

June 17, 1941.

J. DOTTL

2,246,350

CUTTING TOOL

Filed April 13, 1940

2 Sheets-Sheet 1

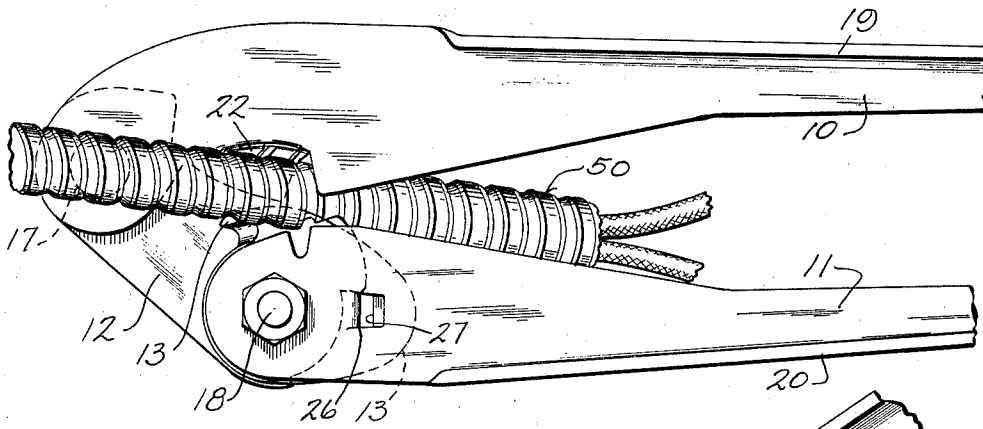


Fig. 1.

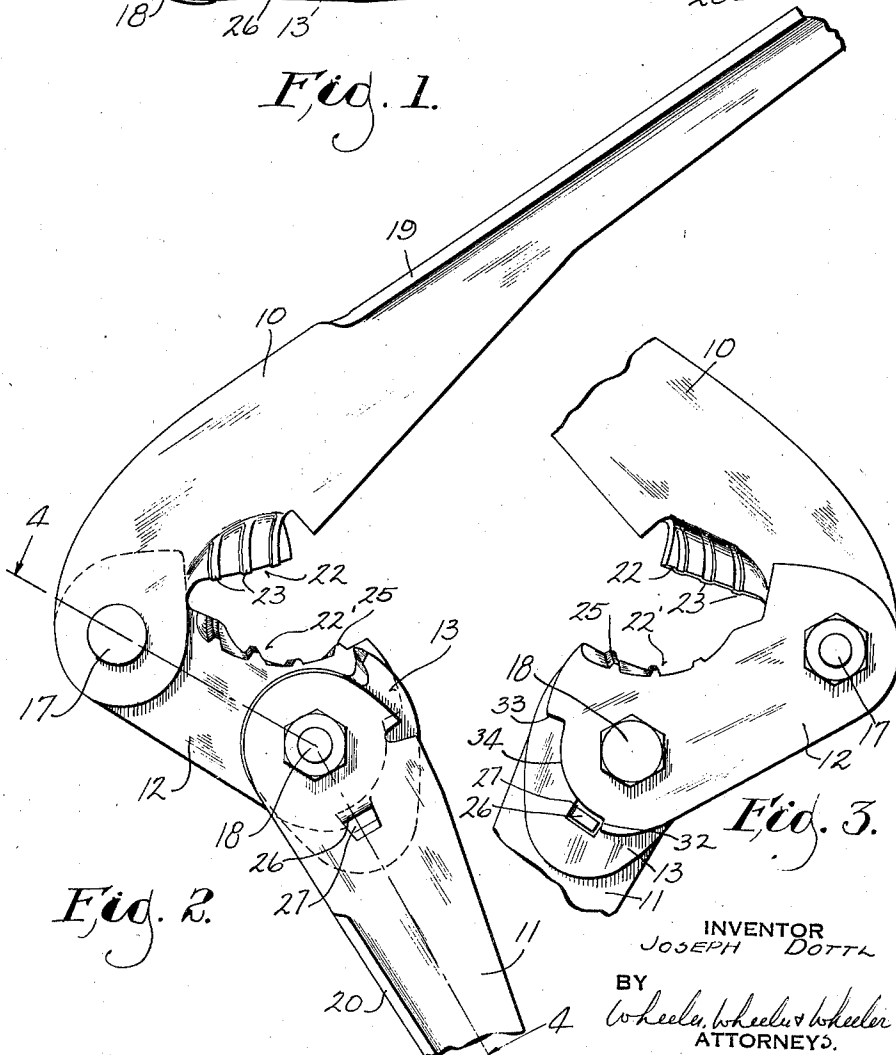


Fig. 2.

