
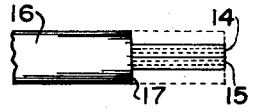


FIG. 7



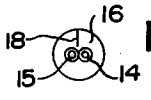


FIG. 7a

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INSULATION CUTTING DEVICE

Ellis Lindgren, Geneva, Ill.

Application July 10, 1943, Serial No. 494,181

6 Claims. (Cl. 30—91)

My invention relates in general to an insulation cutting device and more specifically to a tool for cutting the insulation from the end of an insulated copper wire so that a section thereof may be removed from the wire in order that the ends may be attached to an electrical device.

Many of the electric wires used in ships, aeroplanes and various electric machines such as motors and the like, comprise one or a plurality of current carrying copper wires each separately insulated with enamel, silk or asbestos coverings and the insulated wires then enclosed in a sheath of rubber or some like composition to protect the bundle of wires from the elements and from wear. In the many plants where such wire is used and in maintenance and repair work it is necessary to strip a section of this outer sheath from the wires to expose the bundles of wire inside, so that each may be stripped of its individual insulation and attached to the terminals of the instruments to which the wires are to be connected.

The workmen in stripping the rubber section from a wire of this type are required to use a sharp knife to make a lateral cut around the wire to cut the section to be removed away from the main body of insulation and then slit or cut the section longitudinally so that it can be readily torn from the wire with pliers. The rubber sheath is usually of tough vulcanized rubber, molded to the wire and it is difficult to make the longitudinal and lateral cuts thereof without injuring either the wires themselves or the individual insulation thereof by cutting too deep with the knife.

In order to overcome these difficulties and to speed the operation described, I have designed a tool which can be used to make the lateral and longitudinal cuts of the rubber sheath with accuracy and precision so that the section can be easily removed and that the danger of injury to the wires and insulation is greatly lessened.

My improved device consists of a pair of blocks of wood or like material hinged together and having grooves in the registering surfaces so that a section of the insulated wire may be inserted in one of the grooves. Now when the blocks are brought together a knife blade is brought into engagement with the rubber insulation and as the wire is rotated or turned by hand, the knife will make a lateral or circular cut just through the rubber insulation of the wire. The wire section is then placed in another set of grooves in the registering surfaces and in this case the same knife blade will slit the section of insulation as the wire is pulled by hand from the groove. In this way the end section is cut from the wire and may be slit into sections so that it may be easily removed.

The device of my invention may be easily understood by reference to the accompanying drawing in which

Fig. 1 is a top view of the complete device.

Fig. 2 is a side view taken from the bottom of Fig. 1.

Fig. 3 is an end view taken from the left of Fig. 1.

Fig. 4 is a top view of the device with the upper half turned upward on the hinge.

Fig. 5 is a view taken from the under side of the upper half of the device shown in Fig. 1 with the hinge removed.

Fig. 6 is a partial section of the upper half of the device showing the cutting blade thereof.

Fig. 7 shows a portion of the wire with a section of the rubber insulation shown in dotted lines as removed.

Fig. 7*a* is an end view of a piece of wire showing the wires inside.

Referring to the drawing I have shown a base block 1 formed from wood or like material and having an upper block 2 of like material hinged to block 1 by a hinge 3 so that the lower surface of block 2 lies flat against the upper surface of block 1 when they are closed together, and the blocks always register with each other in the same position. In Fig. 2 I have shown a set of grooves 4 and 5, the smaller groove 5 in upper block 2 (Fig. 5) registering with groove 4 in base block 1 (Fig. 4) to form a channel of the same dimension as the outer circumference of the insulated wire to be skinned.

In the upper block 2 is a fine blade 6 such as a razor blade, mounted in a slot in the block 2 and securely held in position by a pair of screws or bolts 7 and 8. The position of the blade is clearly shown in Fig. 6 with the lower end of the blade slightly projecting below the lower surface of block 2. The screws 7 and 8 extend through holes or notches in the blade 6 to hold it in the desired position. Other methods may of course be used to secure the blade in position.

Another pair of registering grooves 9 and 10 extend longitudinally of the blocks 1 and 2 and are so positioned that when the blocks are closed together the blade 6 extends for a certain distance into the opening or channel provided by the two slots as shown in Fig. 3. In the lower block 1 I also provide a centering or guide pin 11, set in the wood, and projecting upward from the upper surface thereof to register with a hole 12 in the upper block 2 (Fig. 4) to maintain the blocks in proper alignment when the blocks come together. In addition, I have provided a shallow slot 13 in lower block 1 to provide clearance for the lower edge of blade 6.

I have also illustrated a broken off end section of insulated wire in Figs. 7 and 7*a* with a pair of wires 14 and 15 each separately insulated, and having a molded rubber insulation 16 covering

the two wires. In dotted lines in Fig. 7 I have indicated the end section of the rubber insulation which may be removed by the device illustrated in the manner to be explained.

