Oct. 18, 1966 C. E. DIBBLE 3,279,058

ELECTRICAL CABLE INSULATION SLITTING TOOL

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FIG. 1.

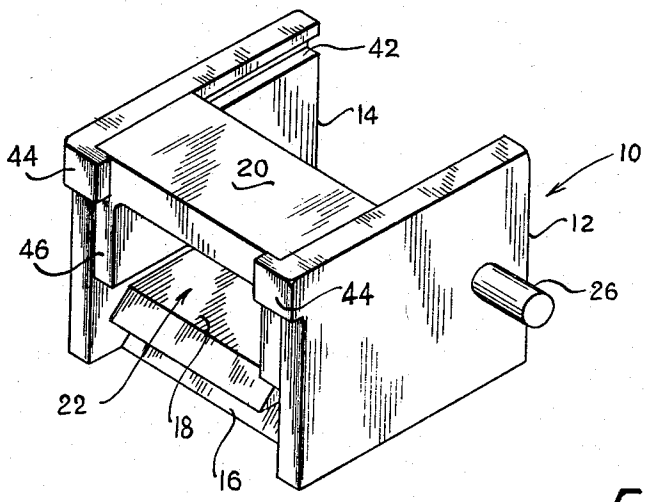

FIG. 2.

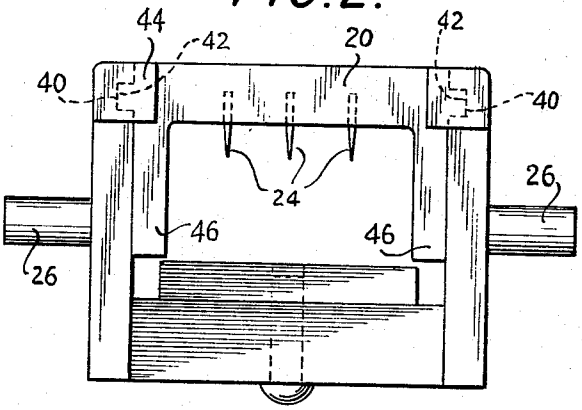

FIG. 3.

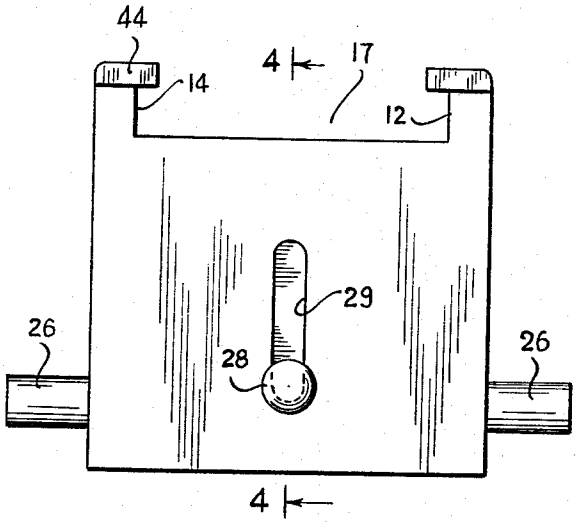

FIG. 6.

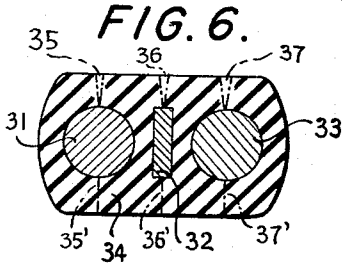

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FIG. 4.

