Aug. 28, 1951

T. F. HORAN

2,565,688

REPEATING FIREARM

Filed Aug. 26, 1946

2 Sheets-Sheet 1

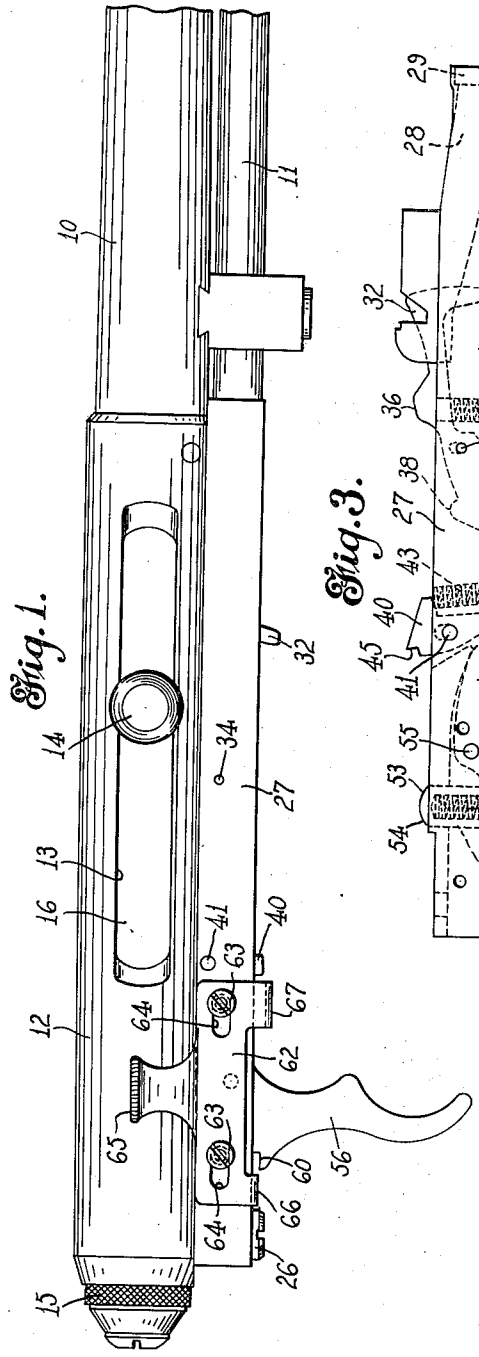


Fig. 1.

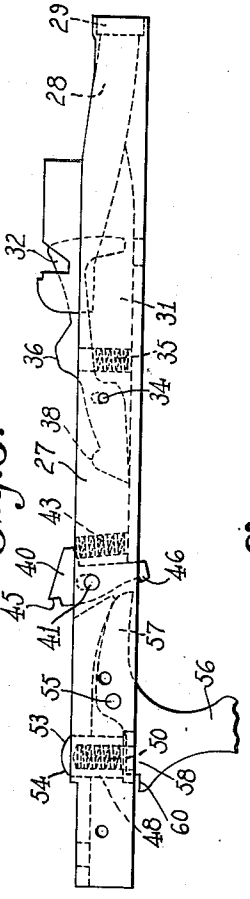


Fig. 3.

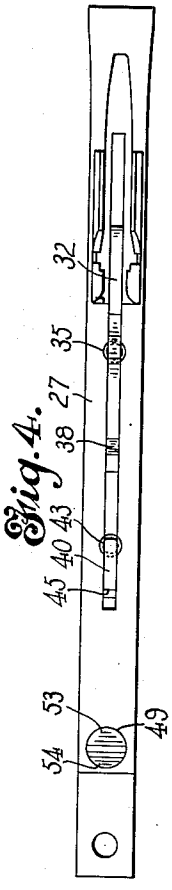


Fig. 4.

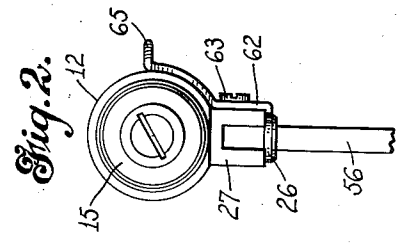


Fig. 2.

