Dec. 3, 1957 M. D. PROWSE 2,814,873

PERCUSSION HOT WIRE CUTTER

Filed Dec. 19, 1956 2 Sheets-Sheet 1

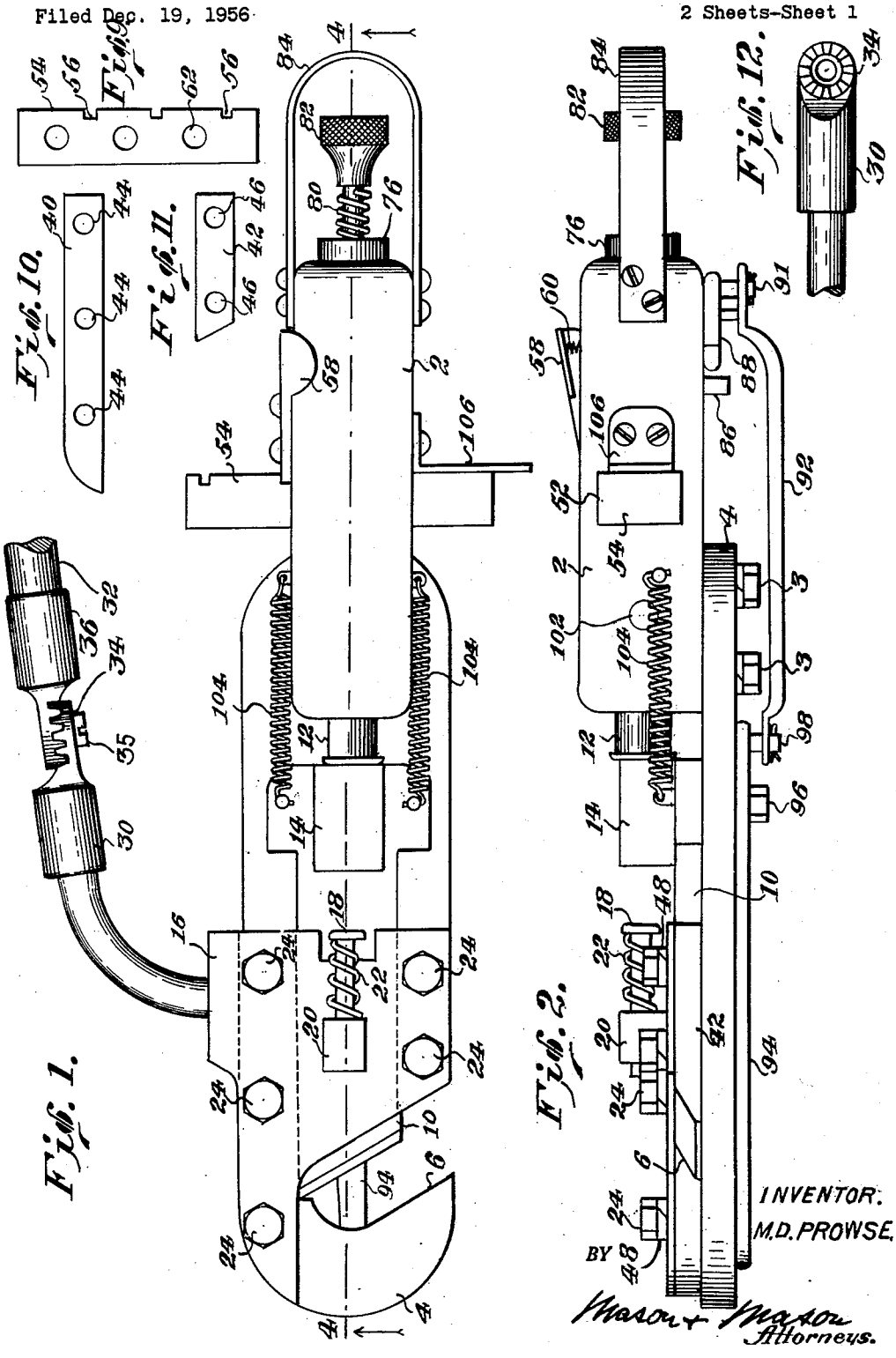


Fig. 1.



Fig. 10.



Fig. 11.



Fig. 2.



Fig. 12.

