Jan. 17, 1939. F. LINDGREN 2,144,540

WIRE CUTTING APPARATUS

Filed May 5, 1937 2 Sheets-Sheet 1

Fig. 1

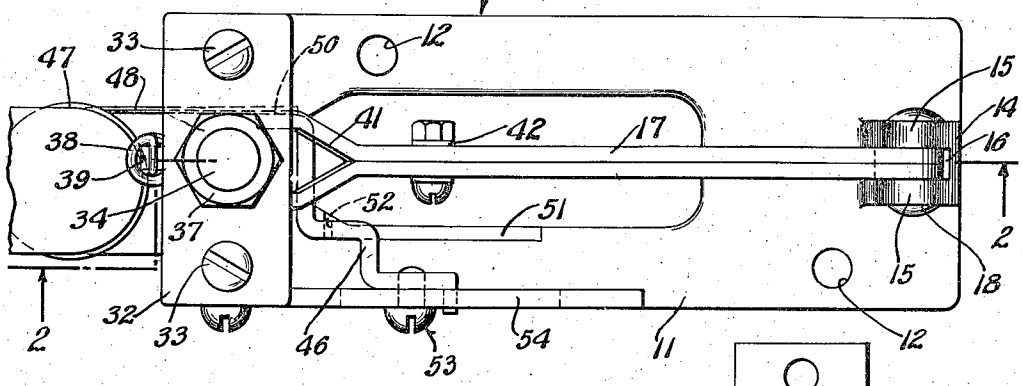


Fig. 3

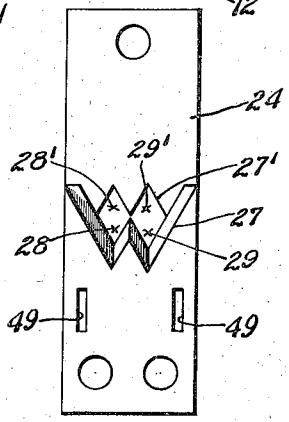


Fig. 2

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WIRE CUTTING APPARATUS

Filed May 5, 1937 2 Sheets-Sheet 2

Fig. 4

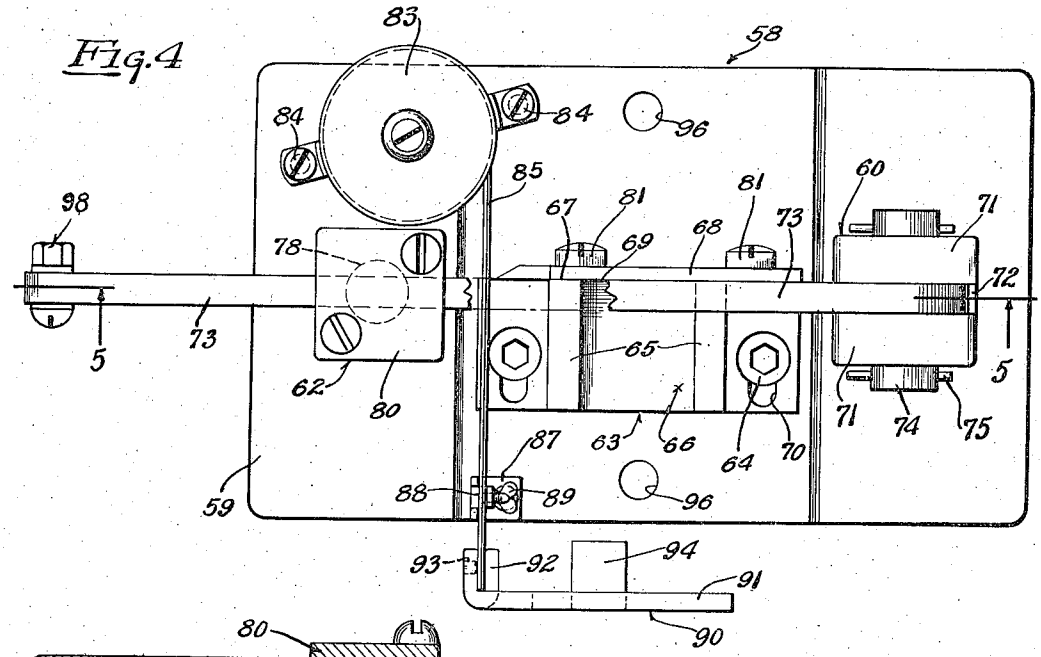


Fig. 5

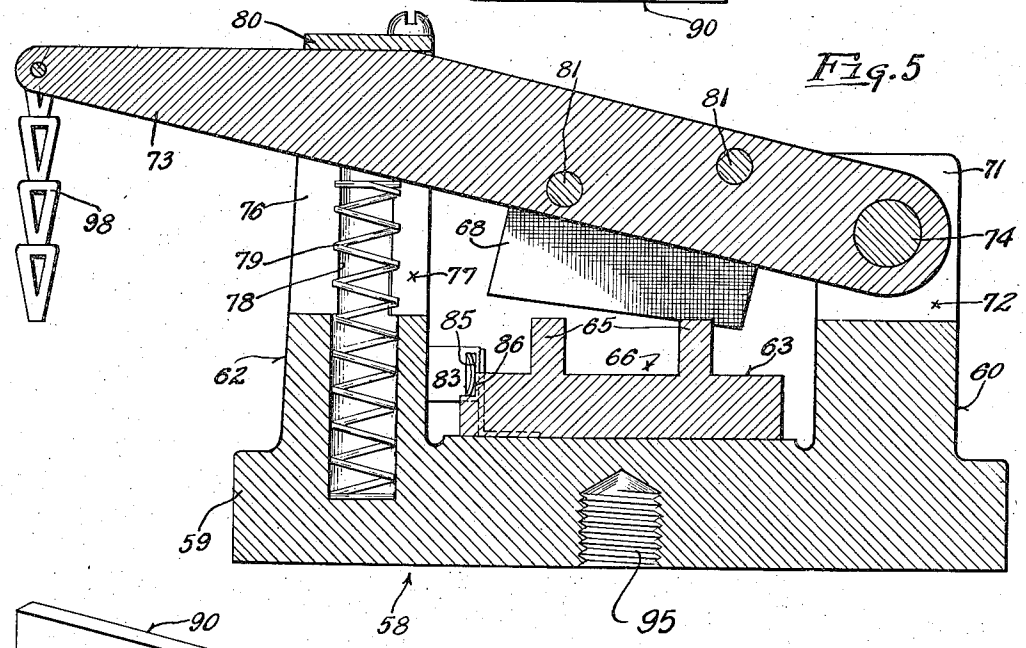
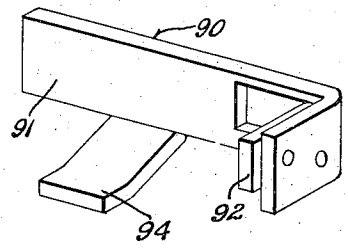


Fig. 6



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UNITED STATES PATENT OFFICE

2,144,540

WIRE CUTTING APPARATUS

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Application May 5, 1937, Serial No. 140,962

13 Claims. (Cl. 140—145)

This invention relates to improvements in wire cutting apparatus.

It is an object of the present invention to provide wire cutting apparatuses which are compact and economical to manufacture.

It is a further object of the present invention to provide wire cutting apparatus which will facilitate the cutting or stripping operations on wire, especially those electrical wires or conductors such as are now used on household utensils and lighting fixtures, in order to reduce manufacturing costs.

A feature of the present invention is the provision of apparatus capable of stripping and cutting wire, which may be easily loaded and may be actuated to do its cutting while both hands are free for holding or otherwise manipulating the wire.

In practically all wire cutting or splicing operations it is desirable to cut or splice the wires to divers lengths. Normally this is done only with considerable inconvenience. It is therefore an important object of the present invention to provide wire cutting and splicing apparatus wherein changeover from one length to another may be easily and quickly accomplished. One of the most usual procedures for this purpose in the past has been to employ a rule or yardstick and mark out lengths with chalk on a bench. However, very often the rule or yardstick would be lost when needed and also the chalk marks would be rubbed off the bench by the wires being cut.

