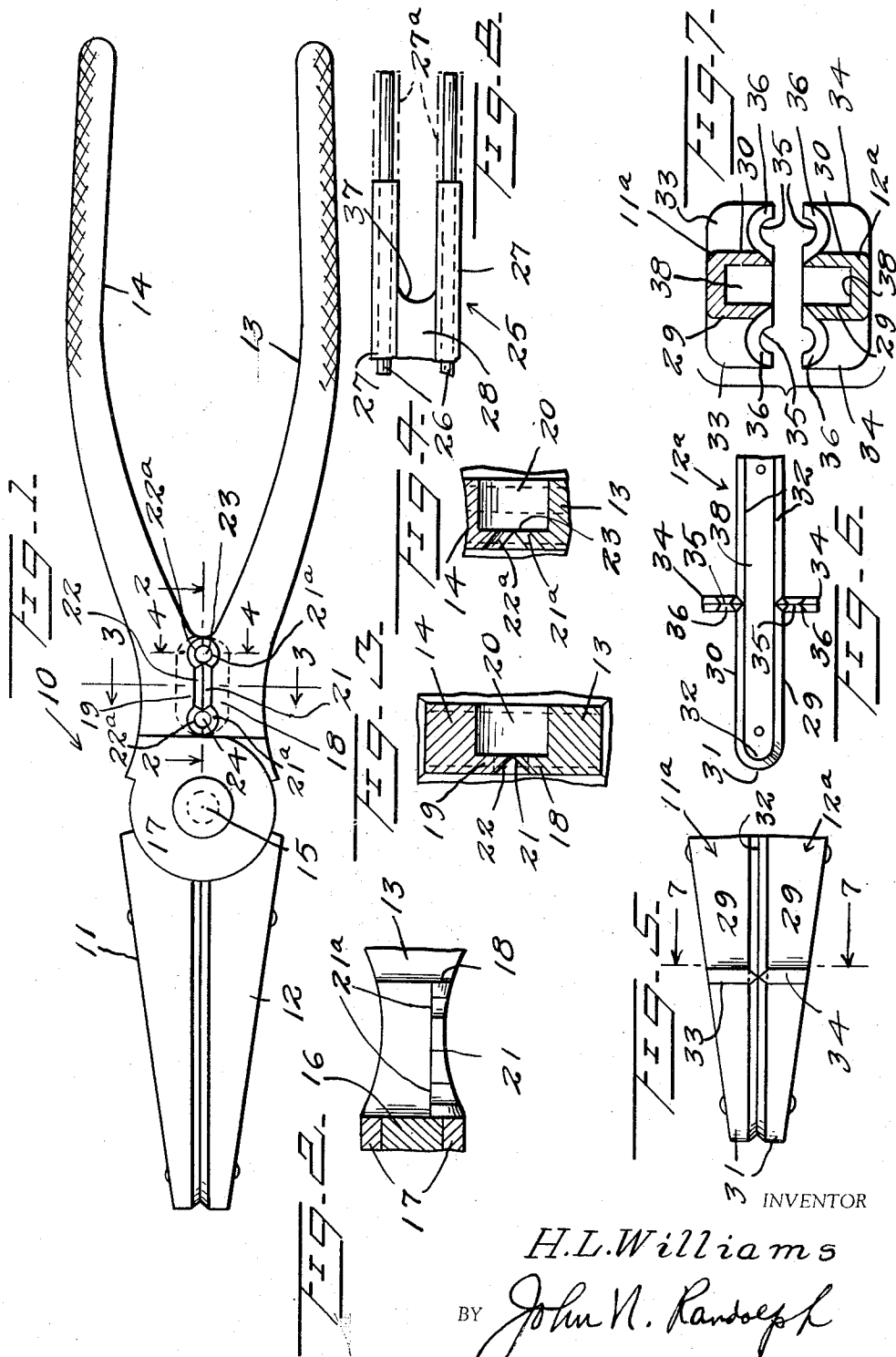


Aug. 14, 1956

H. L. WILLIAMS
INSULATION CUTTING TOOL

2,758,490

Filed June 30, 1954



1

2,758,490

INSULATION CUTTING TOOL

Holly L. Williams, Warrenville, S. C.

