June 17, 1947. T. F. HORAN 2,422,301

CARTRIDGE FEEDING MECHANISM FOR REPEATING FIREARMS

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Fig. 1.

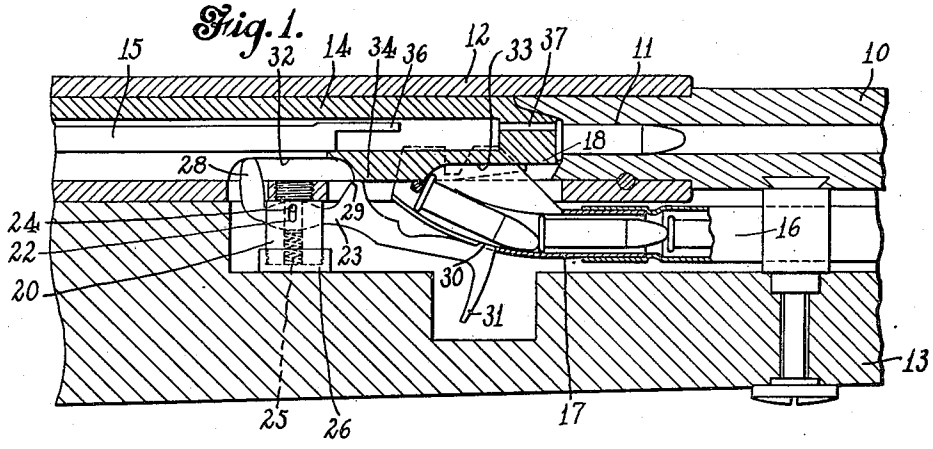


Fig. 2.

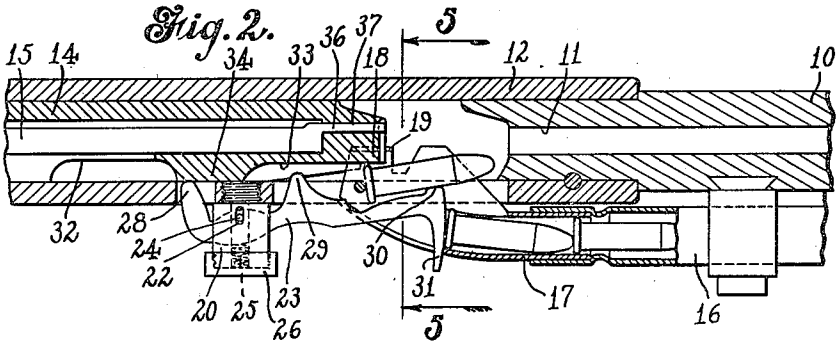


Fig. 3.

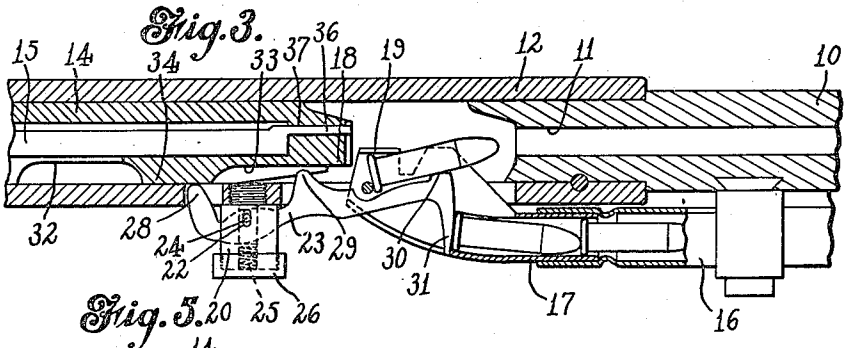
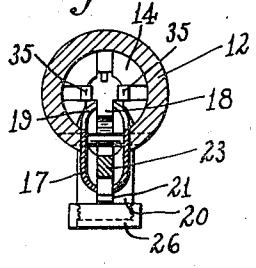


Fig. 5.



INVENTOR.
Timothy F. Horan
BY
Rockwell & Bartholow
ATTORNEYS.

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Fig. 4.