A feature of the present invention flowing from the achievement of this objective is the provision of a graduated roll tape, preferably with a stop, adapted to be moved to various graduated positions relative to the cutters, thus positively insuring correctly measured lengths of cut wire.

A complemental feature is the provision of apertures in at least one of the cutters serving as a guide for the graduated scale and/or serving as a set edge from which the graduated scale may be read.

A further feature linking with the foregoing is the provision of means for clamping or locking the graduated scale in any of the divers positions to which it is set.

Because the cooperating cutters of a wire cutting device are normally subject to a strain, or, because the cutting action is seriously impaired if one cutter is loose or moved slightly away from the other, it is highly desirable to provide supporting means which will maintain the cutters in close shearing or cutting relationship at all times, and this is one of the important objectives of the present invention.

A feature resulting from the achievement of this objective is the provision of a novel mechanism adapted to guide and/or support the movable cutter and/or lever for the movable cutter during movement to operative and inoperative positions. A correlated feature is the provision of novel spring means for urging the movable cutter and/or the lever toward the inoperative position.

A further feature is the provision of novel mechanism for stopping travel of the lever and/or the movable cutter in the operative and/or the inoperative position.

Yet another feature is the provision of cooperating cutters adapted to simultaneously encompass a pair of conductors and cut through the insulation to the bare wire of both at the same time.

A still further feature is the provision of a cutter with projections for locating and guiding wires relative to cutting edges and to guide the movable cutter properly to the cutting edge of the stationary cutter.

Other objects, features and advantages will appear hereinafter.

In the drawings:

Figure 1 is a top plan view of the wire cutting or splicing apparatus provided by the present invention.

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a detail of the cooperating cutters.

Fig. 4 is a top plan view of that form of the present invention used for cutting wire to length.

Fig. 5 is a sectional view of that form of the invention shown in Fig. 4 taken on the line 5—5 of that figure.

Fig. 6 is a detailed view of the stop.

Before describing the present improvements and mode of operation thereof in detail it should be understood that the invention is not limited to the details of construction and arrangement of parts shown in the accompanying drawings, which are merely illustrative of the present preferred embodiments, since the invention is capable of other embodiments, and the phraseology employed is for the purpose of description and not of limitation.

Referring now in detail to the drawings in Figs. 1, 2 and 3, which are illustrative of the present preferred embodiment of the invention, there is shown a main frame 10 having a base 11 which may be secured to a bench or the

like as by conventional lag screws or bolts passed through apertures 12. Preferably the base is provided with a large opening to overlie a suitable cutout in the bench so that insulation stripped from a wire may drop therethrough to a suitable container underneath the bench.

At the back of the main frame there is provided a rear standard 14 preferably in the form of an upright arm with a pair of fingers 15 and socket 16 therebetween adapted to receive and pivotally support a lever 17 on a stud 18.

Preferably integral with the main frame and at the front thereof is a front standard 20 comprising a vertically disposed upright arm having a plurality of fingers 21 with a socket 22 therebetween. The lower and front section of the main frame between the fingers 21 is provided with a socket or channel 23 substantially the same width as the lower or stationary cutter 24 (see Figs. 2 and 3). As shown, a pair of screws 25 may be used to secure the stationary cutter 24 relative to a movable cutter 26.

It will be noted in Figs. 2 and 3 that the lower or stationary cutter 24 is provided with a W-shaped cutting edge 27 providing cavities 28 and 29 and that the upper or movable cutter is provided with an inverted W-shaped cutting edge 27' having cavities 28' and 29'. These W-shaped cutting edges cooperate to receive and cut through the insulation of a double conductor in one operation; thus, making possible a speedy stripping of a double conductor. Of course, a single wire may be placed into either aperture formed by the cutting edges 27 and 27' when it is desired to strip a single conductor.