Application June 30, 1954, Serial No. 440,343

4 Claims. (Cl. 81—9.5)

This invention relates to a tool for cutting electrical insulation from around electrical lead-in wires and has for its primary object to provide a tool by means of which electrical insulation can be cut and stripped from around an electrical lead-in wire without risk of cutting the lead-in wire or any of the strands thereof.

More particularly, it is an aim of the present invention to provide a tool especially adapted for simultaneously cutting and stripping electrical insulation from a pair of lead-in wires which are joined in substantially parallel relationship by the electrical insulation, including a web portion connecting the insulation portions immediately surrounding the conductor wires.

A further object of the invention is to provide a tool wherein the connecting web of a conventional twin lead-in wire of the type commonly employed in connection with television and FM radio receivers may be simultaneously cut back from an end of such a wire at the same time that the insulating portions are cut immediately around the conductor wires.

Various other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawing, illustrating presently preferred embodiments thereof, and wherein:

Figure 1 is a side elevational view of one form of the cutting tool;

Figure 2 is an enlarged fragmentary longitudinal sectional view taken substantially along a plane as indicated by the line 2—2 of Figure 1;

Figures 3 and 4 are enlarged cross sectional views taken substantially along planes as indicated by the lines 3—3 and 4—4, respectively, of Figure 1;

Figure 5 is a fragmentary side elevational view of the tool jaws of another form of the cutting tool;

Figure 6 is a plan view looking toward the inner side of one of the jaws as seen in Figure 5;

Figure 7 is an enlarged cross sectional view taken substantially along a plane as indicated by the line 7—7 of Figure 5 and showing the tool jaws in a partially open position, and

Figure 8 is a fragmentary plan view of an end of a conventional twin lead-in wire after having been cut and stripped by the tool jaws of Figures 5 to 7.

Referring more specifically to the drawing and first with reference to the form of the invention as illustrated in Figures 1 to 4, the insulation cutting tool in its entirety is designated generally 10 and comprises a tool of the pliers type substantially corresponding to the tool as illustrated in my copending U. S. patent application Serial No. 431,770, filed May 24, 1954, now Patent No. 2,742,696. The tool 10 includes a pair of jaws 11 and 12 and a pair of handles 13 and 14 which are connected to the jaws 11 and 12, respectively. The connections between the handles and jaws are formed by shank portions which con-

2

stitute integral parts of the connected jaws and handles and which are disposed in crossed relationship and pivotally connected by a suitable fastening 15, all as more fully illustrated and described in my aforementioned copending application. In the form of the invention as illustrated in Figures 1 to 4, the jaws 11 and 12 could be omitted, as will hereinafter become apparent, so long as the handles 13 and 14 are swingably connected to one another by the pivot 15 for swinging movement between open and closed positions. In Figures 1, 3 and 4 said handles 13 and 14 are illustrated in fully closed positions.

The handles 13 and 14 adjacent their turnably inter-fitting shanks 16 and 17, respectively, through which the pivot 15 extends, are provided with corresponding side walls 18 and 19, respectively. Said walls 18 and 19 have straight edges which are disposed in abutting engagement, as seen in Figures 1, 3 and 4, when the handles 13 and 14 are in closed positions. The walls 18 and 19 protrude inwardly with respect to one another beyond the inner surfaces of the adjacent portions of the remainders of the handles 13 and 14, so that the handles in combination with said walls define a recess 20 which opens laterally outward of the tool 10 on the side thereof opposite to the walls 18 and 19. The walls 18 and 19 are beveled on their outer sides so that the aforementioned straight edges thereof form cutting edges 21 and 22, respectively. Additionally, each wall 18 and 19 is provided with two semicircular notches which are longitudinally spaced from one another and which open through said cutting edges 21 and 22. The notches of the walls 18 and 19 are disposed in complementary portions of said walls to form two longitudinally spaced openings 23 and 24 when the handles 13 and 14 are closed. The walls 18 and 19 are beveled around the notches thereof forming the openings 23 and 24 so that the edges of the openings form portions 21a and 22a of the cutting edges 21 and 22.

Figure 8 illustrates a portion of a conventional twin lead-in of the type heretofore referred to, designated generally 25. The twin lead-in 25 includes two stranded wire conductors 26 each of which is enclosed in a tube or sleeve formed of an electrical insulating material. Said sleeves 27 are connected by a web 28 which is formed integral therewith. The electrical insulation 27, 28 may be formed of polystyrene, rubber, plastic or similar flexible electrical insulating material. The insulation 27, 28 normally extends from end-to-end of the twin lead-in 25 rather than being cut off as shown in Figure 8.