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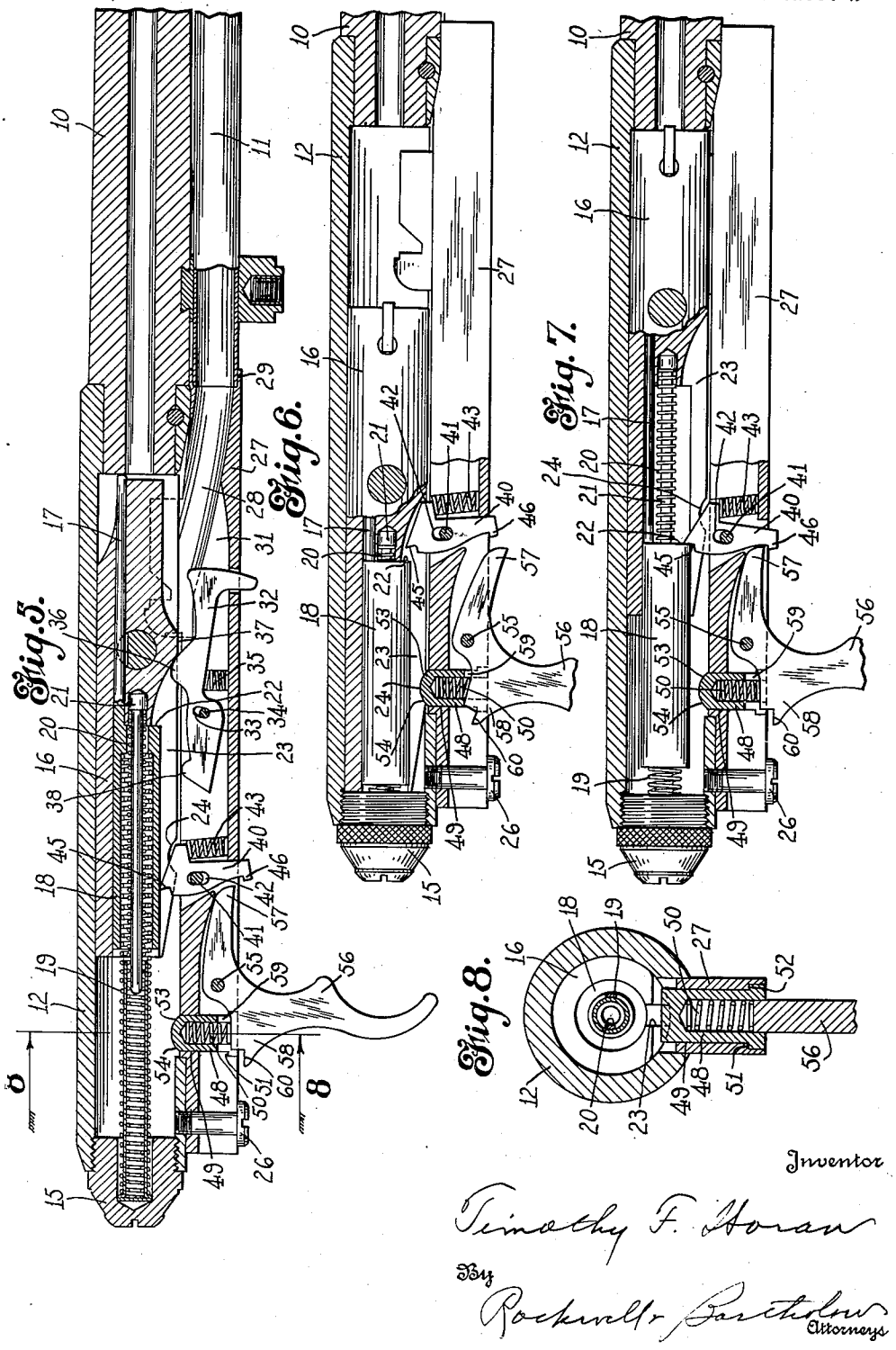


Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

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UNITED STATES PATENT OFFICE

2,565,688

REPEATING FIREARM

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11 Claims. (Cl. 42—17)

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This invention relates to firearms, and more particularly to a firearm of the automatic type, wherein the breech bolt is moved rearwardly in the receiver by the firing reaction and returned to a forward position by spring action. The movement of the bolt serves to actuate mechanism to throw a fresh cartridge from the magazines of the gun into the chamber, and also cocks the gun so that, at the end of the cycle of operations resultant upon the firing of the gun, a fresh cartridge is placed in the chamber and the gun made ready for a subsequent firing merely upon pulling of the trigger.

Some difficulty has at times been experienced with guns of this type in that, when the bolt has been blown rearwardly by the firing reaction and is returned by the spring provided for that purpose, the return takes place so quickly that sufficient time does not elapse to permit the fresh cartridge to be moved to a position where it may be thrown into the chamber by the return of the bolt. This will cause the gun to jam and results in considerable inconvenience to the operator.