Preferably vertically disposed channels 30 are provided on the inside walls 31 of the fingers 21 adapted to accommodate the movable cutter 26 and to guide the same for reciprocatory vertical movement relative to the lower or stationary cutter so that the degree of angularity of the W-shaped cutting edges 27, 27' of the two cutters relative to each other always remains the same during the movement of lever 17 and cutter 26. A top plate 32 is provided at the upper end of the front standard 20 preferably on top of the fingers 21 and held on each of the latter with screws 33. This top plate accommodates a main stud 34 which at its lower end is provided with a slot 35 accommodating the upper end of the movable cutter 26 which latter is connected thereto by a screw stud 36.

The main stud 34 at its upper end is preferably threaded to receive one or two lock nuts 37 and the latter serve to limit movement of the movable cutter 26 relative to the stationary cutter 24 so that the cutters will serve merely to cut through the insulation and not through the wire (and/or to cut into the wire only enough to provide a clean surface for connection to a suitable terminal). By pulling on the wire or wires, after the cutters 24 and 26 have cut through in this manner, the insulation is neatly and clearly removed from the outer end of the wire.

Normally the cutter 26 is maintained in a raised inoperative position, and for this purpose the present invention provides a coil spring 38 hooked at one end upon a screw stud 36 which projects through the main stud 34 and movable cutter 26 (Fig. 2), and at its other end the spring is hooked upon a pin 39 supported in the top plate 32. The lever 17 is preferably made of two pieces of sheet metal secured together with rivets 40 and at its forward end is provided with a yoke 41 straddling the main stud 34 and resting upon or engaging a top edge on the movable cutter in order to force the movable cutter downwardly in the channel 30. Movement of this lever is preferably accomplished through the provision of a chain 42 connected to the lever 17 as by a bolt 43 and at its other end connected to any conventional foot treadle.

Now, of particular importance it should be noted that the present invention provides a stop 46 against which the butt ends of the wires which are to be stripped may be pushed. Thus, when it is desired to strip a half inch, one inch or any other predetermined extent of insulation from a wire or wires it is merely necessary to so set the stop. For this purpose the present invention provides a graduated roll scale comprising a casting 47 and a graduated flexible metal tape which may be spirally wound within casing 47 and the free end 48 of which passes through a guiding aperture 49 in the fixed cutter 24 and is connected at its forward end to a projection 50 on the stop 46. When the tape 48 is pulled 5/8 inch from the aperture in the fixed cutter, as shown by direct reading, the operator is apprized exactly relative the amount of insulation which will be stripped from the wire.

A channel 51 and a lug 52 on the stop 46 may be provided to guide the stop and outer end of the tape relative to the base and in longitudinal direction thereof. Also, a screw and slot connection 53 to a side plate 54 may be provided to lock the stop in any desired set position. However, in practice it has been found that it is not absolutely essential to provide the stop as the operator may gauge or position the butt end of the wire relative to the end of the tape quite accurately.

That form of the invention disclosed in Figs. 4 and 5 also discloses a wire cutting device including a number of advantageous features, such as the unitary extensible tape and the sturdy support for the movable cutter, described in detail in connection with the first form of the invention.

Similarly to the first form of the invention the fixture disclosed in Figs. 4 and 5 includes a substantially U-shaped main frame 58 having a base 59 with a rear standard 60 and front standard 62.

A stationary cutter 63 is secured to the base 59 as by screws 64 and is preferably provided with integral upright lugs 65 forming a socket 66 therebetween for locating one or more wires which are to be cut. Also, forward front faces 67 on these lugs serve to support and guide a movable cutter 68 relative to the cutting edge 69 on the stationary cutter 63.

Preferably elongated holes 70 are provided for the screws 64 so that the stationary cutter may be set in close relation with the movable cutter and to compensate for any wear of moving parts, or to compensate for grinding when the cutters are sharpened.

The rear standard 60 is at its upper end provided with a pair of fingers 71 with an intermediate aperture or socket 72 adapted to receive and pivotally support a lever 73 on a stud 74, the latter being held in place, as by pins 75.