The openings 23 and 24 are of diameters corresponding with or slightly greater than the diameters of the stranded conductor wires 26 and the spacing between the centers of the openings 23 and 24 is equal to the spacing between the centers of the conductors 26. Thus, the handles 13 and 14 may be opened so that a portion of the twin lead-in 25 may be disposed therebetween and with the conductor wires 26 in registration with the notches forming the openings 23 and 24. A gripping action is then applied to the handles 13 and 14 to return them to their closed positions of Figure 1. As the handles are thus moved to a closed position, the cutting edges 21 and 22 will cut the web 28 transversely between the conductor wires 26 and in combination with the cutting edges 21a and 22a will cut the insulating sleeves 27 completely around the conductor wires 26, without damaging the conductor wires. Thus, the conductor wires will then be located within the openings 23 and 24. The twin lead-in 25 may then be grasped with one hand and the other hand holding the tool is then moved away from the hand holding the twin lead-in for stripping the

insulation 27, 28 off of an end of the twin lead-in to leave corresponding ends of the conductor wires 26 exposed for connection to terminal posts or the like. It will also be obvious that the openings 23 and 24 may be used separately with the cutting edges disposed immediately around and adjacent thereto for cutting insulation around a single wire and for stripping the insulation from the wire. Obviously, in each operation the cut will normally be made adjacent an end of the twin lead-in or wire and the tool 10 will be moved toward said lead-in or wire end for stripping the conductor wires 26 back from said adjacent end.

It will thus be apparent that the tool 10, as illustrated in Figures 1 to 4, could be constructed without the jaws 11 and 12 and the openings and cutting edges associated with the walls 18 and 19 would still function, as previously described.

Figures 5, 6 and 7 illustrate a modification of the tool as shown in Figures 1 and 4. The modification of Figures 5 to 7 relates solely to the construction of the jaws 11a and 12a and the remainder of the tool has therefore not been illustrated. The jaws 11a and 12a are channel shape in cross section and have rounded outer ends. The side walls 29 and 30 and the outer end walls 31 of the jaws 11a and 12a are beveled on their outer sides to combine with the recessed interiors 38 of the jaws to provide continuous cutting edges 32 defining the inner faces of the jaws 11a and 12a and which are disposed to move into abutting engagement when the jaws are closed.

The jaws 11a and 12a differ from the jaws of my copending application and from the jaws 11 and 12 in that said jaws are provided with pairs of flanges which extend outwardly from the side walls 29 and 30 thereof. The flanges of the jaw 11a are designated generally 33 and the flanges of the jaw 12a are designated generally 34. The flanges 33 and 34 are disposed in transverse alignment and the flanges 33 and 34 of the complementary walls 29 and 30 of the two jaws are disposed in the same plane when the jaws are in closed positions, as seen in Figure 5. The inner edges of the flanges 33 and 34 are disposed coplanar with the cutting edges 32 of the jaws 11a and 12a, respectively. Said inner edges of the flanges are provided with semicircular notches 35 which are disposed in alignment so that when the jaws are closed, the notches of the complementary flanges 33 and 34 form openings corresponding to the openings 23 and 24. Likewise, the flanges 33 and 34 are beveled on opposite sides thereof around their opening forming notches, as seen at 36, so that the individual notches 35 constitute cutting edges.

The tool equipped with the jaws 11a and 12a may be constructed without the walls 18 and 19 as shown in Figures 1 to 4 but is provided with handles, such as the handles 13 and 14 by means of which the jaws 11a and 12a are opened and closed.