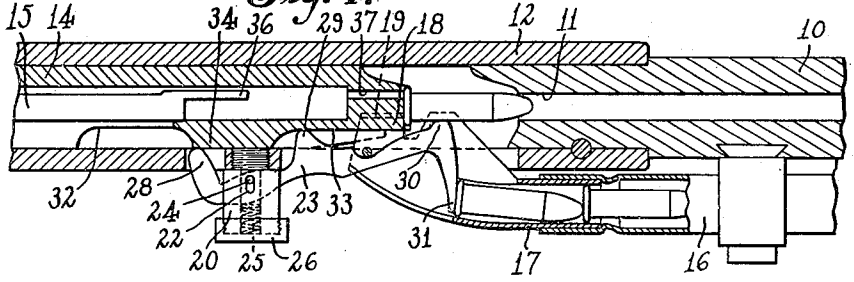


Fig. 6

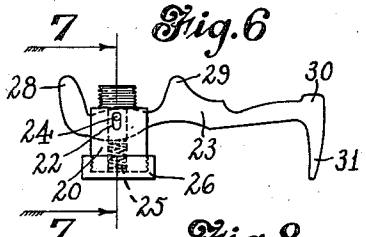


Fig. 7.

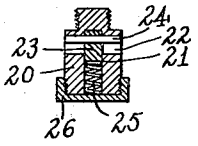


Fig. 8.

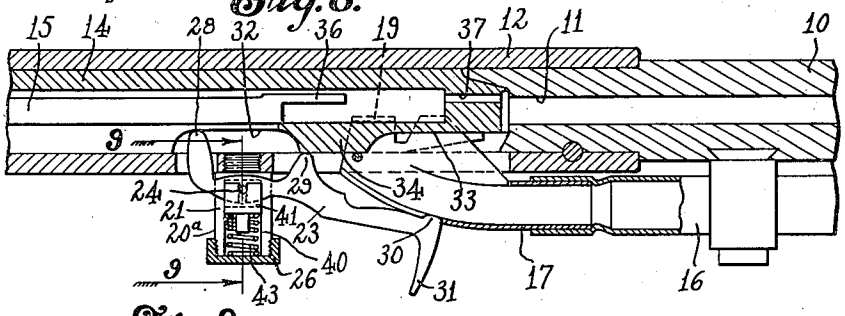


Fig. 9.

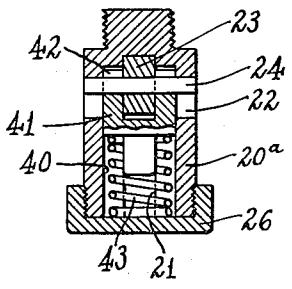
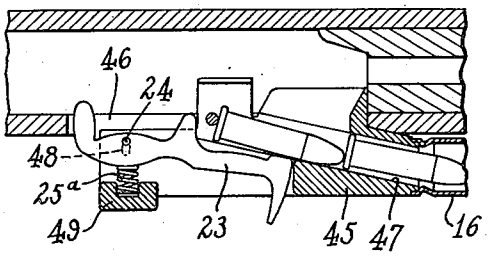


Fig. 10.



INVENTOR.
Timothy F. Horan
BY
Rockwell & Barnard
ATTORNEYS.

Patented June 17, 1947 2,422,301

UNITED STATES PATENT OFFICE

2,422,301

CARTRIDGE FEEDING MECHANISM FOR REPEATING FIREARMS

Timothy F. Horan, New Haven, Conn.

Application January 12, 1944, Serial No. 517,961

3 Claims. (Cl. 42—17)

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This invention relates to firearms, and more particularly to a firearm of the repeating type, wherein the cartridges lie in a magazine or the like and are raised during the rearward movement of the bolt to a position in front of the bolt, so that they may be pushed into the chamber during its forward movement, this application being a continuation in part of my prior application for Automatic firearm, filed July 30, 1940, Serial No. 348,429. The invention may be employed upon an automatic or semi-automatic type of firearm, or upon the non-automatic type, as the particular device for moving the cartridge in a position for entrance into the chamber is actuated by the rearward movement of the bolt, whether this movement is effected manually or automatically.

In firearms of the type disclosed, it has sometimes occurred that the device for lifting the cartridge from the magazine does not place the cartridge in a sufficiently elevated position to be engaged by the bolt upon its forward or return movement, and in such case the forward movement of the bolt will take place without transferring a fresh cartridge into the chamber. This imperfect action is sometimes due to the fact that the cartridge is raised from the magazine during the rearward movement of the bolt into contact with the lower surface of the bolt, which prevents it from being elevated to a sufficient extent to be engaged by the forward edge of the bolt. In the present construction the lifting device for the cartridge is in the form of a lever, pivoted intermediate its ends by means of what may be termed a floating pivot of such a nature that the pivot has a limited movement in addition to its pivotal movement, whereby the lifter may be thrown upwardly to the extent permitted by the bolt, and thereafter, when the latter has moved out of the path of the cartridge, be given an additional or supplementary movement by a spring to insure the lifting of the cartridge to a position in which it will be positively thrust into the chamber upon the forward movement of the bolt.

