Jan. 16, 1945. G. J. HYDE 2,367,280

CONTROL MEANS

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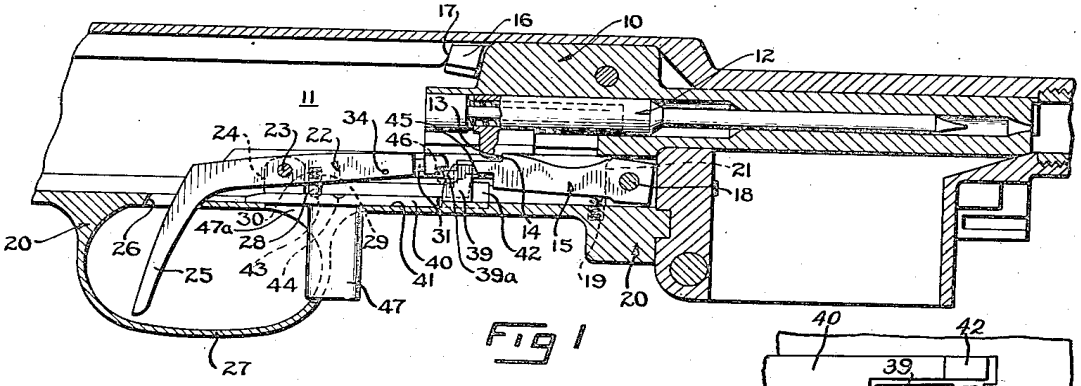

Fig 1

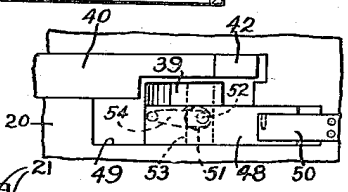

Fig 7

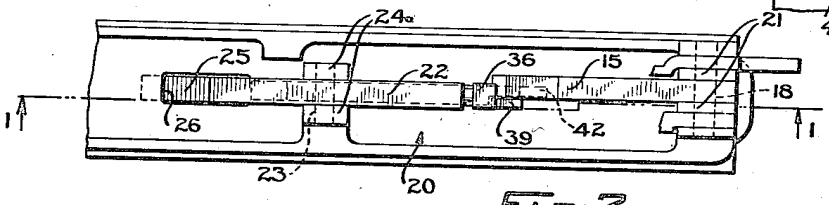

Fig 2

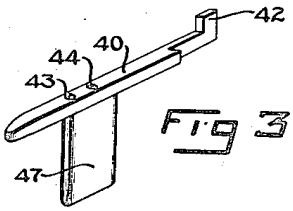

Fig 3

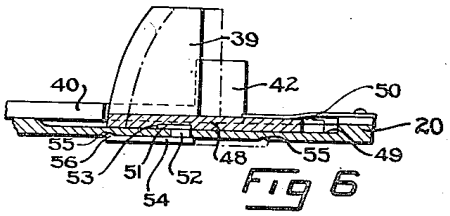

Fig 6

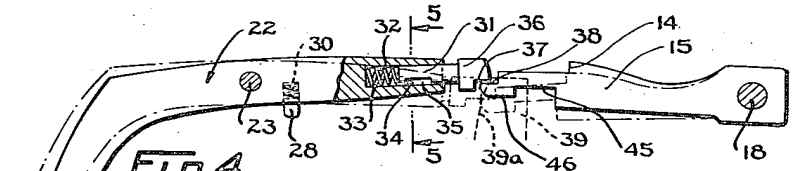

Fig 4

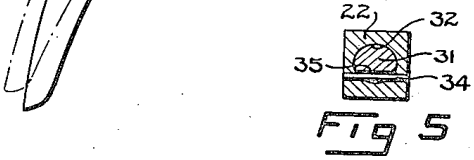

Fig 5

INVENTOR
George J. Hyde
BY F. Bascom Smith
ATTORNEY

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CONTROL MEANS

George J. Hyde, Brooklyn, N. Y., assignor to Firearms Research Corporation, New York, N. Y., a corporation of New York

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2 Claims. (Cl. 42—69)

This invention relates to control means and more particularly to a trigger actuated mechanism for controlling the operation of a cocking member, such as the sear of a firearm.