Somewhat similarly the front standard 62 is provided with a pair of fingers 76 with an aperture or socket 77 therebetween adapted to receive and guide the outer end of the lever 73 in its arcuate movement. Preferably a bore 78 is provided in the front standard to locate and guide a spring 79 in a position underlying the lever 73, for nor-

mally maintaining the lever in the raised inoperative position shown in Fig. 5. A plate 80 extending across the top of the standard 62 and overlying the socket 77 limits the extent of upward movement of the lever 73.

Screws 81 serve to secure the movable cutter 68 to the side of the lever 73. Coextensive sockets 66 and 77 in the standards 60 and 62 respectively together with the projecting fingers 71 and 76 which fit snugly against sides of the lever 73 serve to prevent it and/or the movable cutter 68 from wobbling relative to the stationary cutter 63. As with that form of the invention disclosed in Figs. 1, 2 and 3, this form of the invention may be provided with a roll scale comprising a casing 83 secured to the base 59 as by screws 84, and a graduated tape which is spirally wound within casing 83 and the free end 85 of which may be projected in the general direction of the wire or wires which are to be cut to length, in order to apprize an operator exactly relative to the length the wire will be cut.

Preferably an aperture 86 is provided in the stationary cutter 63 to guide the tape and to provide a set edge whereby reading graduations on the tape adjacent the front or cutting edge of the stationary cutter 63 is facilitated, so that the operator has an exact reading for the length to which the scale is set for a wire cutting operation. A bracket 87 with a socket 88 and screw 89 may be provided to lock the graduated tape in any desired position.

Although the operator may judge very closely by merely extending the wires to the end of the scale, which is of the well-known metal type that remains in set position and takes on a straight shape when pulled from the roll casing 83, a stop 90, such as disclosed in Fig. 6, may be provided in the form of a plate 91 with a yoke 92 having screws 93 to secure it to the end of the tape, and preferably having a runner 94 at the lower section thereof adapted to slide and rest upon the bench which supports the fixture. Preferably the runner fits slidably in a suitable groove in the bench. The large or main plate section 91 serves as a stop against which the butts of the wire may be extended in order to govern the cutting.

The complete wire cutting fixture, as viewed in Figures 4, 5 and 6, may be secured to a bench in any suitable manner, as by a bolt passed through a bench and threaded into the hole 95 or by lag screws passed through holes 96, and secured into the bench, in the well-known manner. Operation of the device is as follows:

One or more pieces of wire are passed into the fixture preferably into the socket 66 and projected therethrough to the desired length which is preferably governed by the extensible tape 85. If the wires are to be cut to a 14" length the tape 85 is pulled from the roll casing 83 until the graduation 14" is adjacent the edge 67 of the stationary cutter 63. Preferably the wing screw 89 is then tightened to clamp the tape 85 in the socket 88 of the bracket 87. Thereupon the wires are merely extended the fourteen inches to the end of the tape or against the plate 91 of the stop 90 if the latter is secured to the end of the tape. As the lever 73 is moved in a counter-clockwise direction, as viewed in Fig. 5, the movable cutter 68 sweeps past the cutting edge 69 of the stationary cutter 63 and chops the short length from the main length of the wire or wires. Movement of the lever 73 may be effected by grasping and pushing down on the outer free end thereof but is preferably effected by a suitable chain connection 98 to any of the well-known foot treadle structures.

Variations and modifications may be made within the scope of this invention and portions of the improvements may be used with others.

Having thus described the invention, what is claimed as new is:

1. In a wire cutting apparatus the combination of a main frame; a pair of cooperating cutters; a pivoted lever for reciprocating one cutter relative to the other; a stop; and a graduated roll tape supporting said stop and associated with and guided by one of said cutters for locating wire lengthwise relative to said cooperating cutters.

2. In a wire cutting apparatus the combination of a main frame; a pair of cooperating cutters, one of which is provided with an aperture; a pivoted lever for reciprocating at least one of said cutters relative to the other; a stop; and a graduated roll tape supporting said stop and guided within the aperture in said cutting member for locating wire relative to the cutter members.