It is contemplated by the present invention temporarily to retard or delay the return of the bolt to breech-closing position, so that this return will not take place until the cartridge lifter has had sufficient time to operate and lift a fresh cartridge to a position in front of the chamber. In the embodiment of the invention illustrated, this retardation of the return of the bolt is effected by a detent controlled by the trigger, which detent serves to delay the return of the bolt under the impulse of the bolt spring. According to the present construction, this detent may act to positively hold the bolt in a rearward or retracted position when sufficient pressure is exerted upon the trigger, or it may serve to engage the bolt fricionally so as to merely retard its return or cause the bolt to hesitate in its return in order to give the cartridge-transferring mechanism sufficient time to act.

To effect this result, the holding detent is not provided with an abrupt shoulder engaging the bolt but rather with a beveled face or shoulder which frictionally engages the bolt, and a spring is provided between the detent and the trigger, which spring not only acts as the trigger spring but also, when the trigger is pulled rearwardly, increases its pressure upon the detent so as to increase the frictional engagement of the detent with the bolt.

If sufficient pressure is placed upon the trigger, the spring may be compressed to such an extent that the trigger will positively engage the detent

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and force it against the bolt or into a recess formed in the bolt, so that the latter will be positively held in its rearward position until the trigger is released, or at least permitted a slight forward movement.

One object of the invention is to provide an automatic firearm having a bolt mechanism of improved construction and operation.

A still further object of the invention is to provide an automatic firearm having improved and simplified means for retarding the return of the bolt to breech-closing position after the bolt has been moved rearwardly by the firing reaction.

A still further object of the invention is to provide a firearm having a bolt mechanism moved rearwardly in the receiver by the firing reaction and returned to breech-closing position by a spring, which shall also be provided with a detent to momentarily delay the return of the bolt, this detent being urged against the bolt by a spring, which spring will be in turn tensioned by the trigger.

A still further object of the invention is to provide a firearm of the character above described in which the spring employed for urging the detent against the bolt also serves as the trigger spring to urge the trigger to a forward position where it may operatively engage the sear.

Other objects of the invention are to provide a novel sear for controlling the striker of the firearm and to provide novel means for supporting certain parts of the gun, such as the holding detent, the trigger, the sear, and the cartridge lifter, whereby these parts may be readily assembled and secured in operative position in the member or frame which supports them and thereafter readily applied to the gun.

To these and other ends the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a side elevational view of a firearm embodying my improvements;

Fig. 2 is a rear elevational view thereof;

Fig. 3 is a side elevational view of the assembly of certain of the operating parts of the gun upon their support, the assembly being shown detached from the receiver;

Fig. 4 is a top plan view of the parts shown in Fig. 3;

Fig. 5 is a longitudinal vertical sectional view through the receiver and associated parts of the gun;

Fig. 6 is a view similar to Fig. 5, showing the parts in the position assumed when the bolt has

been retracted and is being held against its return;

Fig. 7 is a view similar to Fig. 6, showing the parts of the gun in cocked position ready for firing; and

Fig. 8 is a sectional view on line 8—8 of Fig. 5.

To illustrate a preferred embodiment of my invention, I have illustrated in the drawings a firearm comprising a barrel section 10, a magazine 11, a receiver 12 having an opening 13 through which extends the bolt handle 14 in the usual manner, the receiver being closed at its rear end by the plug or cap 15.

Mounted in the receiver is the bolt 16 to which the handle 14 is connected by means of the firing pin or striker 17 which extends through an opening in the bolt and which is connected to, or formed integrally with, a striker body 18 of cylindrical shape, and which is also mounted in a longitudinal opening in the bolt. The body 18 is hollow and receives therein one end of the hammer spring 19, the other end of which reacts against the plug 15 so as to urge the hammer forwardly.

Within the spring 19 is a second coil spring 20 guided by a pin 21 within the bolt, which spring acts at its rear end against the plug 15 and at its front end against the bolt, so as to urge the latter forwardly to breech-closing position. The spring 20, as will be seen, extends through the body 18 of the striker or hammer, its forward end resting against the head of the pin 21, which head rests in the socket in the forward part of the bolt. The striker body 18 has a forwardly facing shoulder 22 at its front end where it is reduced in size at the base of the firing pin 17, this shoulder being engaged by the sear to cock the weapon, as will be hereinafter explained. Also, the bolt 16 is provided with a longitudinally extending recess 23 in its lower face to permit the operation of certain of the action mechanism, as will be hereinafter explained, and is also provided with a transversely extending recess 24, which, as clearly shown in Figs. 5, 6 and 7, is of arcuate form having curved rather than abrupt walls.

