Nov. 11, 1947. R. L. JENKINSON 2,430,680

BREECH BOLT AND RETRACTING MEANS THEREFOR

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Fig. 1.

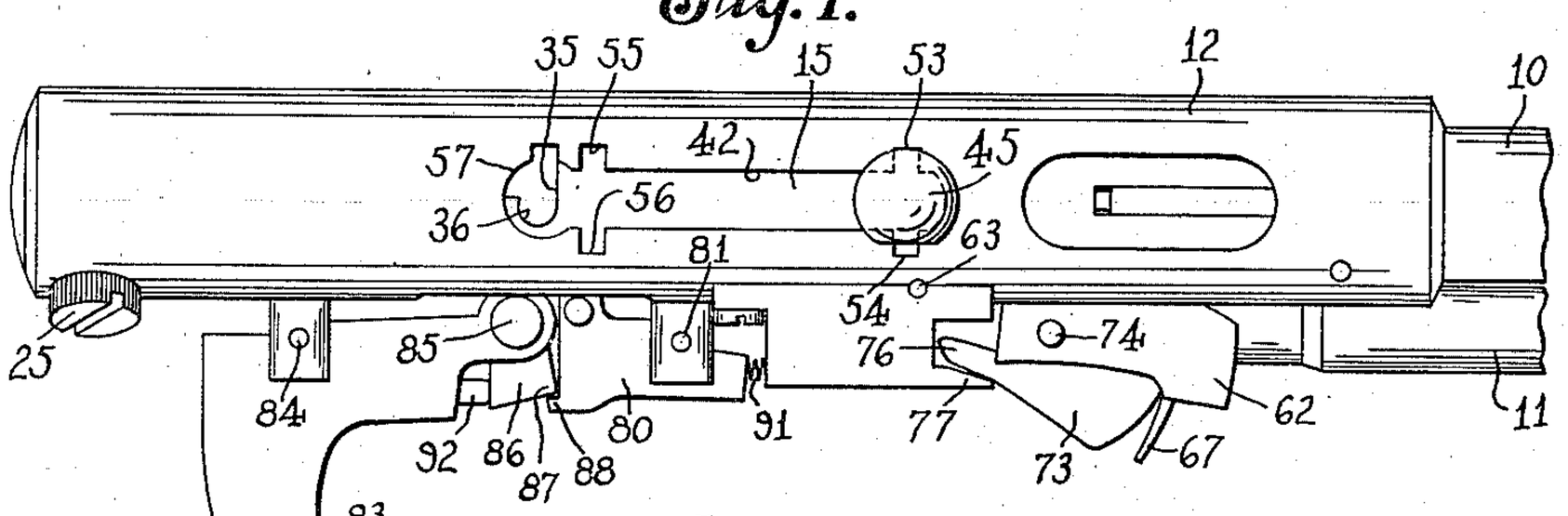

Fig. 2.

