March 11, 1969 A. H. POWELL 3,431,645

ELECTRICIAN'S TOOL FOR REMOVING INSULATION FROM WIRES

Filed May 29, 1967

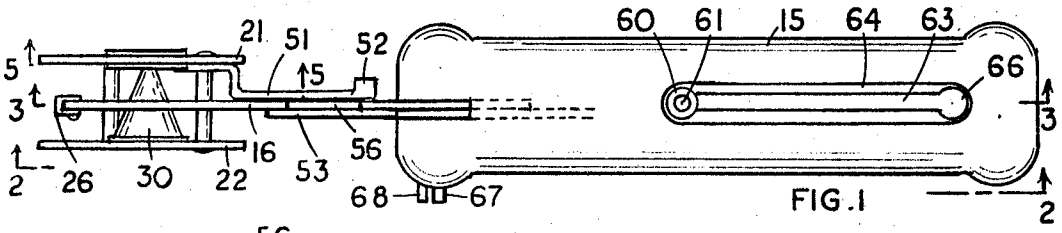

FIG. 1

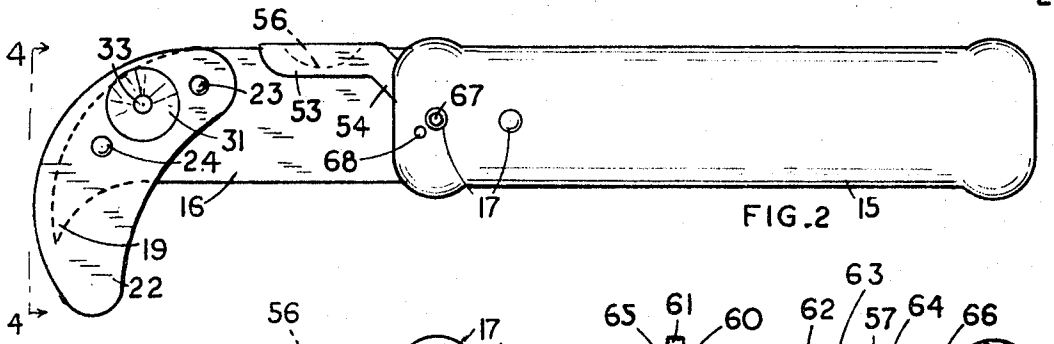

FIG. 2

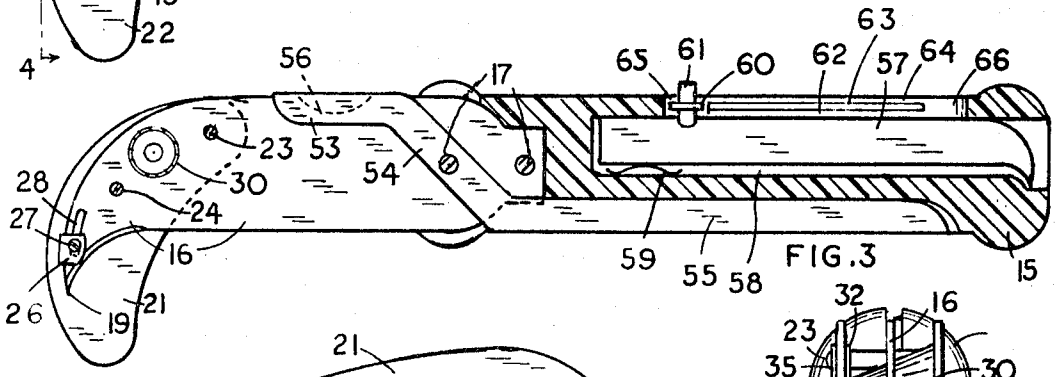

FIG. 3

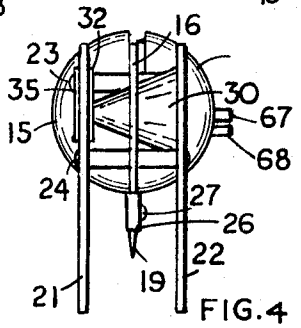

FIG. 4

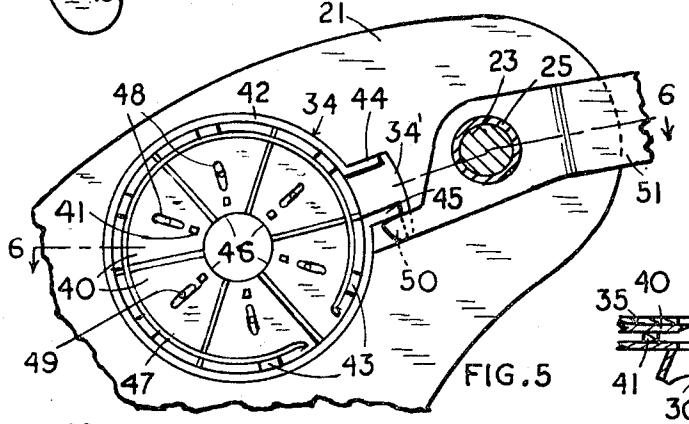

FIG. 5

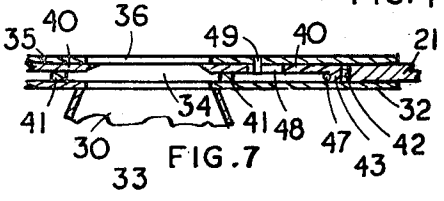

FIG. 7

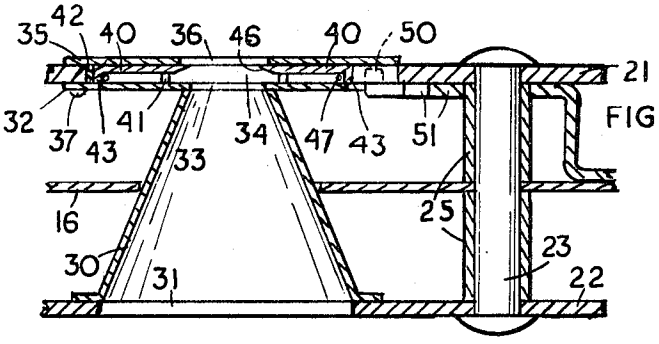

FIG. 6

FIG. 8

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ELECTRICIAN'S TOOL FOR REMOVING INSULATION FROM WIRES

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ABSTRACT OF THE DISCLOSURE

Comprises a handle, a blade rigid with the handle and having a hook shaped slitting tip, two guide plates supported by the blade and spaced from opposite sides of the blade, insulation stripping means attached to one guide plate, a tube to guide wire to the stripping means, and wire cutting and bending means.

My invention relates to a tool for slitting and stripping the insulation on circuit wires and for cutting and bending the wires.

An object of my invention is to provide a tool which can be used by an electrician to perform all of the work on insulated electric circuit wires which is ordinarily required in electric wiring.

Another object is to provide an electrician's tool which will save time and enable the user to do better work.

Another object is to provide a tool which can be used for slitting insulation on and stripping insulation from wires without danger of damaging the wires and can be used for cutting wires and bending loops on wires and for any work ordinarily done with a knife.