In the operations to remove the end section of wire the terminal end of a length of wire is first placed in the groove 4 with the device open as shown in Fig. 4, with the end of the wire against the upper end of the groove. The upper block 2 is then brought down to the position shown in Fig. 2 so that the blade 6 engages the rubber insulation. The wire is then turned by hand so that the blade will cut a circumferential slit around the insulation to sever the end section to be removed from the rest of the insulation. The blade will make this cut along the line 17 of Fig. 7.

After the first lateral cut is made the device is opened and the wire removed from groove 4 and placed in groove 10. The upper block is then lowered so that the wire is encased in the hole shown in Fig. 3 with the blade 6 running longitudinally along that end section of the insulation which has been severed. The wire is then pulled out of this hole with the blocks still together and this pulling causes blade 6 to slit the insulation of the severed end down to a point close to the inner wires along line 18 (Fig. 7a). The wire may then be turned and again placed in groove 10 and the operation repeated to cut several slits along the severed section if desired. After this a pair of pliers or the like may be used to remove the severed end of insulation which has been so cut as to be easily removable. It will be seen that the setting of blade 6 determines the depth of the cuts in the outer insulation and prevents the cutting of the insulation beyond said certain depth. Also in case it is desired to shorten the depth to which a cut is made, I provide a pair of set screws 19 and 20 which may be screwed in or out to adjust the spacing between blocks 1 and 2 when closed together. That is, when these screws are turned out so that they project farther from the lower surface of block 2, they engage the upper surface of block 1 and prevent the blocks from closing together so tightly and thus prevent blade 6 from extending as far down into grooves 10 and 4 so that a shallower cut may be made.

Many modifications may be made in the device in accordance with known mechanical equivalents, that is, the method of holding the blade, the adjusting means and other elements may be changed or modified without departing from the spirit of the invention.

What I consider as novel will be pointed out in the appended claims.

What is claimed is:

1. A device for cutting the insulation of a wire preparatory to skinning the same, comprising a pair of blocks hinged together for relative movement, a groove in the upper surface of one block and a second groove in the other block, said grooves registering with each other when said blocks are brought together and combining to form a hole into which a section of insulated wire may be inserted, a knife blade mounted in the upper block and having its edge extending laterally of and for a certain distance into said hole, said blade acting to make a circumferential cut around said wire for a certain depth when the wire is turned around while inserted in said hole, and means for adjusting the space between the blocks when brought together to thereby adjust the depth of the cut made by said blade.

2. A device for use in cutting a section of the insulation of a length of wire comprising a pair of blocks having registering grooves forming channels surrounding the wire when the wire is inserted in one of the grooves and the blocks brought together, a cutting edge mounted in one of the blocks so that its edge extends into both of said channels for a certain distance, said edge effective to make a cut in the insulation around its circumference a certain distance from the end of the wire to a predetermined depth and effective to make a longitudinal cut in the insulation for a certain distance from the end of the wire to a predetermined depth.

3. A device for use in cutting the insulation of an end section of wire comprising a device having a channel of certain length for receiving the end section of wire, a cutting edge positioned a certain distance from the end of said channel effective to sever an end section of insulation from the remainder of the insulation of the wire as the wire is turned, a second channel of certain length in the device having a cutting edge extending longitudinally thereof and effective to slit the severed portion of insulation as many times as desired when said end section is repeatedly inserted into and withdrawn from said second channel, whereby the end section may be readily removed from the wire.

4. A device for use in cutting an end section of the outer insulation of a wire comprising a pair of blocks hinged together so that two surfaces thereof may engage each other, a pair of grooves in each of said engaging surfaces one of each pair registering with one of the other pair to form a pair of channels in each of which an end section of a wire may be inserted, a cutting blade mounted in one of said blocks with its edge crosswise of one channel and running longitudinally in the other channel, said edge effective to make a circular cut around the wire to a certain depth when the wire is placed in one channel and effective to make a longitudinal cut of a certain length and depth when the wire is placed in the other channel.

5. In a device for cutting an end section of insulation at the end of a length of wire so that the same may be readily removed without disturbing the inner wires and their individual insulation, a block having grooves therein adapted to receive the end of the wire, another block mounting a cutting edge which is lowered, when the blocks are brought together, to a certain distance into the insulation of the wire, so that a circular cut of a certain depth will be cut in the insulation when the wire is turned in one groove, and a longitudinal cut will be made when the wire is in the other groove and withdrawn therefrom.

6. A device for cutting the insulation of a wire preparatory to removing an end section thereof comprising a body having openings therein in which the wire may be inserted, a cutting blade mounted in fixed relation with said openings in such a manner that a longitudinal cut may be made in the insulation of the wire by placing the same in one opening and withdrawing it therefrom, and that a circumferential cut may be made in the insulation of the wire by placing the wire in another opening and turning it therein without changing the relation of said blade to said openings.

ELLIS LINDGREN.