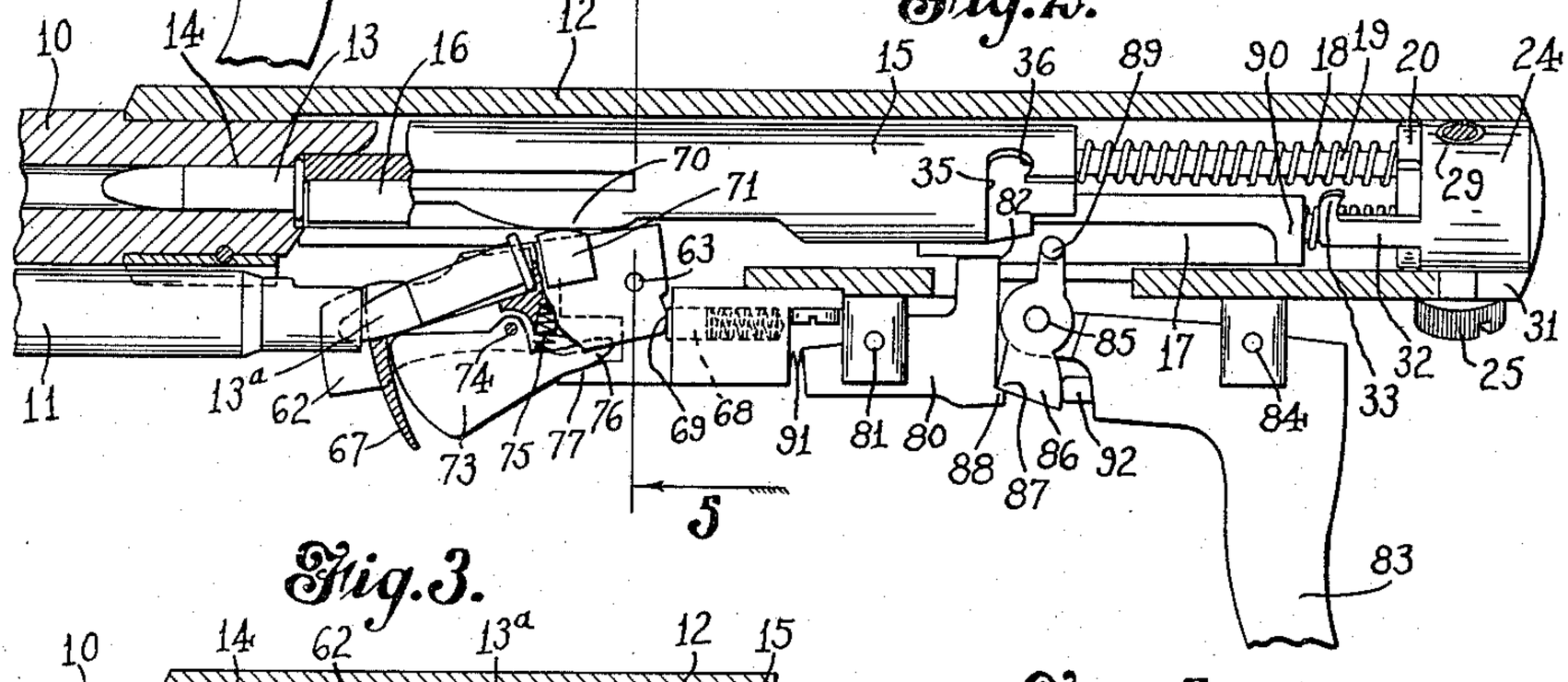

Fig. 3.

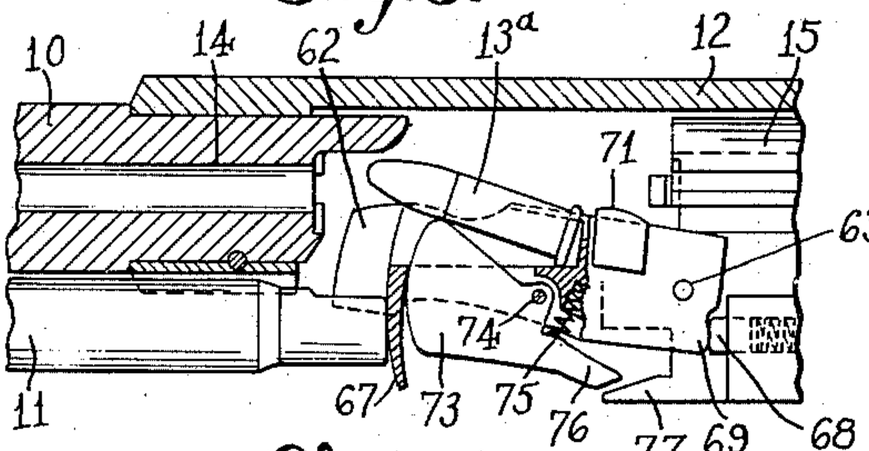

Fig. 4.