Other objects are to provide a tool which is safe and not liable to injure the hands of the user and is particularly well adapted for slitting and stripping the insulation on wires of the type commonly known as "Lomex" and as "S.J." or "Type S" cord.

Other objects will be apparent from the following description.

In the drawings FIGURE 1 is a plan view showing the back edge of a tool embodying my invention.

FIG. 2 is a side elevation taken on broken line 2—2 of FIG. 1.

FIG. 3 is a longitudinal section, with parts in elevation, taken substantially on broken line 3—3 of FIG. 1.

FIG. 4 is an end elevation taken on broken line 4—4 of FIG. 2.

FIG. 5 is an enlarged fragmentary view in elevation, with parts in section, taken substantially on broken line 5—5 of FIG. 1.

FIG. 6 is an enlarged sectional view taken substantially on broken line 6—6 of FIG. 5 and showing a blade and a guard member not shown in FIG. 5.

FIG. 7 is an enlarged, fragmentary sectional detail view showing stripper blade mechanism.

FIG. 8 is an enlarged fragmentary detail view illustrating the overlap of the edge portions of stripper blades.

Like reference numerals refer to like parts throughout the several views.

This tool comprises a handle **15**, preferably of plastic or like material which is strong and durable and an electrical insulator. A splitter blade **16** of thin flat metal fits within a suitable slot in one end portion of the handle **15** and one or more cross pins **17** securely fasten the blade **16** to the handle **15**. The splitter blade **16** terminates at its outer end in a sharp hook shaped blade tip **19** well adapted for use in longitudinally slitting or splitting the insulation on circuit wires.