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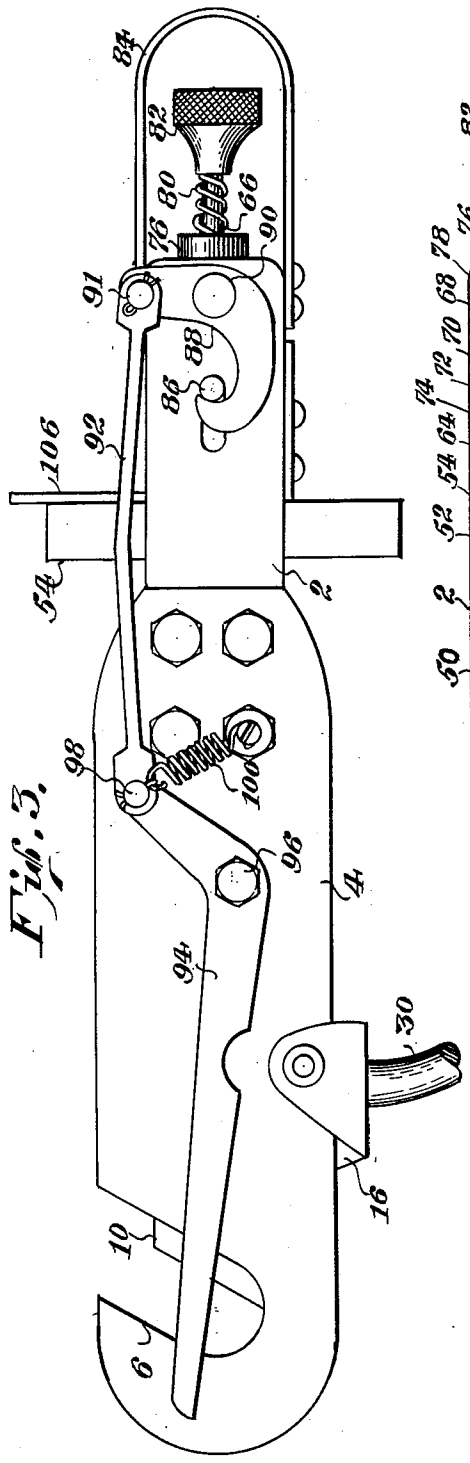


Fig. 3.

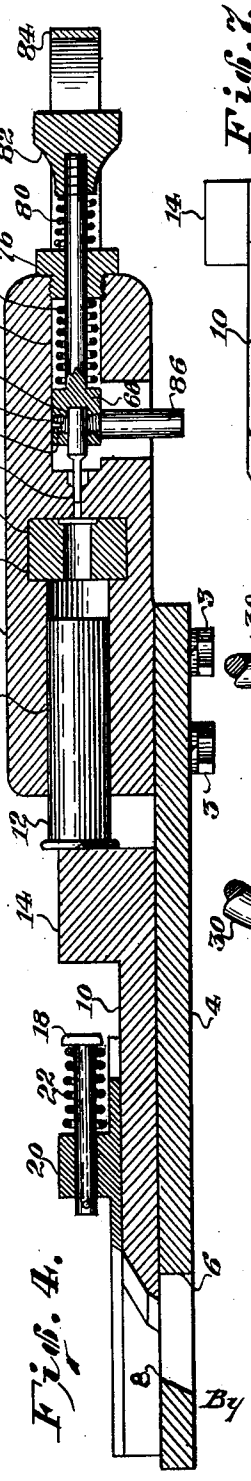


Fig. 4.



Fig. 7.

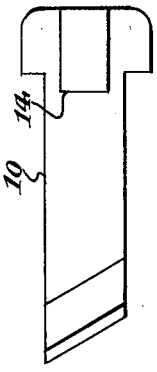


Fig. 8.

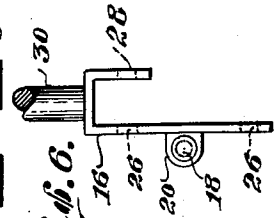


Fig. 6.

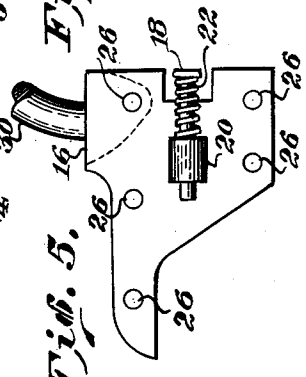


Fig. 5.

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# PERCUSSION HOT WIRE CUTTER

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Application December 19, 1956, Serial No. 629,333

5 Claims. (Cl. 30—228)

This invention relates to a wire cutter which is adapted to cut high voltage wires while they are energized, and more particularly to a cutter in which the blade is forced to its cutting position by an explosive charge.

The principal object of the invention is to provide a wire cutter in which the cutting blade is actuated by the engagement of a trigger member with the wire to be cut.

Another object of the invention is to provide a wire cutter having an adjustable magazine carrying a plurality of explosive cartridges so that a plurality of wires may be cut in succession.

Still another object of the invention is to provide a wire cutter in which the trigger normally holds the firing pin for the cartridges in a retracted position against the action of a spring.

Other objects of the invention will appear hereinafter throughout the specification.

Referring to the drawings:

Figure 1 is a top plan view of my wire cutter with parts broken away to better show certain details.

Figure 2 is a side view of my wire cutter showing certain exterior details.