It is an object of the present invention to provide novel means for controlling the operation of a semi-automatic rifle for single shot fire.

Another object is to provide novel safety means cooperating with the trigger actuated control mechanism of a firearm for holding the cocking member of said mechanism against release, said means being accessible for ready manual actuation and being positive in operation.

A further object is to provide a novel trigger mechanism adapted for adjustment to either of two positions to control the firing mechanism of an automatic rifle so as to render the latter capable of either single shot or continuous firing.

A still further object is to provide a novel trigger mechanism for controlling the sear of a rifle whereby the sear is automatically returned to operative position after each shot is fired regardless of the position of the trigger.

Still another object is to provide a novel trigger actuated mechanism for controlling the operation of a detent, such as the sear of a firearm, said mechanism being light, compact, durable and reliable and comprising a minimum number of movable parts.

The above and further objects and novel features of the invention will more fully appear from the following detailed description when the same is read in connection with the accompanying drawing. It is to be expressly understood, however, that the drawing is for the purpose of illustration only and is not intended as a definition of the limits of the invention, reference for this latter purpose being had primarily to the appended claims.

In the drawing, wherein like reference characters refer to like parts throughout the several views,

Fig. 1 is a vertical, longitudinal sectional view, with parts broken away, of a receiver of a firearm, showing a form of the trigger actuated control mechanism of the present invention operatively associated with the firing mechanism in said receiver, the section being taken substantially along line 1—1 of Fig. 2;

Fig. 2 is a top plan view, with parts broken away, of the above control mechanism mounted on the housing therefor, the latter being removed from the receiver of the firearm;

Fig. 3 is a perspective view of the movable member of the safety means of said control mechanism;

Fig. 4 is an enlarged view, with parts broken away, of the trigger mechanism and the sear controlled thereby, showing in broken lines the position of said mechanism and the sear at the point of disengagement;

Fig. 5 is a sectional view taken substantially along line 5—5 of Fig. 4;

Fig. 6 is a vertical, longitudinal sectional view, with parts broken away, of an alternate embodiment of the cam means provided for controlling the engagement between the sear and the trigger mechanism of the present invention; and

Fig. 7 is a fragmentary top plan view on a slightly reduced scale of the embodiment shown in Fig. 6.

The novel control means of the present invention are illustrated, by way of example, as controlling the operation of the sear of the firing mechanism of a semi-automatic rifle, such as shown in my copending application Serial No. 398,034, filed June 14, 1941, and entitled "Firearm." It is to be understood, however, that the novel trigger actuated control mechanism and the safety means cooperatively associated therewith, which comprise the novel means of the present invention, are not limited for utility only with a firing mechanism of the type shown, but are adapted for controlling the operation of the cocking members or detents of various other devices.

The firing mechanism is of the type comprising a bolt 10 slidably mounted in a receiver 11 for reciprocating movement, said movement being imparted thereto by actuating means (not shown) and being adapted to effect the ejection of the fired cartridge and the injection of a fresh cartridge into firing position. A spring-pressed firing pin 12 is carried by said bolt and is movable relative thereto, said pin being provided with a depending shoulder 13 adapted for engagement with an upwardly extending shoulder 14 on a sear 15 during the forward movement of said bolt whereby said firing pin is cocked. Bolt 10 is fixed in firing position (Fig. 1) by the engagement of a lever 16, pivotably mounted thereon, with an abutment 17 formed in said receiver. Sear 15 is pivotally mounted on a pin 18 and is normally urged upwardly into operative engagement with firing pin 12 by suitable resilient means, such as a compressed spring 19 guided in a recess in a housing 20, pin 18 being supported by bearing members 21 (Fig. 2) formed with or otherwise rigidly secured to said housing.

In order to operate sear 15 so as to release cocked firing pin 12, novel trigger actuated control means are provided. As shown, said means comprise a trigger lever 22 mounted intermediate the ends thereof for pivotal movement relative to housing 20, for example, on a pin 23 supported between suitable bearing members, such as lugs 24 (Fig. 2), formed with or otherwise rigidly secured to said housing. A trigger 25 depends (Fig. 1) from the rear end of said lever, being integrally formed with the latter to extend through a recess 26 in housing 20, and a trigger guard 27 preferably forms a part of said housing to prevent inadvertent actuation of said trigger. Lever 22 is normally held inoperative by resilient means adapted to apply a counter-clockwise torque thereto (Figs. 1 and 4), said means preferably comprising a pin 28 slidably mounted in a recess 29 in said lever and a spring 30 contained in said recess to apply a downward force to said pin. Spring actuated mechanism 28, 30 serves a second function to be more fully described hereafter in connection with the safety means.