Two guard and guide plates **21** and **22** are positioned in transversely spaced relation from opposite sides of the blade **16**. Said plates **21** and **22** are of similar shape and are rigidly secured to and supported from the blade **16** by, preferably two, transverse pins **23** and **24** which can be rivets and each of which extends through two spacer sleeves **25** between the blade **16** and the respective plates **21** and **22**.

A notched depth gauge **26** fits over the outer edge portion of the slitter blade **16** and a screw **27** extends through said depth gauge **26** and through a longitudinally extending slot **28** in the blade **16** and adjustably secures the depth gauge **26** to the blade **16**. The sides of the slotted part of the depth gauge **26** are sufficiently resilient so that tightening of the screw **27** will firmly clamp the gauge **26** to the blade **16**. When the part of an insulated wire or cable from which the insulation is to be removed is positioned between the guide plates **21** and **22** and pressed against the sharp tip **19** of the blade **16** and the tool and wire are moved relative to each other in the proper direction the blade tip **19** will enter and slit the insulation.

The means for stripping insulation from wire comprises a tubular guide cone **30** extending between and attached to the guide plates **21** and **22**. A relatively large opening **31** in the plate **22** registers with the larger open end of the guide cone **30**. The smaller end of the guide cone **30** is attached to an inner cover plate **32** which is secured, as by screws **37**, to the guide plate **21**. An opening **33** in inner cover plate **32** registers with the smaller open end of the guide cone **30**. The inner cover plate **32** covers a circular opening **34** in the guide plate **21**. An outer cover plate **35** is secured to the outer side of guide plate **21** over the opening **34** and it has a centrally positioned wire accommodation opening **36** in axial alignment with the guide cone **30**.

A split circular band **42** of spring metal is disposed within the opening **34** in the guide plate **21** and normally expands against the annular wall of said opening **34**. A plurality of stripper plates **40** of generally triangular shape are disposed within the band **42** and rest against the outer cover plate **35**. The stripper plates **40** are provided with lugs or flanges **43** adjacent their outer ends which serve as spacers between the stripper plates **40** and cover plate **32**. At least one other spacer member **41** is provided on each stripper plate **40** between the inner end portion of the stripper plate and the cover plate **32**. The band **42** has two spaced apart outwardly protruding ends **44** and **45** which are received within a notch **34'** that is provided in guide plate **21** at one side of and communicating with the circular opening **34**. The truncated inner end of each stripper plate **40** is shaped to provide on each plate **40** a concave cutting edge **46** which is preferably sharpened to a chisel edge, as best shown in FIG. 7. The inner ends **46** of the assembled stripper plates **40** provide a contractable cutter and stripper of substantially circular shape which can be indented into insulation on the end portion of a piece of wire and will strip the insulation from the wire when the wire is pulled free of the tool. The tube **30** and stripper plates **40** are positioned between the tip of the blade **16** and the end of the handle **15** with their common axis in substantially intersecting relationship to the axis of the handle so that there will be very little tendency for the handle to turn when a pull is exerted on a wire in stripping insulation from it

A split stripper plate expander ring **47** of spring metal is disposed between stripper plates **40** and inner cover plate **32** and exerts an expanding pressure against lugs **47** to hold the stripper plates against the band **42**. Preferably each stripper plate **40** has a radial slot **48** which fits over and is guided on a stud pin **49** that is rigid with the outer end plate **35**. Clearance is provided between the lateral edges of the stripper plates **40** to allow said plates

40 to move radially the required distance. Also preferably adjacent edges of the stripper plates 40 are grooved shiplap fashion and overlapped as illustrated in FIG. 8.

The resiliency of the band 42 normally holds it expanded in the opening 34 and the expander ring 47 normally holds the stripper plates 40 outwardly against the band 42. One outwardly protruding end 44 of band 42 rests against an end wall of the notch 34' and the other outwardly protruding end 45 of said band protrudes into the notch 34' and rests against a transversely protruding end portion 50 of a lever 51. Said transversely protruding portion 50 extends into the notch 34' and normally rests against an end wall of said notch. The lever 51 is fulcrumed on the pin 23 and is offset toward the blade 16 and lies alongside of the blade and terminates in a thumbpiece 52 which is positioned near the end of the handle 15. The lever 51 can be moved by thumb pressure to contract the band 42 and move the stripper plates 40 inwardly in to stripping contact with the insulation on a wire which has been inserted into the guide cone 30 and through the opening formed by the stripper plates 40. When they are contracted on an insulated wire the chisel shaped edges of the stripper plates 40 will indent themselves into the insulation on the wire far enough to strip the insulation from the end portion of the wire when the wire is pulled out of the tool.