One object of the present invention is to provide a new and improved mechanism for transferring a cartridge from the magazine to the chamber of a firearm.

A further object of the invention is to provide means for improving the action of a repeating firearm, to the end that upon a complete movement of the bolt of the gun a fresh cartridge will without fail be thrust into the chamber.

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 longitudinal sectional view of a portion of a firearm embodying my invention;

Fig. 2 is a view similar to Fig. 1 but showing the parts in another position;

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Fig. 3 is a view similar to Figs. 1 and 2, showing the position of the parts when the bolt is in its fully retracted position;

Fig. 4 is a similar sectional view showing the position of the parts when the bolt has reached a position during its forward movement in which the cartridge is being inserted into the chamber;

Fig. 5 is a sectional view on line 5—5 of Fig. 2;

Fig. 6 is a detail view of the lifter mechanism;

Fig. 7 is a sectional view on line 7—7 of Fig. 6;

Fig. 8 is a longitudinal sectional view of a portion of a firearm showing a slightly modified form of my invention;

Fig. 9 is a sectional view on line 9—9 of Fig. 8; and

Fig. 10 is a sectional view of a further modification.

To illustrate one embodiment of my invention, I have shown in Fig. 1 of the drawings a portion of a firearm comprising a barrel 10 having the usual chamber 11, a receiver 12, a forearm 13, a bolt 14 reciprocably mounted in the receiver to be operated either manually or automatically, and a striker shown at 15.

Below the barrel 10 is the magazine 16 which may be of more or less the usual form employed in a repeating firearm. From the rear end of the magazine a throat 17 leads into the receiver so that cartridges may be transferred from the magazine to the receiver for insertion into the chamber. This throat is as shown in Figs. 1 to 4, open at the top to permit the cartridges to pass therefrom, the forward reduced end 18 of the bolt passing through this opening in the reciprocating movements of the bolt. At its upper and rear portion, as shown in Figs. 1 to 3 and 5, the throat is provided with inturned flanges 19 which serve to limit the upward throw of a fresh cartridge by the lifter, as will be hereinafter explained.

To transfer the fresh cartridges from the magazine throat 17 to the receiver, I employ a pivoted lifter which is mounted upon a floating pivot so that this lifter will not only have a rocking movement about its pivot but will also have a movement of translation to some extent in a vertical direction, this movement being limited by the play or movement allowed the pivot of the lifter. To this end a stud 20 is secured to the lower part of the receiver, the stud being slotted at 21 through its lower end as illustrated, and also being provided with an elongated transverse opening 22.

Within the slot 21 is mounted the pivoted lifter or lever 23, which member has a pin 24 secured thereto, which pin is loosely received in the elongated opening 22 of the stud 20. A spring 25 lies below the body of the lifting lever 23 and urges the latter upwardly, thus tending to maintain the pin 24 at the upper end of the opening 22, the spring operating against a cap 26 which may

be threaded upon the lower end of the stud 20.

As shown in the drawings, the lifter 23 is provided with spaced fingers 28 and 29 and also with a forward end portion 30 designed to contact the cartridge and lift it into the receiver. A guard or tail member 31 is also provided at the forward end of the lifter to close the throat when the lifter is in the position shown in Fig. 4 and prevents a fresh cartridge entering the rear portion of the throat when the forward end of the lifter is in raised position.

As shown in Figs. 1 to 4, the lower side of the bolt is cut away as shown at 32 and 33 so as to leave, between these cutaway portions, a lug 34 designed to engage the fingers 28 and 29 upon the lifter and rock the latter in opposite directions. At the forward end of the bolt, as shown in Fig. 5, there will preferably be provided the usual extractors 35, although these do not need to be described in detail as they form no part of the present invention.

The operation of the parts will now be described. In Fig. 1 the parts are shown in the positions assumed when the gun is in cocked position. The striker 15 is in a rearward position; one cartridge lies in the chamber ready for firing; and another lies in the throat above the end 30 of the lifter ready to be transferred to the receiver. When the gun is fired, the striker 15 moves forwardly in the usual manner, its front end 36 entering the opening 37 provided in the bolt, so that the portion 36 can strike the rear end of the cartridge. After the gun is fired, the bolt 14 is moved rearwardly either automatically or manually. The first stage of this movement is shown in Fig. 2 wherein the lug or shoulder 34 on the bottom of the bolt has engaged the rear finger 28 of the lifter and moves the forward end 30 upwardly so as to lift the cartridge into the upper portion of the throat, which portion lies in the receiver. It will be seen at this time, however, that the front end of the bolt still overlies the rear end of the fresh cartridge so as to limit the upward movement of the forward end of the lifting lever. It will also be observed that the rear end or the finger 28 of the lifting lever is moved downwardly by the lug 34 to the maximum extent and that the pivot pin 24 is substantially at the bottom of the elongated opening 22.