To depress the rear or free end of sear 15 when trigger 25 is pulled and release said sear from firing pin 12, a rod 31 is slidably mounted in a bore 32 (Fig. 4) in the forward end of lever 22 and is pressed outwardly in the direction of sear 15 by a spring 33 disposed in said bore. A pin 34 (Fig. 5) extends transversely through lever 22 and is in operative engagement with a slot or groove 35 provided in rod 31 (Figs. 4 and 5), said pin and groove cooperating to fix the outermost position of said rod relative to lever 22 while permitting inward axial movement of said rod against the pressure of spring 33. An enlarged head portion 36 is formed with or otherwise rigidly secured to the end of rod 31 and is provided with a shoulder 37 adapted to engage and apply a downward force to a shoulder or surface 38 provided at the rear end of sear 15. Pivotal movement of lever 22 in a clockwise direction is thus transmitted to sear 15 by said head portion, producing a counterclockwise rotation of said sear.

To control the firing mechanism of a rifle, particularly of the automatic type, for single shot fire, the sear is automatically returned to operative position after each shot is fired regardless of the position of the trigger. To accomplish this result, novel means are provided for disengaging head 36 from sear 15 when the latter has been sufficiently depressed to release firing pin 12. As shown in Figs. 1 to 5, said means comprise a cam member 39 mounted on housing 20 to the side of and adjacent the rear end of sear 15, lever 22 being located relative to sear 15 (Fig. 2) so that head 36 projects beyond one side of said sear for engagement with said cam member. Cam surface 39a of said member engages said head and moves the latter axially as lever 22 is pivoted clockwise, the axial movement causing disengagement between said head and sear 15 when firing pin 12 is released. Thus, sear 15 is returned to operative position by spring 19 as soon as the cartridge is fired, regardless of the position of lever 22 and of trigger 25.

Novel safety means are provided for holding the trigger mechanism inoperative so as to prevent release of the firing mechanism and, as shown, said means comprise a rod or bar 40 slidably mounted in a longitudinal groove 41 in housing 20 (Fig. 1). The forward end of said bar adjoins cam member 39 and has an upwardly extending lug 42 formed thereon, said lug being located below sear 15 and being movable longitudinally in the same vertical plane as said sear. Rod 40 is resiliently held in groove 41 by spring-pressed pin 28 and is provided with a pair of recesses 43 and 44, which are adapted to receive said pin, to fix said bar in the two alternate positions thereof. In one position of said bar, i. e., when the rear recess 43 engages pin 28 (Fig. 1), lug 42 is disposed opposite a recess 45 in the under side of sear 15 and the latter is free to be actuated by lever 22 to release the firing mechanism. In the other position of bar 40, i. e., when recess 44 receives pin 28, lug 42 is positioned below surface 46 of said sear and is adapted to engage said surface to prevent pivotal movement of said sear, rendering the trigger mechanism inoperative. In order to actuate bar 40, a flat depending arm 47 (Fig. 3) is rigidly attached to said bar intermediate the ends thereof, preferably by being formed therewith, and extends through a longitudinal recess 47a which connects with groove 41. Arm 47 is adapted for ready manual actuation, being located to project on both sides of the forward wall of trigger guard 27.

In operation, when trigger 25 is pulled, clockwise motion is imparted to lever 22 and sear engaging member 31, 36 is caused to depress sear 15. Cam member 39 engages said sear engaging member during the pivotal movement of said lever and imparts axial movement thereto, whereby said member is disengaged from the sear when the latter has been depressed sufficiently to effect the release of cocked firing pin 12. Trigger 25 is adapted to pivot lever 22 beyond this point of release, assuring the return of said sear to operative position whenever the trigger is pressed sufficiently to release the firing mechanism. When trigger 25 is released, lever 22 is pivoted in a counterclockwise direction by spring actuated pin 28, and sear engaging member 31, 36 is returned to its normal operative position above sear 15. To render the trigger mechanism inoperative, arm 47 of the safety means is pulled rearward to locate lug 42 beneath surface 46 of sear 15.

