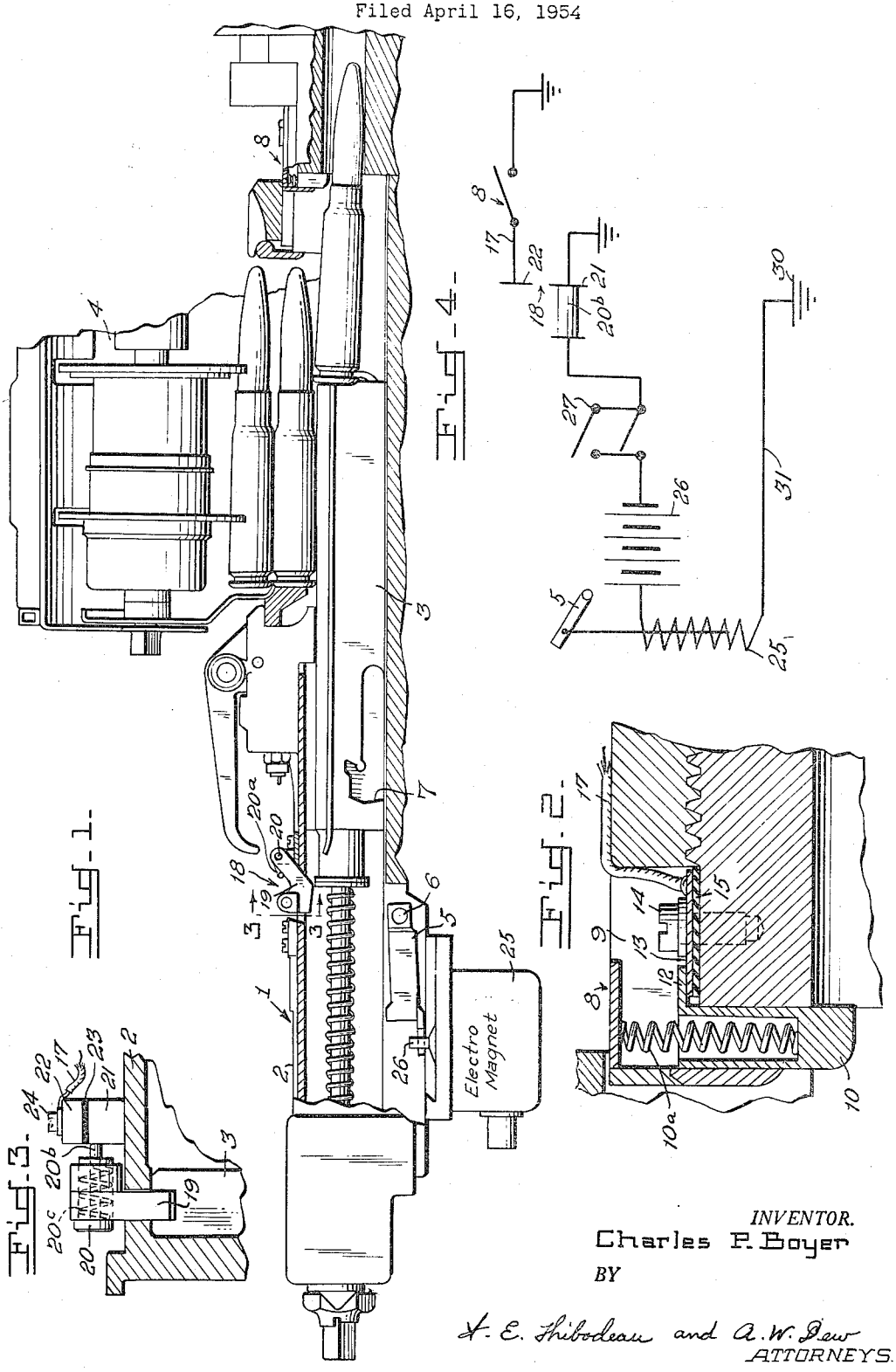
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DOUBLE FEED PREVENTION DEVICE

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DOUBLE FEED PREVENTION DEVICE

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This invention relates to a double feed prevention device for preventing double feeding in conventional automatic guns employing sliding bolts. More particularly, the device consists of a means to actuate the sear to hold the sliding bolt in retracted position in event a cartridge is not extracted from the firing chamber and thereby eliminating danger of double feeding and subsequent jamming of the gun.

It is therefore a primary object of the invention to prevent double feeding of ammunition in an automatic rifle.

Another object of the invention is to provide electrical means for withholding the slide bolt in retractive position in event the case of the previously fired cartridge is not extracted.

Other objects and advantages will be apparent after a study of the following description in connection with the drawing.

An illustrative embodiment of the invention is disclosed in the following description and in the accompanying drawings, in which:

Figure 1 is a fragmentary longitudinal sectional view taken through the breech end of an automatic firearm illustrating the operating switches of the device.

Figure 2 is an enlarged sectional view of the firing chamber switch.

Figure 3 is a cross sectional detail taken along lines 3—3 on Figure 1, and

Figure 4 is a diagram of the electrical hook-up of the switches.

Referring more particularly to the drawings wherein like reference characters designate like or corresponding parts throughout the different views, numeral 1 indicates generally the breech end of a gun having receiver housing 2, spring-biased sliding breech bolt 3 and ammunition feeding mechanism 4, all of conventional construction. A sear arm 5 is pivoted to the housing at 6 and is urged into clockwise rotation by a spring, not shown, to a position wherein it engages shoulder or abutment 7 of the bolt 3 to thereby hold the bolt in retracted position. The free end of the sear is pivotally connected at 26, Figure 1, with the plunger of a solenoid 25 so that, when energized, the solenoid acts to hold the sear down in inoperative position whereby the gun is freed for automatic operation. However, when the solenoid is de-energized by the opening of its circuit as subsequently described, the sear pivots into position to engage and hold the bolt in retracted position.

