

APPENDIX 4
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April 9, 1957

S. N. BUCHANAN ET AL

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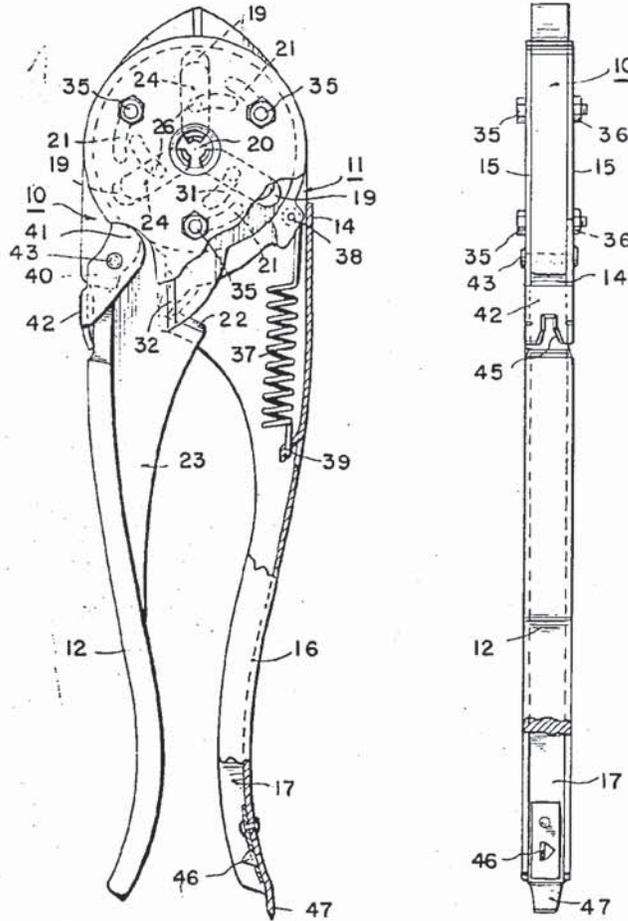
WIRE CRIMPING TOOL WITH CAM-SLOT ACTUATING MEANS

Filed June 8, 1954

2 Sheets-Sheet 1

FIG. 1

FIG. 2



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LoggerHead Tools, LLC
v. Sears Holdings Corp.
and Apex Tool Group
Case No. 12-cv-09033