Figure 3 is a bottom plan view of the wire cutter of Figures 1 and 2.

Figure 4 is a longitudinal sectional view taken on the line 4—4 of Figure 1.

Figure 5 is a detail view in side elevation showing the buffer piston and spring for the cutting blade.

Figure 6 is a detail showing an end view of the members shown in Figure 5.

Figure 7 is a top view of the cutting blade shown in section in Figure 4.

Figure 8 is a side view of the cutting blade.

Figure 9 is a side view of the magazine which carries the explosive cartridges.

Figure 10 is a side view of the upper guide for the cutting blade.

Figure 11 is a side view of the lower guide for the cutting blade, and

Figure 12 is a detail view of the handle adapter.

Referring now to the several figures of the drawing, 2 represents the central or main body member of the cutter. Attached to one end of the body member 2 by bolts 3 is a plate 4 which has a slot 6 in its outer end to receive the wire to be cut. One side of the slot 6 is beveled to provide a sharpened edge 8 which forms the stationary blade of the cutter over which the movable blade 10 passes as it is moved outwardly in response to movement of the piston 12. As clearly shown in Figures 2, 4 and 7, the blade 10 has a laterally extending projection 14 at its inner end which serves as an abutment for the adjacent end of the piston 12. Outwardly of the projection 14 is a substantially U-shaped plate 16 which straddles the plate 4 at one edge and carries a spring buffer 18 for the movable blade 10 as it moves outwardly to cutting position. The buffer 18 is slidably mounted in a projection 20 on the plate 16 and is adapted to be engaged by the side of the projection 14 opposite that



engaged by the piston 12 to cushion the outward movement of the blade 10. A spring 22 mounted around the buffer 18 normally holds it in the position shown in Figures 1, 2, 4 and 5, and provides the cushioning means for the buffer as the blade 10 moves to its cutting position. As shown in Figure 4, the cutting edge of the blade 10 is beveled in a direction opposite to that of the stationary blade. As clearly shown in Figure 1, the plate 16 is secured in place over the blade 10 and the plate 4 by five bolts 24 which pass through openings 26 in the plate 16. As indicated in Figures 3 and 6, one of the bolts 24 not only passes through one of the openings 26 in the longer leg of the plate 16 but also through an opening 28 in the shorter leg. Projecting outwardly from the bight portion of the plate 16 is an adapter 30 to receive an insulated handle 32. As shown, the handle or stick 32 and the adapter 30 are provided with interfitting teeth 34 to allow relative angular adjustment between the handle and the adapter. As shown in Fig. 1, the teeth are meshed together and held in adjusted position by a screw 35. The enlarged portion 36 of the handle may be a separate socket to receive the member 32 or it may be integral with 32. In order to guide the blade 10 in its movement, guide rails 40 and 42 are attached to the plate 4 above and below the blade. The upper of these rails is shown in Figure 10 and the lower in Figure 11. The rail 40 is attached to the opposite side of the plate 4 from the plate 16 and is provided with three bolt holes 44 which receive the three uppermost bolts 24, while the rail 42 is provided with holes 46 to receive the other two bolts 24. As shown in Figure 2, the bolts are provided with suitable lock washers 48.

As clearly shown in Figure 4, the body member 2 is provided with an axial opening 50 in which the piston reciprocates. The inner end of this opening terminates at a rectangular through passage 52 in which the magazine 54 is adjustably mounted. One side of the magazine 54 is provided with spaced notches 56 any one of which is adapted to receive a pivoted detent 58 to hold the magazine in the desired position. As shown in Figure 2, a tension spring 60 may be mounted between the detent 58 and the body member 2 to yieldably hold the detent in one of the notches. The magazine is also provided with three equally spaced cartridge openings 62, these openings being so related to the notches that when the detent is engaged in one of the notches, one of the openings 62 will register with the piston opening 50, as shown in Figure 4. In this position, a cartridge in the registering opening will be in line with the firing pin 64 which is detachably carried by a firing bolt 66 slidably received in the axial opening 68 in the body 2. The inner end of the firing bolt 66 is enlarged at its inner end which has a socket 70 for receiving the adjacent end of the firing pin. This end of the firing pin is enlarged and is held in place in the socket 70 by a screw 72 which is threaded into a cross bore 74 in the enlarged end of the firing pin. The outer end of the opening 68 is closed by a screw collar 76 through which the firing bolt may reciprocate and is engaged on its opposite sides by two springs. One of these springs 78 is arranged between the inner end of the collar 76 and the enlarged portion of the firing bolt while the other 80 is confined between the outer end of the collar 76 and a knurled cocking piece 82 on the outer end of the firing bolt. Mounted over the knurled cocking piece 81 is a U-shaped guard member 84 to prevent accidental movement of the firing bolt and in turn the firing pin. In the end of the cross bore 74 opposite the screw 72 is threaded a sear pin 86 which projects beyond the side of the body 2 for engagement with the sear 88 pivoted on the pin 90 intermediate its ends. The sear 88 is substantially J-shaped in form and has its upper end pivotally connected at 91 to a trigger