Secured at the lower side of the receiver by the screw 26 is a supporting block 27 which serves to support certain parts of the elements of the gun action. This block is of substantially rectangular cross section and is hollowed or cut out, as shown, to receive the elements which it supports, such as the trigger, the sear, the lifter, the holding detent, and associated springs, as will be hereinafter explained. It may here be stated that all of these parts may be assembled in the supporting block 27 and the latter thereafter applied and secured to the receiver. At its forward end this block is provided with a passage 28 to permit cartridges to pass into the receiver from the magazine 11, which passage is counterbored, as shown at 29, to receive the rear end of the magazine so that the latter assists in securing the supporting block in place.

Adjacent its forward end, this block is provided with a recess 31 within which is mounted the cartridge lifter 32. This lifter is provided with a vertically elongated slot 33 within which is loosely received a pivot pin 34 secured in the block 27, so that the lifter not only enjoys a pivotal movement with relation to the block, but also a vertical movement, the lifter being urged upwardly by a spring 35. The lifting element 32 is also provided with a cam surface 36 which is engaged by the cam surface 37 of the bolt to move the front end of the lifter downwardly upon the return of the bolt to closed position, and is also provided with a cam surface 38 adjacent its rear end also engaged by the cam surface 37 when the bolt is retracted to raise the forward end of the lifter and thus transfer a cartridge from the passage 28 into the receiver forwardly of the bolt in position to be moved into the chamber in the bolt when the bolt is moved forwardly.

A sear 40 is pivotally mounted in the block 27 upon the pin 41, the sear being provided with a vertically elongated slot 42, so that it is loosely mounted upon the pivot pin 41 and is urged upwardly by the spring 43 so that the pin 41 will, when permitted, lie at the bottom of the opening 42, as shown in Figs. 6 and 7. At its upper end, the sear is provided with a shoulder 45 adapted to engage the shoulder 22 upon the striker body 18 to hold the striker in cocked position, as shown in Fig. 7, and, at its lower end, is provided with a rearwardly projecting lug 46 adapted to be engaged by the trigger for firing, as will be hereinafter explained.

Mounted in the block 27 for vertical sliding motion is a detent 48 of substantially cylindrical form, this detent projecting upwardly into the receiver through an opening 49 in the block 27. It may here be stated that the receiver is provided with an elgonated opening in its lower face, this opening being closed by the block 27 so that the various operating parts may project from the block into the receiver to engage the hammer and striker. The detent 48 is hollow, and mounted within it is a spring 50 urging the detent upwardly, this movement being limited by a shoulder 51 on the detent which engages a complementary shoulder 52 formed in the supporting block 27, as shown more particularly in Figs. 5 and 8.

The upper end of the detent is beveled or rounded, both forwardly and rearwardly, as shown at 53 and 54, thus forming a crest between these surfaces, and this end of the detent is adapted to engage in the transverse recess 24 of the bolt to retard the return thereof, as will be more fully explained.

Pivoted to the block 27 at 55 is a trigger 56, this trigger having a forwardly extending arm 57 adapted to engage the lug 46 at the lower end of the sear and also being provided with a tail portion 48. This tail portion extends into a slot 59 formed in the detent 48, so that the spring 50 is seated upon this tail portion of the trigger and acts against it, urging the lower end of the trigger forwardly.

The tail portion of the trigger is also provided with a shoulder 60 spaced slightly below the lower surface of the block 27. As shown more especially in Figs. 1 and 2, a safety slide 62 is movably mounted upon the block 27 by screws 63, which screws extend through elongated slots 64 in the slide, enabling the latter to be moved through a limited distance forwardly and rearwardly by the fingerpiece 65. This slide is provided below the block 27 with laterally or horizontally projecting holding lugs 66 and 67. In Fig. 1, the slide is shown in its inoperative position. If moved forwardly, however, the holding lug 66 moves between the shoulder 60 and the lower surface of the supporting block 27, thus preventing the pulling of the trigger, while, at the same time, the holding lug 67 moves below the lower end of the sear 40, thus blocking the sear against being moved downwardly. Thus a double safety is provided, so that not only is the trigger prevented from being pulled, but the

sear is prevented from moving downwardly to release the hammer as a result of a shock or jar.