DTX 75

LH-00002331

exhibitstick.com

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2 Sheets-Sheet 2

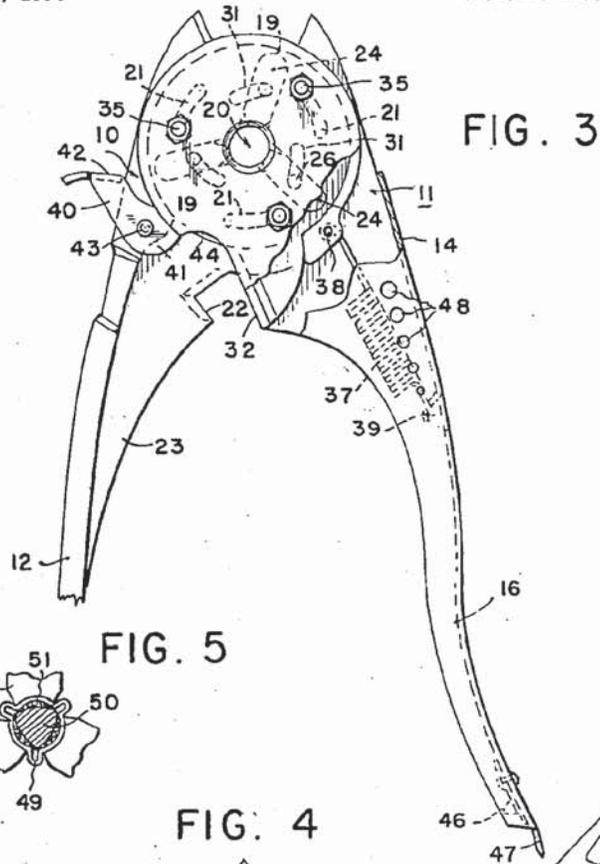


FIG. 3

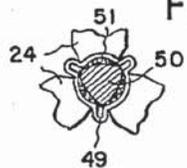


FIG. 5

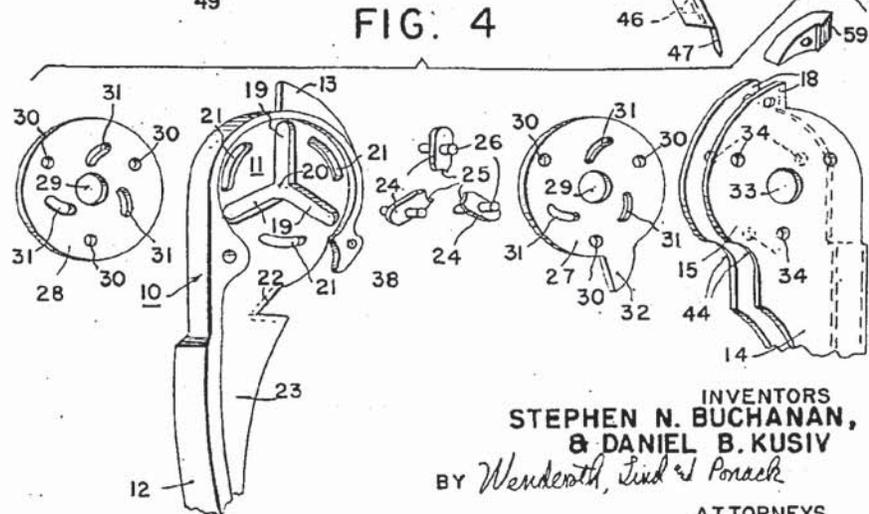


FIG. 4

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WIRE CRIMPING TOOL WITH CAM-SLOT ACTUATING MEANS

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Application June 8, 1954, Serial No. 435,334

2 Claims. (Cl. 81--15)

The present invention relates to a multifunctional tool, more especially adapted for use in the insulated electrical wire art.

Workers dealing with installations involving insulated electrical wire find it necessary to carry out a wide variety of operations with and on the latter, such for example as cutting, splicing, insulation stripping, holding, crimping, etc. It is manifestly inconvenient as well as uneconomical to have to provide and manipulate a separate tool for each of these operations. It is therefore a desideratum in the art to provide a multifunctional tool, i. e. a single tool which is so constructed that it is adapted to carry out the aforesaid diverse operations.

It is a primary object of the present invention to embody a novel relationship of parts in a tool of the character described, whereby the aforesaid desideratum may be realized. In other words, it is an object of the invention to embody a multifunctional tool adapted to carry out the various different aforesaid functions or operations without the necessity of a corresponding multiplicity of tools.

It is a further object of this invention to provide an improved crimper capable of providing effective pressure over considerable area, thus preventing reduction in area or cutting of strands of wire crimped.

The foregoing objects, and others which will hereinafter be apparent to those skilled in the art, is realized by the new tool described in the following detailed specification of a presently preferred embodiment thereof, illustrated on the accompanying sheets of drawing, and precisely defined in the appended claims.

On the said sheets of drawing:

Fig. 1 is an end view of the multifunctional tool comprising this invention in the closed position;

Fig. 2 is a side view of the tool;

Fig. 3 is an end view of the multifunctional tool in the open position;

Fig. 4 is an exploded view of the parts of the multifunctional tool; and

Fig. 5 is a cross section of a wire crimped by the crimping means of the multifunctional tool.

Referring now to the drawings in which like reference numerals refer to like parts, inner handle 10 has a central cam plate 11, a grip 12 depending therefrom and a jaw member 13 protruding opposite the grip. Outer handle member 14 is comprised of a pair of parallel plates 15 and a second grip member 16 depending therefrom, and has a channel-like recess 17 in its extremity. Protruding from the plates 15 opposite the grip 16 is a pair of jaw retaining ears 18 adapted to hold jaw member 13 between them.

Central cam plate 11 has three radial slots 19 extending outwardly from a central aperture 20 and spaced 120° from each other. Adjacent the outer periphery of the central cam plate are three curved slots 21.

A V-shaped, beveled cutting edge 22 is disposed in the web-like portion 23 which extends between grip 12 and central cam 11.

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Three plungers 24 are provided, each of them having a crimping portion 25 which is a concave depression at one end of the plunger and a cam engaging pin 26 extending on either side of the faces of the plungers. These plungers 24 are of a size to slidably engage with the slots 19 of the central cam plate.

Two auxiliary cam plates, 27 and 28, have central apertures 29 and three peripheral apertures 30 spaced at 120° from each other at a radius from the central apertures equal to the radius at which the curved slots 21 in the central cam plate 11 are spaced from the aperture 29. In addition, each auxiliary cam plate has three curved slots 31 spaced between the three apertures which curve eccentrically outwardly. These slots 31 are of a size to slidably engage the pins 26 on crimping plungers 24. The outer ends of slots 31 are disposed over the radial slots 19 in central cam plate 11 when the tool is in the open position. Auxiliary cam plate 27 carries a straight, beveled blade 32 on a projection from its periphery.

A central aperture 33 is provided in the parallel auxiliary cam plate carriers 15 of the outer handle member 14. Three apertures 34 are located at 120° from each other and at a radius equal to the radius at which the apertures 30 in auxiliary cam plates 27 and 28 are located from the central aperture 29 in those cam plates.