The bolt still continues to move rearwardly as shown in Fig. 3 and when its forward end has passed out of engagement with the rear end of the cartridge, as shown in this figure, the spring 25 lifts the pivot pin 24 and lever 23 upwardly in the opening 22, thus causing the forward end of the lifter to be elevated to a further extent, moving the fresh cartridge upwardly until its rear end is in engagement with the flanges 19. The bolt is now in its rearmost position, as shown in this figure, and the rear end of the cartridge will be engaged by the forward end of the bolt when the latter moves forwardly as the cartridge has been moved upwardly so that a part of it lies above the lower portion of the front edge of the bolt. It may also be noted that the pivot pin 24 is in an intermediate position in the elongated opening 22, thus providing for a further upward movement of the front end of the lifter if the cartridge were not held by the flanges 19.

The bolt is now moved forwardly, as shown in Fig. 4, and, as illustrated in this figure of the drawings, has engaged the rear end of the cartridge and moved it forwardly out of engagement with the flanges 19. As soon as the rear end of the cartridge moves to a position forwardly of these flanges, the spring 25 urges the forward end of the lifter upwardly from the position shown in Fig. 3, to that shown in Fig. 4, thus raising the fresh cartridge to a level with the chamber as shown in Fig. 4, so that, upon a continued forward movement of the bolt, the cartridge will be positively and evenly transferred from the receiver into the chamber. This additional upward movement of the forward end of the lifter, shown in Fig. 4, is the result of the provision of the elongated opening 22 as the pivot pin 24 moves from the intermediate position shown in Fig. 3 to the upper end of the opening 22, as shown in Fig. 4. It may also be noted that, in the position shown in Figs. 2, 3, and 4, the finger 28 is engaged by the lug 34 and the lifter, in its movements to the position shown in Fig. 3 and also to the position shown in Fig. 4, moves about the upper end of the finger 28 as a pivot.

It will be seen that, in Fig. 4 of the drawings, the tail 31 of the lifter is disposed in the path of an additional cartridge entering the throat from the magazine so as to prevent this cartridge from being pushed rearward below the lifter and prevent the downward return of the latter. When the bolt moves forwardly from the position shown in this figure, the finger 29 of the lifter will be engaged by the forward portion of the lug 34, and the forward end of the lifter will be moved downwardly, returning the parts to the position shown in Fig. 1. As the forward portion of the lug 34 engages the finger 29, the rear portion of this lug will disengage the finger 28 so that the forward end of the lifter will be swung downwardly about the pivot pin 24. If, however, the timing of the engagement of finger 29 and disengagement of finger 28 are not perfect, compensation in this respect would be provided by the floating pivot 24 as it could move downwardly in the opening 22.

It will be apparent, therefore, that I have provided a lifting device which is permitted an additional or auxiliary upward movement at its forward end without any change in the position of its rear end and that this additional forward movement serves to insure the cartridge being moved to a position in front of the bolt after the latter has moved rearwardly a sufficient distance to clear the cartridge so as to insure the transfer of a fresh cartridge into the chamber upon each reciprocation of the bolt.

In Figs. 8 and 9 of the drawings, I have shown a slightly modified form of my invention. In this form, the parts are of the same construction as described in connection with Figs. 1 to 7 except in respect to the mounting of the lifter 23. The lifter is provided with the pivot pin 24 as before, the ends of which pin lie in elongated openings 22 in a stud 20^a secured to the receiver. The stud 20^a is similar to the stud 20 in that it is provided with elongated openings 22 and also with the slot 21 and cap 26. It is, however, provided with an internal bore 40 within which is mounted a plunger 41 having cradle arms 42 in which the pivot pin 24 is rockably supported. A spring 43 bears against the plunger and against the cap 26 to normally urge the plunger upwardly.

Thus it will be seen that a floating pivot is also provided for the lifter 23 in this form of my invention, which acts in a manner similar to that previously described in that the lifter is rockably mounted in the plunger by means of the pin 24 and the cradle arms 42, and that this plunger is mounted for vertical movement in stud 20^a so

that the pivot pin 24 of the lifter is permitted a vertical movement and limited by the elongated openings 22. The principal difference between that form of the invention shown in Figs. 1 to 7 and that form shown in Figs. 8 and 9 is that in the latter the spring 43 acts upon the plunger 41 and, through it, acts upon the pivot pin of the lifter instead of the spring's acting upon the lower surface of the lifter directly as in the form of my invention first described.