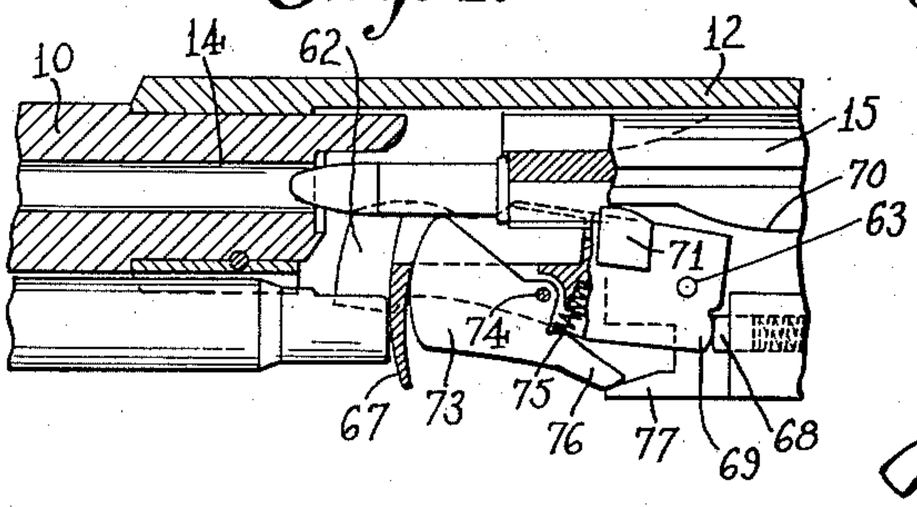

Fig. 5.

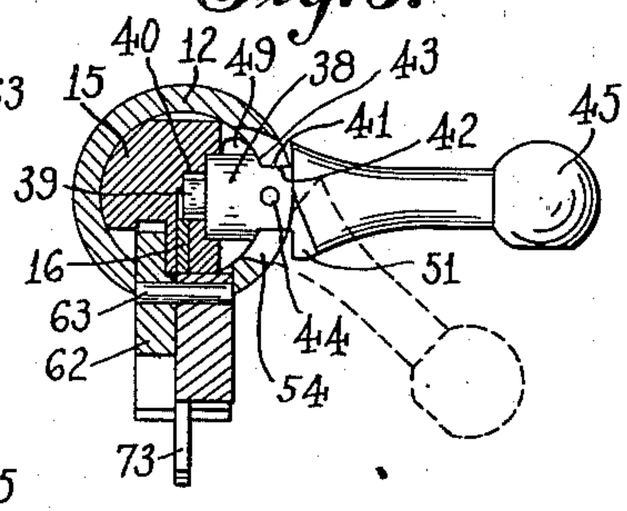

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Fig. 6.

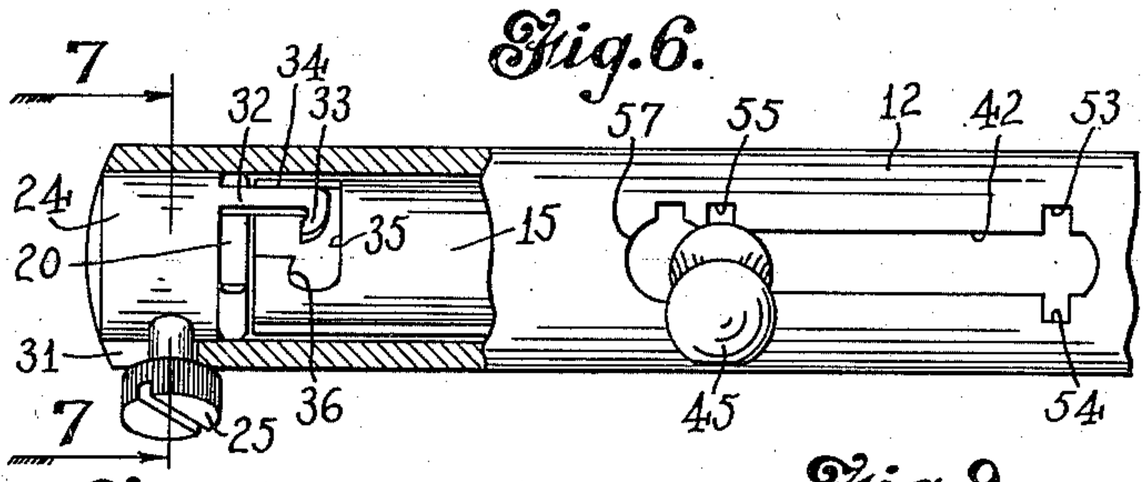


Fig. 7.

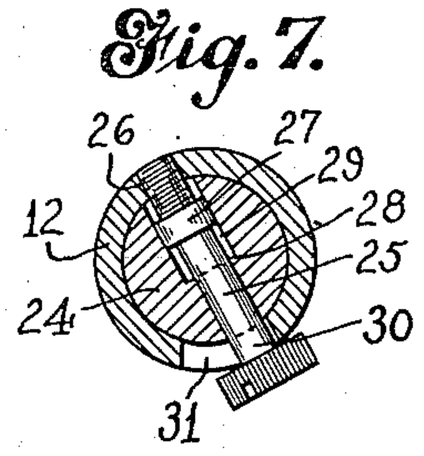


Fig. 8.