Fig. 3.

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2 Sheets-Sheet 2

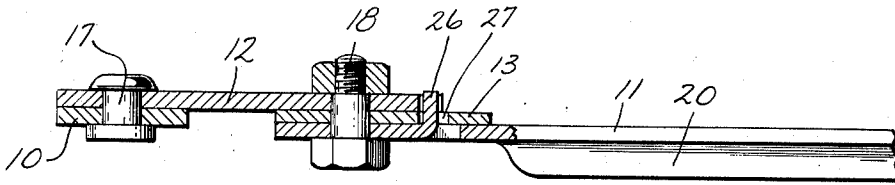


Fig. 4.



Fig. 5.

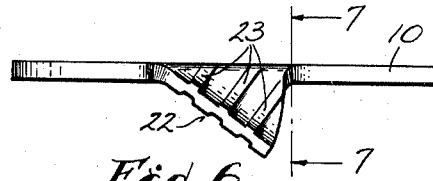


Fig. 6.

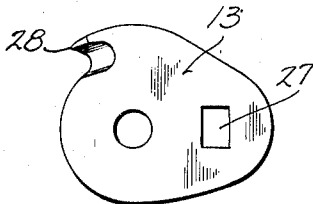


Fig. 8.

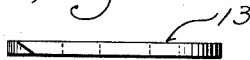


Fig. 9.

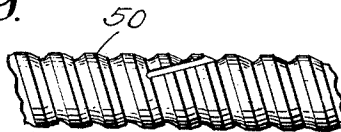


Fig. 10.

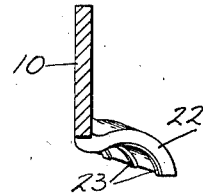


Fig. 7.

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2,246,350

CUTTING TOOL

Joseph Dottl, Madison, Wis.

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15 Claims. (Cl. 30—91)

This invention pertains to cutting tools. More specifically, it pertains to improvements in a tool of the type which is particularly adapted for use by electricians in cutting the armor or helical casing from so-called BX cable.

The invention has for its objects the provision of:

1. An improved compound lever type cutting tool or pliers which is easy to operate and positive in its cutting action;

2. A hand operable armored cable cutting tool including a blade which is easily removable for sharpening or adjustment;

3. An armored cable cutter wherein a manually operable knife-like element operates at an angle to the cable being cut in a manner whereby to cut at least one convolution of the cable without harming the insulated conduit which is carried within the cable.

4. A tool which may be used by an unskilled workman without danger of cutting too deeply into the cable and causing injury to the electric conduit carried therein.

Other objects of my invention will become apparent to those skilled in the art upon examination of the following specification, drawings, and appended claims.

In the drawings:

Figure 1 is a side elevation of a tool having my invention incorporated therein and showing an armored cable which has been cut thereby.

Figure 2 is a side elevation of the tool shown in Figure 1, with the jaws and handle levers shown in open position.

Figure 3 is a side elevation looking at the tool as shown in Figure 2 from the opposite side.

Figure 4 is a view taken along line 4—4 of Figure 2.

Figure 5 is a plan or edge view of the connecting link shown in Figures 1, 2 and 3, taken from the serrated or jaw sides.

Figure 6 is a plan or edge view of the jaw end of the upper lever member as shown in Figures 1 and 2.

Figure 7 is a section taken along line 7—7 of Figure 6.

Figure 8 is a plan view of the cutting knife.

Figure 9 is an edge view of the cutter shown in Figure 8.

Figure 10 is a bottom plan view of a piece of armored cable after it has been cut by the tool.

Like parts are identified by the same reference characters throughout the several views.

As disclosed in Figures 1 and 2, the invention

comprises a compound cutting tool of the pliers type including handle levers 10 and 11, link lever 12, and a cutting blade 13. Handle levers 10 and 11 are oscillatably mounted or pivoted to end portions of link lever 12 by means of pintle bolts 17 and 18, respectively, which project through suitable apertures provided in the members. Substantial portions of handle members 10 and 11 are preferably provided with flanged portions 19 and 20, respectively, to increase strength in proportion to weight, and to also increase hand gripping area.