The jaws 11a and 12a are positioned on opposite sides of the web 28 of the twin lead-in 25 and with said jaws extending inwardly from the right hand end of the twin lead-in 25, as seen in Figure 8. The jaws 11a and 12a are of a width between the parallel portions of their cutting edges 32 such as to cut out the twin lead web 28 between the sleeves 27. The openings formed by the notches 35 are of diameters corresponding to or slightly greater than the diameters of the stranded conductor wires 26 and have their centers spaced apart a distance corresponding to the spacing between the centers of the conductor wires 26. Accordingly, as the jaws are closed, the cutting edges 32 will cut out the web 28 longitudinally from an end of said twin lead-in 25, for example as shown at 37, at the right-hand end of the lead-in 25 as seen in Figure 8. At the same time that this cut 37 is formed in the web 28 by the cutting edges 32, the opposed notches 35 will cut transversely through the insulating sleeves 27 around the conductor wires 26 with-

out damaging said conductor wires but so that the sleeve portions 27 will be transversely severed. With the jaws 11a and 12a held closed, the tool is moved so that said jaws are displaced outward from the end of the twin lead-in in which the cut has been made and in a direction away from said end, so that the severed sleeve portions 27a, shown in dotted lines in Figure 8, will be stripped longitudinally off of the right-hand ends of the conductors 26 for leaving said conductor ends exposed to be secured to contact posts or the like.

Obviously, the flanges 33 and 34 could be located nearer to the left-hand free ends of the jaws 11a and 12a as seen in Figures 5 and 6, so that the conductor wires 26 would be stripped a greater distance inwardly from their right-hand ends, and in most instances said flanges 33 and 34 will be positioned near the rounded free ends 31 of the jaws.

Various modifications and changes in the embodiments of the invention as herein disclosed are contemplated and may obviously be resorted to, without departing from the spirit or scope of the invention as hereinafter defined by the appended claims.

I claim as my invention:

1. A pliers type tool of the character described comprising a pair of swingably connected tool elements having coacting cutting edges movable toward and away from one another and disposed in abutting engagement in a closed position of said tool elements, said cutting edges having corresponding spaced semicircular notches cooperating to form spaced openings in the cutting edges when said tool parts are in a closed position, said notches forming sharpened cutting edges adapted to cut around sleeves of electrical insulating material surrounding spaced conductor wires of a twin lead-in when the tool parts are moved to a closed position, said openings being spaced apart a proper distance and being of a proper diameter to accommodate the conductor wires therein, and portions of said cutting edges disposed between said notches being adapted to sever a web of insulating material extending between and connecting the insulating sleeves, said tool being movable with said cutting edges in abutting engagement for stripping the electrical insulating material from the conductor wires, said tool elements including a pair of jaws, said cutting edges including parts defining inner faces of the jaws and each of which includes transversely spaced substantially parallel side portions and an outer end portion connecting corresponding ends of said side portions, said jaws having aligned transversely projecting flanges extending outwardly from opposite sides thereof and constituting portions of the tool elements, said cutting edges also including parts formed by adjacent edges of the flanges and which have inner ends intersecting the cutting edge parts of the jaws, and said notches being formed in said flanges.

2. A tool as in claim 1, said flanges being spaced from the ends of said jaws and from the ends of the parallel cutting edge portions of the jaws.

3. In a tool of the character described, a pair of swingably connected jaws having jaw faces constituting cutting edges, said cutting edges including transversely spaced substantially parallel portions extending longitudinally of the jaws and outer end portions connecting outer ends of said parallel portions, the cutting edges of said jaws being disposed in abutting engagement when the jaws are in a closed position, flanges extending outwardly from opposite sides of the two jaws, said flanges being disposed in a common plane transversely of the jaws, when the jaws are in a closed position, and having sharpened inner cutting edges disposed coplanar with the aforementioned cutting edges of the jaws individual thereto, the inner ends of the cutting edges of the flanges intersecting parts of the longitudinal portions of the cutting edges of the jaws, and said flanges having corresponding semicircular notches formed in the cutting edges thereof and con-

stituting arcuate cutting edge portions forming transversely spaced openings when the jaws are closed.

4. In a tool as in claim 3, said flanges being spaced from the ends of the parallel cutting edge portions of the jaws.

5

References Cited in the file of this patent

UNITED STATES PATENTS

177,875 Naylor ----- May 23, 1876 10

1,107,210

1,354,365

1,735,821

1,978,124

2,054,973

2,642,657

2,643,561

Adams ----- Aug. 11, 1914

Aaron ----- Sept. 28, 1920

Wentzloff ----- Nov. 12, 1929

Batchler ----- Oct. 23, 1934

Ferguson ----- Sept. 22, 1936

Arnt et al. ----- June 23, 1953

Ackley ----- June 30, 1953