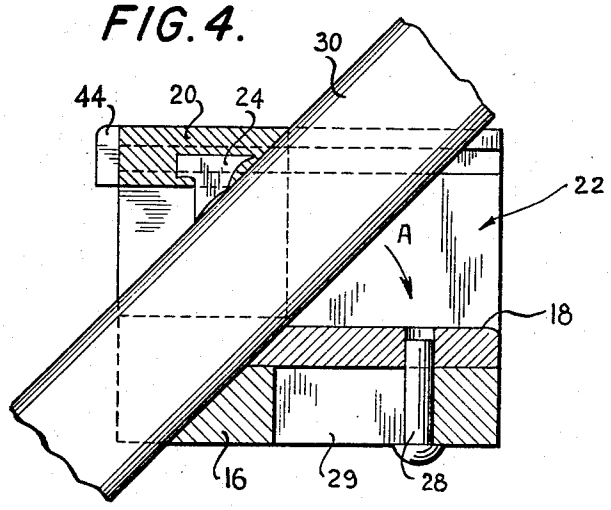
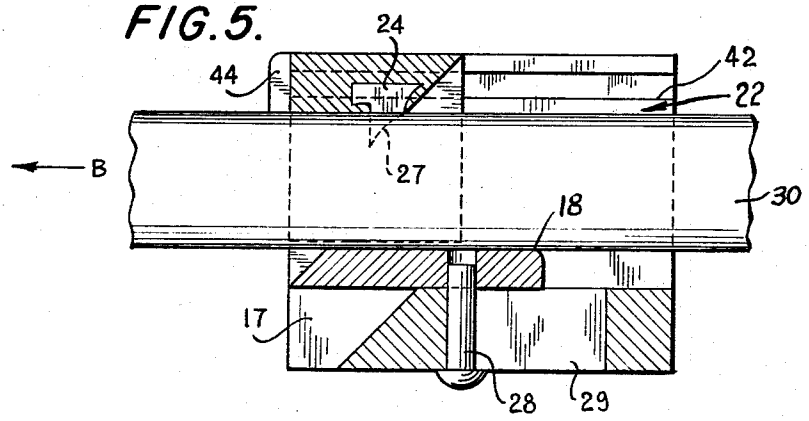


FIG. 5.



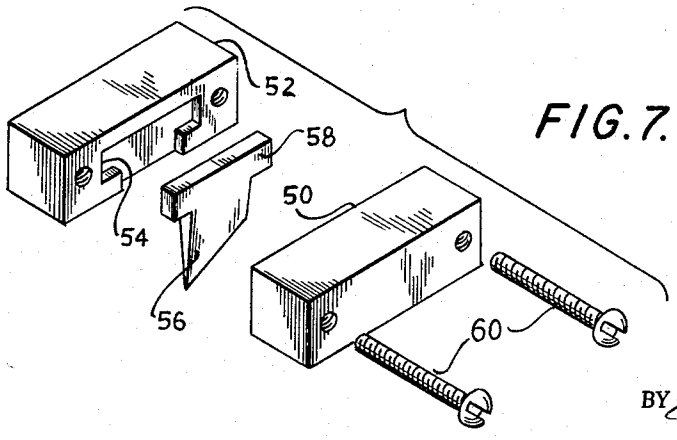


FIG. 7.

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ELECTRICAL CABLE INSULATION SLITTING TOOL

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2 Claims. (Cl. 30—90.8)

This invention pertains to cable insulation cutters, and particularly to cutters for longitudinally slitting the relatively thick insulation commonly used on heavy duty electric power cables.

Many types of heavy duty electric power cables, such as those commonly used to supply power to portable mine machinery, for example, are characterized by thick coverings of tough, cut-and-abrasion-resistant, insulating materials. When it becomes necessary to remove this insulation for the purpose of making connections or repairs, however, these otherwise highly desirable characteristics are generally found to be quite undesirable from the standpoint of cutting and trimming operations. Toughness and cut resistant qualities substantially increase the effort required to manually penetrate, cut away and remove this insulation in order to bare the underlying cable conductors.

Although a great variety of knife-edged hand tools are commercially available for cutting and removing cable insulation, these presently known devices are generally not particularly suited for heavy duty usage. Since they are commonly intended for relatively soft insulation, the operator is not afforded adequate mechanical advantage for readily penetrating the type of tougher insulation under discussion. Many of these devices further require the operator to supply simultaneously the force required to penetrate into the insulation and the force required to perform the cutting operation. Other tools which overcome some of these disadvantages through the use of pivot or hinge mounted cutting elements suffer, on the other hand, from the disadvantage of relatively fragile and easily broken support arrangements for the cutting elements.

Accordingly, it is an object of this invention to provide a cutting tool for cable insulation wherein the effort required to penetrate tough cable insulation is less than in prior tools used for the same purpose.

A further object is to provide a cutting tool which simply and effectively maintains a cutting blade in proper engagement with the insulation of an electric cable during cutting of the insulation.

A still further object is to provide a tool wherein the cutting blade may be securely mounted to a relatively rigid structural part of the tool but may nevertheless be readily removed for repair or replacement.

Features of this invention include the use of a housing member having a cable receiving channel therethrough which includes a movable wall portion adapted to force an inserted cable into cutting engagement with a cutting blade and to thereafter maintain the cable in cutting relationship with the cutting blade as the housing is moved axially along the cable.