Lever 10 is provided with an integral jaw portion 22 which is in the form of an arcuate wing offset from the general plane of lever 10. Jaw 22 is provided with internal ribs 23 as shown in Figures 6 and 7. Link lever 12 is provided with a complementary jaw portion 22' which coacts with jaw 22 to engage the armored cable as disclosed in Figure 1. The jaw portion 22' of lever 12 is provided with teeth or ribs 25 which correspond in size, pitch and spacing with ribs 23 of jaw 22, but lever 12 is not provided with an offset portion. Jaws 22 and 22' are so shaped that when they co-actively engage the helical cable 50, the cable will assume an angular disposition to the general plane of the tool in a position above the cutting blade 13, and directly over pintle bolt 18. The cable passes through levers 10 and 12 at an angle of approximately 30 degrees to the free end of the lever 10 in the embodiment of my invention which is shown in the drawings, but I do not wish to narrowly limit the angular disposition of the clamping jaws in respect to the general plane of the tool. Ribs 23 and 25 are adapted to be disposed in wedging relation between the outer helical convolutions of the cable armor whereby to positively hold the cable and prevent its rotation during the cutting operation.

As above mentioned, lever 11 and link lever 12 are mounted on pintle bolt 18 for oscillatory or fulcrum movement therebetween. The blade or tooth portion 13 is also mounted on bolt 11, being interposed between the members 11 and 12. The cutting blade 13 is constrained to move with handle 11 by means of a tongue 26 which is struck up from the handle as viewed in Figure 3 to project through an aperture 27 provided in the cutting blade 13.

Blade 13 is generally oval in plan view as shown in Figure 8, and is provided with a tooth 28 projecting eccentrically from its margin near one end of its major axis. Tooth 28 is sharpened, as shown in Figure 9. Blade 12 and the

pivoted end portion of its associated handle or operating lever 11 are preferably of similar shape. Blade 13 is preferably of tool steel, while the levers may be of a lower priced material so long as it is strong and hard. The blade is preferably of somewhat thinner material than the levers. While a separate blade is preferable, as disclosed herein, the invention is not limited to its use, it being apparent that blade 13 and operating lever 11 may be an integral piece of tool steel, if desired.

Oscillatory movement of lever 11 in respect to link lever 12 is limited to a restricted arc by provision of an annular channel in the adjacent end portion of link 12. This channel is best shown in Figure 3, and is defined by shoulders 32 and 33 and intermediate margin 34. Tongue 26, shown in Figure 4, extends upwardly through aperture 27 and adjacent the channel margin 34. Oscillatory movement of lever 11 is arrested upon contact of tongue 26 with either shoulder 32 or 33 at the ends of the annular channel.

Operation of the device is as follows:

When the handle levers 10 and 11 are swung wide apart, the link lever 12 will be carried by handle lever 11 toward its open position to freely receive the armored cable. When the handle lever 11 is moved toward handle lever 10, the initial movement will swing link lever 12 toward the handle lever 10 to clamp jaws 22 and 22' upon the cable. The continued movement of lever 11 toward lever 10 will oscillate cutting knife 13 across the surface of the armor of cable 50, as indicated in Figure 1, tooth 28 of blade 13 thereby engaging and slitting at least one helical strip of cable 50.

The tool, as illustrated in the drawings, actually cuts through at least two convolutions of the cable as shown in Figure 8, but it is immaterial whether one or more convolutions are cut so long as one strip is completely cut. Because the blade tooth moves in a plane which is intersected at an acute angle by the armored cable, which is firmly held by the jaws in that angular relation, the tool will always cut an offset portion of the armor in respect to the adjacent diametric portion which is engaged. Further, cutter tooth 28 can move only through a path which is fixed in respect to the clamping jaw 22', and hence there exists a correlation between the cutter tooth and the cable armor which effectively prevents the tooth from penetrating the cable beyond a depth necessary for severance of the armor. The tool can therefore be used by unskilled persons without danger of injury to the enclosed insulation and wires which form a part of BX cable.

I claim:

1. A tool for severing articulated helical cable armor strips comprising compound action cutting pliers including a pair of members pivoted to the respective end portions of an intermediate lever, one of said members and said lever provided with complementary jaws adapted to clampingly engage the cable in oblique angular relation thereto, the other of said members having a cutting tooth in a position for cutting a slit in at least one turn of the helical strip.

2. In a BX cable cutter, in combination, a pair of manually operable levers having end portions pivotally connected to the respective end portions of an intermediate lever, one of said manually operable levers and said intermediate lever being provided with complementary jaws adapted

to clampingly engage a BX cable in oblique angular relation to the general plane through which the levers operate during an initial clamping action, the other manually operable lever being provided with an offset tooth positioned to swing through an arc extending obliquely through at least one turn of said armor strip during continued clamping action of the levers.

3. A cutter for helically wound armored cable comprising a compound action tool having a pair of handle levers pivoted to an intermediate link, means associated with one of said handle levers and link to grip the cable therebetween in oblique angular relation to the general plane of the levers, and cutter means operable by a further movement of the levers in a path oblique to the longitudinal axis of the cable and transversely of the helical strip comprising such armor through said armor, whereby to cut at least one convolution of the cable armor.