The operation of my device may be briefly described as follows: In Fig. 5 of the drawing, the parts are shown in the position which they occupy at the moment of firing of the gun. The hammer and also the bolt are in their forward positions, but the trigger is also shown in its forward position, as though it had been released by the operator. The firing reaction will then move the bolt to the rear against the tension of the bolt spring, and the bolt will carry the hammer and striker therewith to the rear end of the receiver, or to the position shown in Fig. 6 of the drawings. It is assumed that the trigger will still be held rearwardly by the operator, and it will be seen that the detent 48 will be held upwardly by pressure of the spring 50.

During the rearward travel of the bolt, the detent will be cammed downwardly against the tension of this spring, until the bolt arrives at such a position that the detent may enter the recess 24 of the bolt, when it will spring upwardly into this recess and retard the return movement of the bolt. As shown in Fig. 6, the upper surface of the tail portion 58 of the trigger is in engagement with the upper edge of the slot 59 in the detent, so that the detent will be held positively in the recess 24, thus positively preventing return of the trigger. In some instances, however, this positive action may not occur and the trigger will merely increase the pressure of the spring 50, in which case the detent, by its frictional engagement in the recess 24, will merely retard the return of the bolt but will not positively prevent this return.

It will be seen that in Fig. 5 the sear 40 is held downwardly by the contact of its upper end with the lower surface of the striker body 18, the pin 41 being near the upper end of the slot 42. When the bolt is blown back, as described above, the striker is also carried rearwardly to the position shown in Fig. 6, in which the sear is moved upwardly by its spring 43 to a position in which the shoulder 45 lies in front of the shoulder 22 of the striker, the sear thus being ready to engage the striker upon the return of the bolt and hold it in cocked position.

When the operator releases the pressure upon the trigger, the bolt moves forwardly to closed position, as shown in Fig. 7, the striker, however, being retained in a rearward position by engagement with the sear, also as shown in this figure. The trigger spring 50 returns the trigger to its forward position, and re-engages its forward end 57 with the lug 46 on the sear, so that the gun is again ready for firing. It will be understood that the releasing movement of the sear is a downward movement permitted by the slot 42, but that the sear also has a pivotal movement on the pin 41 to permit its re-engagement by the part 57 after the gun has been fired.

During the rearward movement of the bolt, the lifter 32 is actuated in the usual manner to transfer a fresh cartridge from the throat 28 into the receiver, to be moved into the chamber upon the return movement of the bolt in the usual manner.

It will be obvious that I have provided a firearm which is of very simple construction and economical to manufacture, in that it consists of relatively few parts which may be readily made and assembled with the supporting block 27 prior to the application of the latter to the receiver.

While I have shown and described a preferred embodiment of my invention, it will be understood that it is not to be limited to all of the details shown, but is capable of modification and variation within the spirit of the invention and within the scope of the claims.

What I claim is:

1. A firearm comprising a receiver, a trigger pivoted thereto and having an integral tail portion rearwardly of its pivot, a breech bolt reciprocably mounted therein and adapted to be moved rearwardly from closed position by the firing reaction, a spring to return the bolt to closed position, said bolt being provided with a shoulder, means for momentarily retarding the return of the bolt, said means comprising a detent mounted on the receiver in position to engage said shoulder when the bolt has been moved rearwardly, and a spring positioned between said detent and the tail portion of the trigger to move the latter forwardly and urge said detent toward the shoulder.

2. A firearm comprising a receiver, a trigger pivoted thereto and having an integral tail portion rearwardly of its pivot, a breech bolt reciprocably mounted therein and adapted to be moved rearwardly from closed position by the firing reaction, a spring to return the bolt to closed position, said bolt being provided with a shoulder, means for momentarily retarding the return of the bolt, said means comprising a detent mounted on the receiver in position to engage said shoulder when the bolt has been moved rearwardly, a spring positioned between said detent and the tail portion of the trigger to move the latter forwardly and urge said detent toward the shoulder, a striker, and a sear to control the striker, said sear being actuated by the trigger.

3. A firearm comprising a receiver, a trigger pivoted thereto and having an integral tail portion rearwardly of its pivot, a breech bolt reciprocably mounted therein and adapted to be moved rearwardly from closed position by the firing reaction, a spring to return the bolt to closed position, said bolt being provided with a shoulder, means for momentarily retarding the return of the bolt, said means comprising a detent mounted on the receiver in position to engage said shoulder when the bolt has been moved rearwardly, a spring positioned between said detent and the tail portion of the trigger to move the latter forwardly and urge said detent toward the shoulder, a striker, and a sear to control the striker, said sear being actuated by the trigger, said detent spring being rearwardly of the trigger pivot and said sear being forwardly thereof.