link 92 and its lower end arranged to engage the sear pin 86 to hold the firing bolt and the firing pin in their normal retracted positions. As clearly shown in Figure 3, the trigger 94 is pivoted to the plate 4 at 96, and is pivotally connected at its inner end to the trigger link 92 at 98. The outer end of the link spans the slot 6 in a position to be engaged by a wire as the cutter is applied to it. Engagement of the wire with the trigger 94 will force it toward the bottom of the slot against the action of the spring 100 which is attached at one end to the side of the plate 4 and at the other end to the pivotal connection 98 between the trigger 94 and the trigger link 92. This movement of the trigger will cause the trigger link 92 to move to the left, as viewed in Figure 3, and at the same time will cause the sear 88 to rock in a counterclockwise direction releasing the sear pin 86. When the sear pin 86 and in turn the firing bolt 66 are released, the spring 78 will force the firing bolt and firing pin 64 to the left to fire a cartridge mounted in the magazine 54. The resulting explosion will force the piston 12 and the blade 10 outwardly thus severing the wire at the slot 6. In this operation, the spring 80 will act as a buffer for the cocking piece 82, and the spring 22 will act to cushion the movement of the blade by its engagement with the projection 14. As the blade 10 reaches its outermost position, the inner end of the piston passes the port 102 allowing the gases to escape and releasing the pressure in the opening 50 so that the blade springs 104 may draw the piston back to its original position. The firing bolt and pin are now drawn outwardly by the cocking piece 82 until the sear pin 86 snaps over the cam-shaped lower end of the sear to the locked position of Figure 3. The magazine may now be shifted in the opening 52, after the detent 58 has been released, to bring another cartridge into line with the firing pin. The operation may now be repeated to cut another wire. In order to keep the remaining cartridges from dropping out of the magazine, a keeper 106 in the form of an angle bracket has one arm attached to the body member 2 and the other in sliding engagement with the magazine 54 and over the exposed cartridges therein.

For the sake of clarity, the piston 12 has been shown as projecting some distance out of its cylinder but it will be understood that under normal conditions its outer end will be substantially flush with the end of the body member 2. It will be held in this position by the action of the blade springs 104.

The magazine 54 is shown as being provided with three cartridge openings but any suitable number may be used depending on the number of wires it is desired to cut at one time.

Since the firing bolt is protected by the guard member 84, danger of prematurely discharging the cartridges is prevented, and in view of the fact that engagement of the wires with the trigger releases the firing pin, the cutter cannot be operated until it is in cutting position on the wire. Moreover, the striking action of the blade causes the cut ends of the wire to jump apart eliminating a drawn out electrical arc.



In view of the above description of the structure and operation of the cutter, it is believed that no further description of the operation of the cutter is necessary.

The above description and drawing disclose one embodiment of the invention, and specific language has been employed in describing the figures. It will, nevertheless, be understood that no limitations of the scope of the invention are thereby contemplated, and various alterations and modifications may be made as would occur to one skilled in the art to which the invention relates.

I claim:

1. A wire cutter comprising an elongated body, a slot extending into one side of said body adjacent one end to receive a wire to be cut, said slot being closed at its inner end, a cutting blade slidably mounted on said body and adapted to move back and forth across said slot, a longitudinally extending passage in said body, a piston in said passage to move said blade outwardly to its cutting position in response to an explosion behind said piston, a spring means to retract said blade from its cutting position, means mounted in said body behind said piston and adapted to support an explosive cartridge, a cartridge firing means in said body comprising a spring actuated pin, means to releasably hold said pin in its inoperative position, a trigger pivotally mounted on said body and extending outwardly across said slot in a position to be engaged by a wire within the slot, and means connecting said trigger and said pin holding means to release said firing pin in response to inward movement of said trigger due to pressure of the wire on the trigger.

2. A wire cutter as defined in claim 1, wherein said trigger has two arms arranged at an angle to each other and is pivoted at the juncture of said arms, and a spring biasing said trigger toward the open end of said slot.

3. A wire cutter as defined in claim 2, wherein the means for holding said firing pin in its inoperative position comprises a sear pin rigidly connected to said firing pin and extending outwardly through an opening in said body, and a sear pivoted on said body and adapted to normally engage said sear pin.

4. A wire cutter as defined in claim 3, wherein said sear is operatively connected to the inner arm of said trigger by a link.

5. A wire cutter as defined in claim 4, wherein said firing means is provided with a manual means to retract the firing pin to a position away from said magazine, and the sear pin to a position to be engaged by said sear.

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