3. In a wire cutting apparatus the combination of a main frame; a pair of cooperating cutters; a pivoted lever for reciprocating one cutter relative to the other; and a graduated roll tape associated with and guided by one of said cutters for locating wire lengthwise relative to said cooperating cutters.

4. In a wire cutting apparatus the combination of a main frame; a rear standard on said main frame; a front standard; a stationary cutter on said main frame; a movable cutter; a lever supporting said movable cutter; a plurality of fingers on both the rear and front standards for guiding the lever and movable cutter relative to the stationary cutter; a compression spring acting on said lever; and means integral with said front standard for locating said spring and for maintaining the same in alignment with said movable cutter.

5. In a wire cutting apparatus the combination of a main frame; a rear standard on said main frame; a front standard; a stationary cutter on said main frame; a movable cutter; a lever; means associated with the front standard to guide the lever and movable cutter relative to the stationary cutter; and a pair of projections on said stationary cutter for locating wires relative to the cutters and for guiding the cutting edges of the cutters relative to each other.

6. In a wire cutting apparatus the combination of a main frame; a pair of cooperating cutters; W-shaped cutting edges on the cooperating cutters adapted to receive a pair of insulated wires from a double conductor, and to cut through the insulation to the metal wire conductors; a pivoted lever for reciprocating one cutter relative to the other; a front standard; and means associated with the front standard to guide the lever and movable cutter relative to the stationary cutter.

7. In a wire cutting apparatus the combination of a main frame; a pair of cooperating cutters; a pivoted lever for reciprocating one cutter relative to the other; a stop; a graduated roll tape supporting said stop and associated with said cutter for locating wire lengthwise relative to said cutters; and means on said main frame for locking said graduated roll tape in various positions.

8. In a wire cutting apparatus the combination of a main frame; a rear standard on said main frame; a pair of cooperating cutters; a lever for

reciprocating one of said cutter members relative to the other, pivotally mounted in said rear standard; and a front standard on said main frame, comprising a plurality of vertically disposed fingers with an aperture therebetween for accommodating the free end of the pivoted lever and for guding the lever in its pivotal movement.

9. In a wire cutting apparatus the combination of a main frame; a rear standard on said main frame; a fixed cutter; a movable cutter; a lever pivotally mounted on said rear standard; a front standard on said main frame, including a pair of vertically disposed fingers; side walls on said fingers having channels for guiding the movable cutter relative to the fixed cutter; a top plate on said front standard a stud secured to said movable cutter and projecting through said top plate; adjustable means on said stud for limiting travel of said movable cutter relative to the fixed cutter; and a yoke on said lever straddling said stud and engaging the movable cutter to move the latter relative to the fixed cutter.

10. In a wire cutting apparatus the combination of a main frame; a rear standard on said main frame; a fixed cutter; a movable cutter; a lever pivotally mounted on said rear standard; a front standard on said main frame, including a pair of vertically disposed fingers having channels for guiding the movable cutter relative to the fixed cutter; means for associating said movable cutter to said pivoted lever for conjoint movement; a top plate on said front standard; a stud secured to said movable cutter and projecting through said top plate; and adjustable means on said stud engaging the top plate for limiting travel of said movable cutter relative to the fixed cutter.

11. In a wire cutting apparatus the combination of a main frame; a pair of cooperating cutters each having cutting edges angularly inclined relative to one another; a lever pivoted about an axis parallel to said cutters for reciprocating one cutter relative to the other; the degree of angularity between said cutting edges always remaining substantially the same during the pivoting movement of said lever.

12. In a wire cutting apparatus the combination of a main frame; a pair of cooperating cutters; a lever for reciprocating one cutter relative to the other; a stop; a graduated tape supporting said stop; means for spirally winding and storing said tape; and means for guiding said tape for movement outside of said winding means in only one direction.

13. In a wire cutting apparatus the combination of a main frame; a pair of cooperating cutters; a lever for reciprocating one cutter relative to the other; a stop; a graduated tape supporting said stop; means for spirally winding and storing said tape; means for guiding said tape for movement outside of said winding means in only one direction; and means for locking said tape in various positions.

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