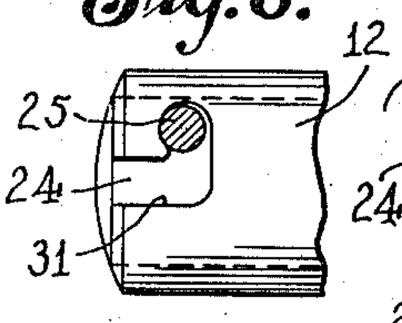


Fig. 9.

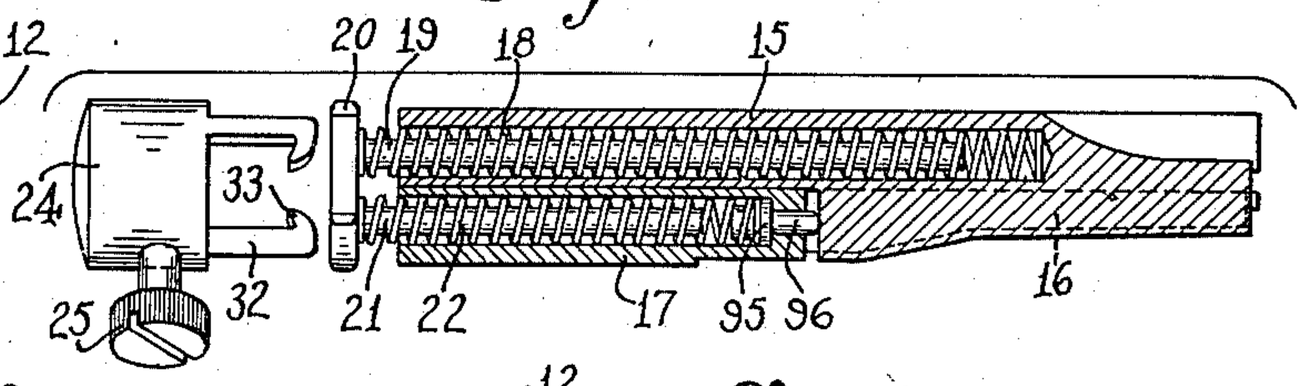


Fig. 10.

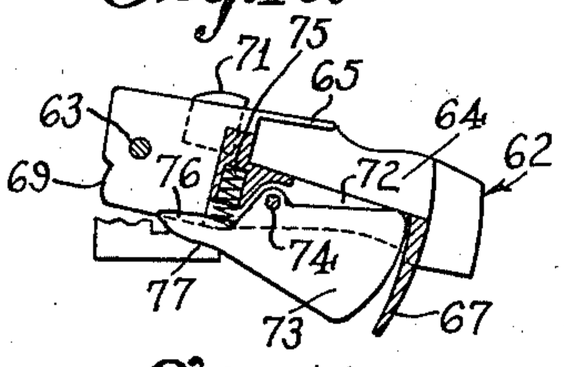


Fig. 11.

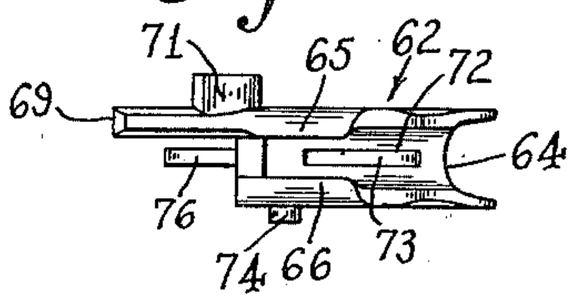


Fig. 12.