For wire cutting purposes the tool is provided with a long flat cutter bar composed of a wire cutting part 53, a diagonal part 54, which is fulcrumed on one of the cross pins 17, and a handle part 55 which, except when it is in use, is housed within a suitable slot in the handle 15 where it is out of the way. The back edge of the splitter blade 16 has in it a notch or recess 56 which is suitably shaped to receive and hold a wire and to cooperate with the part 53 of the cutter bar in cutting the wire. Preferably the cutter bar is normally retained by friction within the handle groove in which it is disposed but can easily be moved to an open position for cutting use.

The tool is provided with a knife blade 57 which is slidably disposed within a groove 58 in the handle 15 and is movable between a concealed position within the handle 15 and an open or extended position in which it protrudes from the end of the handle. A spring 59 attached to the knife blade 57 urges it upwardly as respects the position in which it is shown in FIG. 3. The upper or back edge of the blade 57 carries a rigidly attached disc 60 and a thumb knob 61 of smaller diameter than disc 60 protrudes from said disc. The wall of the handle 10, outwardly from the blade 57, is shaped to provide a wider concealed groove 62 in which the disc 60 can move longtudinally of the handle, a narrower groove 63 in which the thumb knob 61 can move, a wider but shallow exposed groove 64 on the outside of the handle and two circular openings 65 and 66 at the ends of the three grooves 62, 63 and 64 in which the disc 60 can seat to hold the knife blade 57 in either a closed or an open position. Obviously the blade 57 can be quickly and easily moved between an open and a closed position by application of the user's thumb to the knob 61 and said blade can be used for any purpose for which a knife blade is ordinarily used.

Wire bending devices for bending a loop on the end portion of a wire which is to be engaged with a screw are provided. These devices are in the form of two pins 67 and 68 positioned close to each other in the end portion of the handle 15 nearest the blade 16 and prortuding transversely from the side of said handle. The pin 67 is preferably an integral part of one of the pins 17 and is of larger diameter than the pin 68. The end portion of a wire is bent in the form of a loop by laying the wire between the two pins and bending it around the pin 67 to form a loop of larger size or around the pin 68 to form a loop of smaller size.

The foregoing description is believed to make clear the mode of operation of this tool. The slitting blade 16 with the two laterally spaced guide plates 20 and 21 is particularly well adapted for slitting three-wire insulated cord or cable of oval cross section commonly known as "Lomex" but can be used to advantage in slitting other types of insulated wire. The guide plates center and guide the work and are particularly effective in preventing injury of the hands of the user on the blade. The stripping mechanism is sufficiently flexible to make it applicable to all of the different sizes of wire ordinarily used in electrical wiring work.

Obviously changes in this device may be made within the scope of the following claims.

I claim:

1. A tool for use with insulated electric circuit wires comprising a handle; a thin flat blade rigid with and protruding from an end of said handle; two guide plates rigidly supported by said blade substantially parallel to said blade in outwardly spaced relation from the respective sides of said blade; a guide tube carried by and extending transversely of said guide plates with its axis in substantially intersecting relationshp to the axis of said handle; a pluralty of flat substantially triangular insulation stripper plates supported in a common plane by one of said guide plates for radial movement toward and away from the axis of said guide tube, said stripper plates having sharp concave inner edges cooperating in forming a contractable circular opening capable of receiving an insulated wire; and means operable in imparting radial movement to said stripper plates, said guide tube being adapted to guide insulated wire to said stripper plates.

2. The apparatus as claimed in claim 1 in which the wire guiding tube is of conical shape and converges toward the stripper plates; and in which resilient means is connected with the striper plates yieldingly urging all of said stripper plates outwardly.

3. The apparatus as claimed in claim 1 in which the guide plate that carries the stripper plates is provided with a circular stripper plate receiving opening in which the strpper plates are disposed, the outer ends of said stripper plates being convexly curved; means yieldingly urging said stripper plates outwardly, a contractable band disposed within said stripper plate receiving opening and extending around said stripper plates; and a lever operable in contracting said band and radially moving said stripper plates inwardly into stripping engagement with insulation on an insulated wire when the wire extends through the opening formed by the stripper plates.

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MILTON S. MEHR, *Primary Examiner.*

U.S. Cl. X.R.

81—9.51; 7—15; 30—293