In Fig. 10 of the drawings, I have shown a somewhat modified construction in which a supporting member is attached to the receiver, which member supports the lifter and also is provided with a throat opening receiving the cartridges from the magazine and holding them in position to be moved into the receiver. In this instance, the throat opening is arranged on a gentle incline instead of a sharply curved incline as in the other figures of the drawings.

As shown in Fig. 10, a supporting member 45 is secured in an opening 46 at the lower portion of the receiver, this member being provided with a throat or passage 47 communicating with the magazine 16 at its forward end so that the cartridges from the magazine slide into this throat to be engaged by the lifter 23 and carried upwardly into the receiver as previously explained. The lifter 23 is of the same form shown in Figs. 1 to 4 of the drawings and is provided with a pivot pin 24, which pivot pin is mounted in elongated slots 48 provided in a portion of the member 45, this member being slotted longitudinally to receive the lifter between its two side walls. The member 45 is also provided with an abutment 49, against which acts the lower end of the spring 25a, the upper end of which contacts the lower surface of the lifter 23 and tends to maintain the pin 24 at the upper end of the slot 48. It will be noted that the throat 45 has a gentle incline rearwardly from the magazine so that a cartridge in this throat occupies a more elevated position with respect to the receiver than that shown in Fig. 1, for example, this being particularly true of the cartridge shown partly in the magazine and partly in the throat, or the second from the last cartridge as shown in Fig. 10. With this position of the two cartridges, shown, the rearmost one cannot, when the bolt is in its forward position, move upwardly to a sufficient extent to permit the following cartridge to slide rearwardly under the nose of the first and thus cause the gun to jam. When the bolt is moved rearwardly, it will be understood that the rearmost cartridge will be moved into the chamber and permit the next following cartridge to move into a position below it so as to be ready to be lifted into the chamber upon a subsequent loading operation.

While I have shown and described some preferred embodiments 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 repeating firearm comprising a barrel, a chamber, a receiver, a magazine, a bolt reciprocally mounted in the receiver for closing the chamber, means for transferring a cartridge from the magazine to the receiver for insertion into the chamber comprising a lifter pivoted between its ends on the receiver and having a member thereon rearwardly of its pivot engageable by a part of the bolt during its rearward movement to lift the forward end of the lifter and a cartridge carried thereby, stop means limiting the raising of the cartridge by the lifter, said bolt during its forward movement engaging the cartridge to move it out of engagement with said stop means, said lifter pivot being movable vertically, and a spring acting on said pivot to move it upwardly after the cartridge has been moved from engagement with said stop means to give the cartridge a lifting movement in addition to that imparted by the bolt.

2. A repeating firearm comprising a barrel, a chamber, a receiver, a magazine, a bolt reciprocally mounted in the receiver for closing the chamber, means for transferring a cartridge from the magazine to the receiver for insertion into the chamber comprising a lifter pivoted between its ends on the receiver and having a member thereon rearwardly of its pivot engageable by a part of the bolt during its rearward movement to lift the forward end of the lifter and a cartridge carried thereby, stop means limiting the raising of the cartridge by the lifter, said bolt during its forward movement engaging the cartridge to move it out of engagement with said stop means, said lifter pivot being movable vertically, and a spring acting on said pivot to move it upwardly after the cartridge has been moved from engagement with said stop means to give the cartridge a lifting movement in addition to that imparted by the bolt, said spring acting directly on said pivot in a vertical direction.

3. A repeating firearm comprising a barrel, a chamber, a receiver, a magazine, a bolt reciprocally mounted in the receiver for closing the chamber, means for transferring a cartridge from the magazine to the receiver for insertion into the chamber comprising a lifter pivoted between its ends on the receiver and having a member thereon rearwardly of its pivot engageable by a part of the bolt during its rearward movement to lift the forward end of the lifter and a cartridge carried thereby, stop means limiting the raising of the cartridge by the lifter, said bolt during its forward movement engaging the cartridge to move it out of engagement with said stop means, said lifter pivot being movable vertically, a spring acting on said pivot to move it upwardly after the cartridge has been moved from engagement with said stop means to give the cartridge a lifting movement in addition to that imparted by the bolt, the pivotal mounting of the lifter on the receiver comprising a pin on one of said members and an elongated slot provided on the other member in which said pin rests, and a spring acting on said pin in a vertical direction.

TIMOTHY F. HORAN.

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