Novel alternate means for mounting cam member 39 are provided in order to adapt the above-described trigger mechanism for utility in automatic rifles which are capable of continuous as well as single shot fire. As shown in Figs. 6 and 7, said means comprise a plate 48 to which cam member 39 is rigidly secured, said plate being slidably mounted in a groove 49 in housing 20 and held in said groove by suitable means, such as a flat spring 50. A disc 51 is provided in groove 49 and is eccentrically mounted on a shaft 52 carried by housing 20 so as to be in cooperative engagement with the walls of a transverse slot 53 in plate 48. To rotate shaft 52, a resilient lever 54 is mounted thereon to be accessible from the exterior of housing 20, said lever having two positions thereof determined by recesses 55 in said housing which are adapted to receive the enlarged end 56 of said lever. Rotation of the latter from one of said positions to the other causes cam member 39 to be displaced longitudinally relative to housing 20.

In operation, when the rifle firing mechanism is to be controlled for single shot fire, cam member 39 is disposed as shown in full lines in Fig. 6, being located relative to the sear and the sear engaging member in the same manner as in Fig. 1. However, for continuous firing it is desirable that the sear engaging member remain in continuous engagement with the sear and, accordingly, for this type of firing, cam member 39 is moved longitudinally forward to the position

shown in broken lines in Fig. 6. The longitudinal displacement of said cam member to this second position is sufficient to move the latter out of the path of the sear engaging member so that the latter remains in engagement with the sear.

There is thus provided a novel trigger actuated mechanism adapted to control the operation of the sear of an automatic rifle for single shot or repeated firing. The mechanism comprises novel means for effecting disengagement between the sear and the sear actuating member to cause the sear to automatically return to operative position after each cartridge is fired. There is also provided a novel safety means adapted, when operative, to hold the trigger mechanism inoperable, said means being mounted in a novel manner and comprising a minimum number of parts. The trigger mechanism and safety means are compact, positive in operation, and comprise relatively simple, rugged parts which can be readily fabricated.

Although only two embodiments of the present invention have been illustrated and described, it is to be expressly understood that the same is not limited thereto. Various changes may be made in the design and arrangement of parts, as will now be apparent to those skilled in the art, without departing from the spirit and scope of the invention. For a definition of the limits of the invention, reference will be had primarily to the appended claims.

What is claimed is:

1. In an automatic rifle adapted for single shot or repeated firing, a pivoted sear, means resiliently urging said sear into operative position, a pivoted lever, a trigger for operating said lever, the pivotal axes of said sear and said lever being disposed in a single plane substantially parallel to the longitudinal axis of the barrel of the rifle, a member carried by said lever and movable bodily relative thereto, said member having an end portion arranged to engage and move said sear to inoperative position when actuated by the movement of said trigger, and cam means disposed adjacent said sear and selectively movable bodily to two positions for controlling the engagement between said sear and said member, said last-named means in one position being arranged in response to movement of said trigger to be engaged by said end portion to disengage said member from said sear when the latter reaches inoperative position and in the other position thereof being arranged to permit continuous engagement between said sear and said member.

2. In an automatic rifle adapted for single shot or continuous firing, a pivoted sear, means resiliently urging said sear into operative position, a pivotal lever, the pivotal axes of said sear and said lever being in a single plane substantially parallel to the longitudinal axis of the bore of the rifle, a trigger for imparting pivotal movement to said lever, a member slidably mounted in said lever, said member having an end portion arranged to engage and move said sear to inoperative position when said lever is pivoted, cam means disposed adjacent said sear and operative to engage said end portion and impart movement to said member relative to said lever in response to movement of the latter to cause said member to become disengaged from said sear when the latter reaches inoperative position, and means for moving said cam means bodily to inoperative position whereby said member and sear are maintained in continuous engagement, said last-named means comprising an eccentrically mounted disc and a transverse slot in said cam means and engaged by said disc.

GEORGE J. HYDE.