These and other objects, features, and advantages of this invention are more clearly illustrated and particularly pointed out in the following specification and claims, and in the accompanying drawings, in which:

FIG. 1 represents a pictorial view of an embodiment of this invention having a movable wall portion in a cable receiving channel;

FIG. 2 is a front elevation view of the embodiment shown in FIG. 1;

FIG. 3 is a bottom plan view of the same embodiment;

FIG. 4 is a side section view of the cutting tool of FIG. 1, showing a cable and the tool parts in initial engagement position;

FIG. 5 is a side section view showing the cable and tool parts in final cutting position;

FIG. 6 is a transverse section view through a cable such as might be used in connection with this invention;

FIG. 7 is a pictorial representation of a disassembled mounting block such as might be used to support a cutting blade in a tool constructed in accordance with this invention.

Referring now more particularly to the drawings, the cutting tool illustrated in FIGS. 1 through 5 may be seen to comprise a housing member designated generally by reference numeral **10**, which includes a pair of upright opposed side walls **12**, **14** coupled together in generally U-shaped configuration by a connecting wall element **16**. Movable wall element **18** and insert element **20** extend between the side wall **12**, **14**, in opposed spaced-apart relationship to define, in cooperation with the side walls, a longitudinal channel **22** extending through the housing **10**. One or more cutting blades **24** are coupled to the housing **10** by means of insert **20** so as to project into the longitudinal channel **22** in position for penetrating the insulation of a cable telescopically disposed within the channel. Gripping handles such as **26** are provided on the housing **10** to facilitate drawing the blade or blades **24** longitudinally along and through the insulation of a cable constrained in channel **22**.

The operation of this invention is best illustrated by FIGS. 4 and 5, wherein it may be seen that in the first, or retracted, position of wall member **18**, a cable **30** may be inserted into the housing **10** at an angle to the axis of longitudinal channel **22** so as to substantially clear cutting blade **24**. Subsequent to insertion of the cable, wall member **18** may be moved to a second, extended position, as shown in FIG. 5, wherein the cable **30** is forced into a position substantially parallel to the axis of channel **22** so that cutting blade **24** necessarily penetrates the cable insulation to a predetermined depth; this penetrated position will be maintained so long as wall member **18** remains in the location shown. The cable **30** is then free to move in the longitudinal direction only, as indicated by arrow B in FIG. 5, so that the sharpened cutting edge **27** of blade **24** will move axially along and through the cable insulation until a slit of the desired length has been formed.

The dimensions of blade **24** may be selected to correspond to a particular cable and particular channel dimension so as to form a slit in the insulation extending from the outer surface thereof through to the surface of the encased conductor. By removing a cable which has been slit, rotating it 180° about its own axis, and reinserting it into this tool, a second slit may be formed which is coextensive in length and directly opposite the first; the insulation which has thus been slit on both sides of a cable may then be peeled away in two separate halves to expose the underlying conductor.

FIG. 6 illustrates a transverse cross section of a heavy duty cable **30** which might be used in connection with this invention. The cable is seen to include a pair of round wire conductors **31**, **33** and a central flat conductor **32** which are together encased in a common insulating jacket **34**. Three parallel longitudinal slits **35**, **36** and **37** have been formed in the jacket in the cable, extending from the outer surface of jacket **34** to the surface of the conductors, in the manner described above. Dotted lines **35'**, **36'** and **37'** illustrate the position of corresponding opposite slits which might be formed by use of the rotation and reinsertion process also described above.

Movable wall portion **18** is slidably coupled to the housing **10** by means of a stud fastener **28** which extends

through longitudinal slot **29** in wall portion **16**. The slot and stud capture portion **18** to portion **16** while permitting longitudinal relative motion therebetween. Movable portion **18** is thus freely movable between a forward position, as shown in FIG. 4, in which cable **30** may be inserted through the housing **10** at an angle to the axis of channel **22**, and a rearward position, as shown in FIG. 5, in which the cable **30** is constrained to telescopic movement substantially parallel to the axis of channel **22**. It has been found that the frictional relationship between the commonly used cable insulating materials and the structural materials which may expectably be used for a housing such as **10**, is such that wall member **18** will ordinarily be drawn from the forward position shown in FIG. 4 to the rearward position of FIG. 5 merely in response to movement of cable **30** in the rearward direction (direction of arrow B) relative to housing **10**. The rearward movement of wall portion **18** will force cable **30** to tilt about the edge of the wall portion into alignment with the channel axis (as shown by the direction of arrow A in FIG. 4), gradually forcing penetration of the blade **24** into the cable and ultimately holding the cable in its final, penetrated position ready for slitting.