4. In a device of the character described, the combination of a pair of handle levers pivoted to a link lever, one of said handle levers being provided with an offset arcuate wing portion having internal ribs, said wing portion being adapted to snugly engage helically wound armored cable, said link lever being provided with a jaw portion in complementary relation to said wing portion and having ribs adapted to engage said armored cable at a position transversely of said wing portion, the complementary jaws being positioned to hold the clamped cable in oblique angular relation to the lever members, whereby to permit cutting means carried by the other handle lever to cut through the armor along a line transversely of the helical strip comprising the armor.

5. A compound cable cutting tool having levers adapted to pivotally clamp a helical cable therebetween in oblique angular relation to the plane of said levers, one of said levers being provided with a cutting tooth for severing engagement with the helical cable armor strip, and means including a tongue projecting from said toothed lever and shoulders provided in an associated lever and positioned to define limits of movement of said tongue to limit pivotal movement of said tooth carrying lever in respect to the shouldered lever.

6. In a tool of the described class, the combination with a work clamping jaw, a lever pivoted thereto, means for holding armored cable against the jaw in a position oblique to the plane of said lever movement, and a cutter operatively mounted to be moved by the lever in an arc concentric to the pivot axis and into severing engagement with said armored cable.

7. A tool for cutting cable armor comprising the combination with a set of clamping jaws engageable with the cable armor, of means pivoted to one of the clamping jaws for moving a cutter tooth in a circular path intersecting one side of the armor in a line oblique to the axis of the armor.

8. A tool of the class described, comprising a pair of pivotally connected clamping members adapted to engage armored cable, an operating lever pivoted to the free end of one of the clamping members, a cutter plate interposed between the connected ends of the operating lever and its associated clamping member and having a projecting cutter tooth, and means associated with the operating lever and the cutter plate, whereby pivotal movement of the operating lever in respect to its pivoted clamping lever moves

said tooth through a circular path to effect a severing engagement with the cable armor.

9. A tool as set forth in claim 8, having the pivotal connection between the operating lever and its associated clamping lever in close proximity to the cable engaging jaws, said cutter tooth being adapted for movement through a path which intersects the cable armor at a point adjacent to and offset from a portion of the cable armor which is directly engaged by one of the jaws.

10. A tool for cutting helically wound cable armor, said tool comprising a link lever having a side edge provided with a concave surface ribbed for engagement with the armor, a hand lever connected to one end thereof for pivotal movement in the general plane of the link lever and provided with an offset concave portion ribbed for engagement with the armor at a point opposite to the point of engagement of the link lever, a second hand lever provided with pivot means connecting it to the link lever, and a tooth carried by the second hand lever and positioned for severing engagement with armor clamped between the link lever and the first hand lever, when the hand levers are drawn together.

11. The device as set forth in claim 10, wherein said tooth is carried by a separate element disposed between the link lever and the second hand lever and mounted on said pivot means, the tooth element being provided with an aperture spaced from the pivot and from the tooth carried thereby and a leg projecting laterally from the second hand lever and extending into said aperture, whereby to prohibit relative pivoting between the tooth carrying element and the second hand lever and to constrain the tooth to move with the said lever.

12. A replaceable blade for an armor cutting tool, said blade comprising a sheet steel plate having a pivot opening and a second opening to receive an actuating lug, and an integral

knife portion projecting laterally of a line connecting said openings and having a channel inclined toward its lower face, and directed toward said line beyond said openings and running out adjacent the extremity of said portion whereby to provide a forwardly directed hook-shaped cutting edge at said face.

13. A tool for cutting armored cable and comprising a pair of levers, means pivotally connecting said levers for relative pivotal movement in a predetermined plane, clamping means obliquely disposed on each of the levers and positioned for interaction to clampingly engage a cable armor disposed between said levers and passing obliquely through said plane, knife means having a guiding connection to one of said levers and movable thereon substantially parallel to said plane and obliquely across the position of a cable armor so engaged, and means for the actuation of said knife means and including a handle in operative connection therewith.

14. A tool for cutting armored cable and comprising a first lever having a handle portion, a link in pivotal connection with the lever remote from said portion, co-operative clamping jaws mounted respectively on the link and the lever and having portions formed for engagement with cable armor inclined obliquely therebetween, a second lever provided with a handle, means providing a pivotal connection of the second lever with the link and imparting motion from the second lever to the link, and a knife connection to the second lever to receive cutting motion therefrom and positioned to operate across cable armor engaged between said jaw portions when said second lever is moved pivotally respecting said link.

15. The device of claim 14 in which the link has a portion behind which said knife is substantially fully retractible when moved pivotally in a direction converse to its said cutting motion.

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