The tool is assembled by placing the crimping plungers 24 in the radial slots 19 in the central cam plate 11 with crimping portions 25 toward central aperture 20, and placing the auxiliary cam plates 27 and 28 on either side of the central cam plate 11 in such a position that the cam engaging pins 26 are positioned in the slots 31; blade 32 is positioned opposite V-shaped blade 22 in the web-like portion 23 on inner handle 10 and the apertures 30 are positioned over the curved slots 21. The parallel plates 15 of outer handle member are then placed over the auxiliary cam plates 27 and 28 in such a position that the apertures 34 are lined up with apertures 30 in the auxiliary cam plates and with curved slots 21 in the central cam plate. Bolts 35 are then passed through apertures 34 in the parallel plates, apertures 30 in the auxiliary cam plates and the curved slots 21 in the central cam plate, and secured in place with nuts 36. The nuts 36 are tightened and hold the parts in engagement but allow relative movement between them.

A spring 37 is provided in order to hold the tool in the opened position. It is attached to a projection 38 on the central cam plate 11 and to a hook 39 in the grip 16 of the outer handle member 14. The spring is so arranged that in the open position of the tool it is unstressed, and when the grips are closed together the spring is placed under tension. Thus release of the force closing the grips permits the spring 37 to move the grip 16 relative to the inner handle member 10 to the open position, as shown in Fig. 3.

The operation of the tool is as follows: When grip portions 12 and 16 are moved toward each other, as by the action of a hand squeezing them together, bolts 35 slide in slots 21 of central cam plate 11, and carry auxiliary cam plates 27 and 28 with parallel plates 15 and thus move them relative to central cam plate 11. This causes the outwardly eccentric curved slots 31 carrying cam engaging pins 26 of plungers 24 to move across radial slots 19 of central cam plate 11. The action of the eccentric slots on the pins slides plungers 24 toward the central aperture 20 in the central cam plate. At the same time, straight beveled blade 32 is moved across V-shaped beveled blade 22, and jaw member 13 is moved closer to jaw member 14. When the closed position is reached, the bolts 35 have moved to the ends of the curved slots 21 in central cam plate 11, and the cam engaging pins 26

have moved to the end of curved eccentric slots 31 in auxiliary cam plates 27 and 28. Plungers 24 have moved to the central part of the radial slots 19 moving the crimping portions 25 into the central aperture 20 of central cam plate 11. Cutting blade 32 carried by auxiliary cam plate 27 has moved across beveled V-shaped blade 22 and jaws 59 and 13 have moved into engagement.

Since both of blades 22 and 32 are beveled, their cutting edges can move across the end of a piece of wire on which has been crimped a sleeve or the like cutting the wire flush with the end of the sleeve.

The concave crimping portions 25 on plungers 24 act to crimp a crimping sleeve 49 onto a wire 50 having insulation 51, as shown in Fig. 5. This configuration of the crimping portions enables crimping pressure to be applied on substantially all of the circumference of the wire. Thus the reduction of area, or cutting of strands if the wire is the strand type, common with the use of other types of crimpers, is eliminated.

A locking mechanism is provided to lock the tool in the closed position. A locking pawl 40 having two parallel locking cams 41 connected by connecting member 42 is secured to the inner handle member 10 by pin 43. Cam notches 44 are placed in the parallel plates 15 of the outer handle member 14 to receive locking cams 41 in the manner shown in Fig. 1, to lock the parallel plates, and thus the outer handle member, from movement relative to the inner handle member.

For the convenience of those utilizing this tool, an insulation stripping blade 45 is provided in the connecting member 42 of the locking pawl. Likewise an insulation slitting point 46 is positioned in the channel-like recess 17 of the grip on the outer handle member 14. The channel-like recess guides the wire to the slitting blade. In addition a screwdriver blade 47 is attached to the end of the grip 16. Holes 48 may also be provided in the outer handle member to measure the size of wires or screws.

Having thus disclosed the invention, what is claimed is:

1. In a wireworking tool having a plurality of centrally converging crimping plungers, means to converge said crimping plungers comprising a central cam plate having a central aperture therein and a plurality of radial slots,

a first grip depending from said central cam plate, said crimping plungers being slidably mounted in said radial slots and having crimping portions in one end thereof toward said central aperture and having cam engaging pins extending from the sides of said plungers, a plurality of auxiliary cam plates having elongated eccentric apertures therein, said auxiliary cam plates rotatably mounted on said central cam plate with said cam engaging pins engaged in said apertures to slide said crimping plungers in a converging or diverging direction depending on the rotation of said auxiliary cam plates relative to said central cam plate, a plurality of auxiliary cam plate carriers fixedly attached to said auxiliary cam plates and having central apertures therein, and a second grip depending from said carriers and spaced from said first grip and adapted to be moved toward said first grip.

2. In a wire working tool having a plurality of centrally converging crimping plungers, means as claimed in claim 1, said central cam plate having a plurality of curved slots with a radius of curvature having a center at the center of said central cam plate, said auxiliary cam plates and said auxiliary cam plate carriers each having a plurality of apertures at the same radius as that of said curved slots in said central cam plate, and a plurality of fastening pins extending through said apertures and slots fastening said central cam plate, said auxiliary cam plates and said auxiliary cam plate carriers, whereby said auxiliary cam plates are rotatably mounted on said central cam plate and said auxiliary cam plate carriers are fixedly attached to said auxiliary cam plates.

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