4. A firearm comprising a receiver, a trigger pivoted thereto, a breech bolt reciprocably mounted therein and adapted to be moved rearwardly from position closing the receiver by the firing reaction, a spring to return the bolt to closed position, said bolt having a recess therein, a detent member movably carried by a part of the receiver, said detent having a beveled upper surface to engage in said recess and frictionally hold said bolt in a rearward open position, and a spring urging said detent toward the recess.

5. A firearm comprising a receiver, a breech bolt reciprocably mounted therein and adapted to be moved rearwardly from position closing the receiver by the firing reaction, a spring to return the bolt to closed position, said bolt having a recess therein, a detent member movably carried by a part of the receiver, said detent

having a beveled upper surface to engage in said recess and frictionally hold said bolt in a rearward open position, a trigger pivoted to a part of the receiver and having a tail portion rearwardly of its pivot, and a spring acting between the said tail portion and detent to urge the latter upwardly and urge the trigger forwardly.

6. A firearm comprising a receiver, a breech bolt reciprocably mounted therein and adapted to be moved rearwardly from position closing the receiver by the firing reaction, a spring to return the bolt to closed position, said bolt having a recess therein, a detent member movably carried by a part of the receiver, said detent having a beveled upper surface to engage in said recess and frictionally hold said bolt in a rearward open position, a trigger pivoted to a part of the receiver and having a tail portion rearwardly of its pivot, and a spring acting between the said tail portion and detent to urge the latter upwardly and urge the trigger forwardly, the tail portion of the trigger engaging said last-named spring to increase the pressure of the detent on said bolt when the trigger is pulled.

7. A firearm comprising a receiver, a trigger pivoted thereto, a breech bolt reciprocably mounted therein and adapted to be moved rearwardly from position closing the receiver by the firing reaction, a spring to return the bolt to closed position, said bolt having a recess therein, a detent member movably carried by a part of the receiver, said detent having a beveled upper surface to engage in said recess and frictionally hold said bolt in a rearward open position, and a spring acting between said detent and trigger and urging said detent toward the recess, said detent having means engaging a part of the receiver to limit its movement toward the bolt whereby said last-named spring acts as a trigger spring.

8. A firearm comprising a receiver, a trigger pivoted thereto, a breech bolt reciprocably mounted therein and adapted to be moved rearwardly from position closing the receiver by the firing reaction, a spring to return the bolt to closed position, means for frictionally retarding the return of the bolt comprising a detent member movably carried by said receiver, a spring urging said member into contact with the bolt, and means formed integrally with the trigger acting on said last-named spring to increase the pressure of the detent member on the bolt when the trigger is pulled.

9. A firearm comprising a receiver, a trigger, a striker operatively associated with the receiver, a horizontal pivot pin secured to a part of the receiver, a sear pivoted on said pin and having a vertically elongated slot in which said pin is received to permit substantially vertical movement of said sear relatively to the receiver, said sear being mounted in position to engage the striker and having a tail portion extending below a part of the trigger whereby it is moved downwardly by the latter, and a spring acting on said sear forwardly of said pivot pin urging said sear upwardly and urging the lower end thereof forwardly away from the trigger.

10. A firearm comprising a receiver, a trigger pivoted thereto, a breech bolt reciprocably mounted therein and adapted to be moved rearwardly from position to close the receiver by the firing reaction, a spring to return the bolt to closed position, a detent member movably carried by said receiver, a spring urging said member into contact with the bolt, and means on the trigger acting on said last-named spring to increase the pressure of the detent member on the bolt when the trigger is pulled, said detent member being cammed from holding engagement with the bolt when the latter is returned by its spring to closed position.

11. A firearm comprising a receiver, a bolt and striker operatively mounted therein, said receiver having an opening in its lower surface, an assembly adapted to be detachably applied to said receiver, said assembly comprising a supporting block adapted to close said opening and also comprising a cartridge lifter, a sear, and a trigger operatively mounted in said block, and a detent member also mounted in said block and extending upwardly through said opening into the receiver to engage the bolt to retard the return thereof after the bolt is thrown rearwardly, said trigger being positioned to actuate said sear and the latter extending through the opening in the receiver to engage the striker.

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