A cartridge-actuated plunger switch generally indicated at 8, is positioned in a recess 9 in the breech end of the gun barrel. This switch comprises a plunger 10 urged radially inwardly by spring 10*a* into the position shown on Figure 2 when there is no cartridge in the barrel. In this position the inner end of the plunger is in such position that on ramming of a round into the barrel, the plunger is cammed upwardly by the case of the round to open the switch. The plunger has a forwardly-extended contact element 12 adapted to engage a contact plate 13 having a lead 17 extending therefrom. This plate is held

in place by a screw 14 and insulated from the barrel by a dielectric element 15.

Lead 17 connects plate 13 to another switch generally indicated at 18 and comprising an arm 19 pivoted at 20 to the receiver housing 2 on an axis transversely thereof, and having its rearward or free end protruding through an opening in the receiver housing and into the path of the sliding bolt whereby, when the bolt is retracted, it cams the arm into clockwise pivotal movement against the action of a torsion spring 20*a*. The free end of the arm carries an insulated contact 20*b* which is pressed by spring 20*c* against either one of two vertically-stacked relatively insulated contacts 21 and 22. As shown in Figure 3, these contacts are held to the housing 2 by a screw 24 and are relatively insulated by a dielectric spacer 23. Contact 22 is connected with the other end of lead 17 while contact 21 is grounded.

Referring to the wiring diagram of Figure 4 it will be noted that the circuit extends from ground at 30, by lead 31, to one terminal of solenoid 25, the other terminal of which is connected to one terminal of a battery 26. The circuit proceeds from the other battery terminal to firing switch 27 and thence to sliding contact 20*b* of switch 18. From contact 20*b* the circuit extends to ground either by way of contact 21 when the bolt is in battery position, or by lead 17 and chamber switch 8 when the bolt is retracted.

In operation, assuming that firing switch 27 is open, solenoid 25 is de-energized and sear 5 is therefore in operating position. With a round in the breech chamber and bolt 3 in battery position, switch 8 is open but contact 20*b* is in the position shown at Figures 3 and 4 so that, except for firing switch 27 the circuit is closed. Firing may be initiated by closing switch 27 whereupon solenoid 25 is energized and sear 5 is drawn downwardly to inoperable position. As the bolt moves in recoil toward retracted position it engages arm 19 and moves the same to shift contact 20*b* from contact 21 to contact 22. Therefore, provided the case of the previously fired round has been extracted, switch 8 is closed at this time and the solenoid remains energized. Thus automatic firing continues unless and until the extractor fails to function. When this happens, switch 8 remains open and when slide 20*b* moves onto contact 22 in response to recoil of the bolt, solenoid 25 is de-energized and arm 5 is pivoted by its spring to catch and hold the bolt in retracted position. The spent casing must then be removed before a fresh cartridge can be rammed.

It is apparent that a simple yet effective means for preventing fouling of the ammunition and subsequent jamming of a weapon has been provided and also that the danger inherent in the ramming of a live cartridge into the unextracted case of the previous round has been eliminated. The device may be installed in a weapon with very little structural change.

While a specific embodiment of the invention has been shown and been described, it will be understood that various alterations may be made without departure from the spirit of the invention as indicated by the appended claims.

I claim:

1. In a rapid fire gun having a breech bolt movable between battery and retracted positions, a sear spring-urged into position engaging and holding said bolt in retracted position, electro-magnetic means connected with said sear to hold the same free of said bolt when energized, a normally closed switch associated with the breech chamber of said gun and opened only by a cartridge casing therein, first and second contacts, a first lead connecting said first contact with ground and including said switch, a second lead connecting said second contact directly with ground, a slider adapted to engage either of

said contacts, spring means urging said slider into position against said second contact, a source of voltage, a lead connecting said slider with said source and electro-magnetic means with ground and including a firing switch, and means responsive to movement of said bolt to retracted position to move said slider from said second to said first contact.

2. Means for preventing jamming in a rapid fire gun having a breech chamber and a bolt reciprocable between battery and retracted positions to ram cartridges into said chamber and to extract spent casings therefrom, a sear spring-pressed into position normally engaging and holding said bolt in retracted position, an electromagnet having a plunger connected with said sear and energizable to hold the same clear of said bolt, a normally closed switch in the cartridge chamber of the gun and opened only by the presence of a cartridge casing in said chamber, first and second contacts, a first lead from said first contact to ground and including said switch, a second lead from said second contact to ground, a source of votage, a slider movable to engage either of said contacts, a firing switch, a third lead from said slider to ground and including said source, electromagnet and firing switch in series, means yieldingly urging said slider into engagement with said second contact and means operated by said bolt during movement into substantially retracted position to move said slider from said second to said first contact.

3. In a rapid fire gun having a breech chamber and a bolt therein reciprocable between battery and retracted positions to ram cartridges into said chamber and to extract spent casings therefrom, a sear, a spring urging said sear into a position engaging and retaining said bolt in retracted position, an electromagnet having a plunger connected with said sear and energizable to hold the same free and clear of said bolt, first and second relatively insulated contacts, a normally closed switch associated with said chamber and opened by and in response to movement of a cartridge thereinto, a first lead connecting said first contact with ground and including said switch, a second lead connecting said second contact with ground, a slider movable onto either of said contacts, a source of voltage, a firing switch, in series a third lead connecting said slider with ground and including said source, firing switch and electromagnet, means urging said slider onto said second contact, and means operated by and in response to movement of said bolt into retracted position to move said slider from said second to said first contact.

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