To provide adequate peripheral constraint for the cable during the cutting operation, the side walls **12** and **14** may be made to extend rearwardly so as to define, in effect, a longitudinal opening **17** which extends through the wall **16** of the housing **10** and through the rearward end of the housing. As seen in FIG. 4, the longitudinal opening **17** permits the desired insertion of the cable **30** at an angle to the axis of the channel **22**. The rearward position of slidable wall portion **18** may thus be considered to cover over or to obstruct the longitudinal opening **17**.

In the embodiment illustrated in FIGS. 1 through 5, cutting blades **24** have been shown to be embedded in insert element **20**. FIG. 7 illustrate an alternative means of supporting a cutting blade in a hand tool constructed in accordance with this invention. In this configuration a pair of structural elements **50** and **52** are fitted with a cutout seat such as **54** on the interface of one or both of the elements which is adapted to receive and clamp a cutting blade such as the blade **56** between them. The blade **56** may be provided with tab portions such as **58** adapted to mate with corresponding portions of the cutout **54** to assure multidirectional tension of the blade within the cutout.

To retain element **20** in proper position relative to the remainder of the housing member **10**, a pair of transversely extending key portions **40** project from the sides of element **20** in position to mate with corresponding longitudinal keyways **42** formed in side walls **12** and **14**. A pair of tabs or stop members **44** obstruct the rearward end of keyways **44** to limit the rearward movement of insert element **20**. Rearward relative movement of an inserted cable **30** will thus serve to draw the blade or blades **24**, and attached insert **20**, more firmly against stop members **44**.

Insert element **20** has further been shown to include a pair of downwardly depending leg portions **46** which lie parallel to the opposed side walls **12** and **14**. These leg portions serve to effectively delimit the dimensions of enclosed channel **22**. It is apparent that various differently dimensioned insert members **20** may be used in conjunction with a given housing member **10** in order to accommodate a fairly wide range of different cable sizes. Insert **20** may, of course, be used without any depending leg portions in order to accommodate a cable of maximum

width; maximum width in such case is determined by the spacing between the opposed side walls **12** and **14**. Similarly, the housing member **10** may be formed within an integral top wall (not shown) in place of insert element **20**, and the cutting blade or blades **24** may, in turn, be mounted to such an integral top wall. Still further, an integral top wall may be used in conjunction with an insert element such as **20**.

The invention has thus been described but it is desired to be understood that it is not confined to the particular forms or usages shown and described, the same being merely illustrative, and that the invention may be carried out in other ways without departing from the spirit of the invention; therefore, the right is broadly claimed to employ all equivalent instrumentalities coming within the scope of the appendent claims, and by means of which objects of this invention are attained and new results accomplished, as it is obvious that the particular embodiments herein shown and described are only some of the many that can be employed to obtain these objects and accomplish these results.

I claim:

1. A hand tool for longitudinally slitting the insulating jacket surrounding the electrical conductor in a heavy duty electrical cable, comprising:

a housing member having an interior surface defining a longitudinal channel of given cross sectional shape, said channel extending through said housing member between a rearward and a forward end;

a longitudinal opening in said interior surface wall extending through at least the rearward end thereof;

a housing sub-portion slidably coupled to said housing for longitudinal movement between a forward position wherein a cable may be inserted into said channel at an angle to the longitudinal axis thereof, and a second position wherein a cable within said channel is constrained to telescopic motion substantially parallel to the axis thereof;

an insulation cutting blade coupled to said housing member and projecting into said longitudinal channel, said cutting blade being located within said channel in position to clear a cable inserted into said channel at an angle to the axis thereof, and to penetrate into the insulation of such a cable as the axis of the cable is tilted into a position substantially parallel to the axis of the said longitudinal channel,

whereby longitudinal relative motion of said housing along a cable will move said cutting blade axially through the insulation of the cable at a given depth.

2. The hand tool of claim **1** further including insert means adapted to be substantially telescopically inserted into said longitudinal channel to delimit the cross section thereof; and retainer means for preventing over insertion of said insert means into said channel.

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