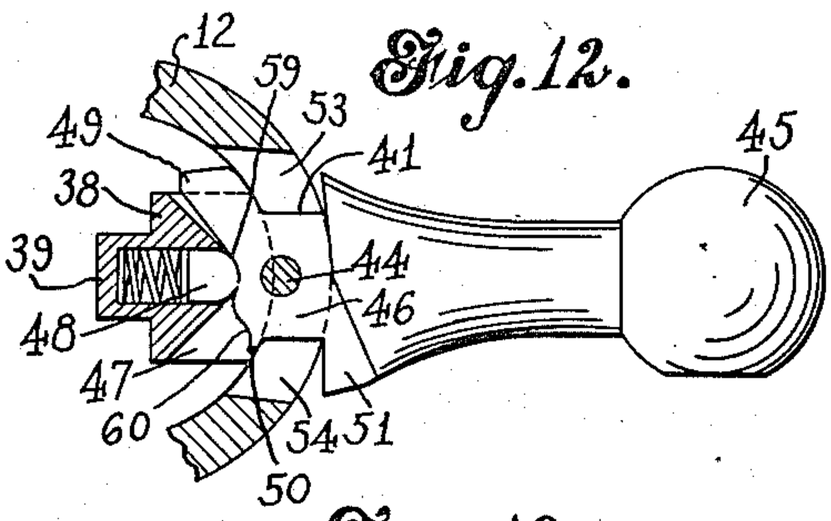
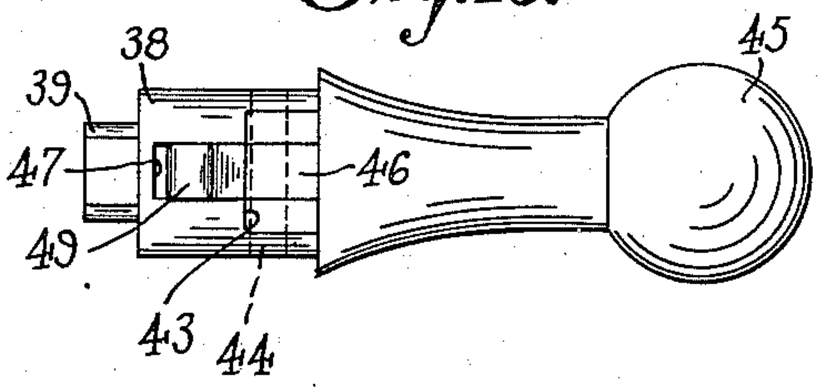


Fig. 13.



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UNITED STATES PATENT OFFICE

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BREECH BOLT AND RETRACTING MEANS THEREFOR

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Application September 4, 1944, Serial No. 552,639

4 Claims. (Cl. 42—16)

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This invention relates to firearms, and more particularly to a firearm of the semi-automatic type. As shown, it is applied to a semi-automatic bolt-action rifle, although it will be understood that in certain of its aspects the invention is applicable to other types of firearms.

Distinction is usually made between an automatic firearm and one of the semi-automatic type, in that a fully automatic gun continues to fire as long as the trigger is held back, while in the semi-automatic type of gun the trigger must be released and pulled again for each successive discharge, although the loading and cocking of the gun are effected automatically.

In a gun of this type it is necessary that the introduction of the new cartridge into the chamber from the magazine be accomplished with smoothness and ease, for, as will be obvious, the movement of the bolt takes place very rapidly upon the discharge of the gun. It is, therefore, contemplated by the present invention to provide a new and improved carrier to move a fresh cartridge from the magazine into a position to be forced into the barrel by the return of the bolt. Also it is desirable in guns of this type, and particularly in a gun adapted for civilian use, to provide for a ready conversion of the gun from one of the semi-automatic type to one of the manual or single-shot type, wherein the loading and cocking operations are effected manually.

In bolt-action guns it is more or less usual to provide a threaded plug or bumper at the rear of the receiver, against which the bolt and striker springs react. When it is desired to remove the bolt and other parts of the action from the receiver, this plug is unscrewed and the parts are removed. The parts, however, become disassembled to some extent in such an operation, and are difficult of reassembly and replacement into the receiver due to the fact that the springs must be compressed to some extent in this operation. In the present invention the receiver plug or bumper is held in place by a bayonet joint, and means are provided for locking the bolt to this bumper when it is desired to remove the bolt and associated parts from the receiver, so that the bolt and bumper may be removed in assembled position so that the tension of the springs does not have to be released.

One object of the present invention is to provide a new and improved firearm of the semi-automatic type.

Still another object of the invention is to provide a bolt-action firearm wherein the bolt and

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associated parts may be readily removed from the receiver and replaced therein.

A still further object of the invention is to provide a firearm of the semi-automatic type, which may be readily converted into a manually operated bolt-action single-shot firearm.

Still another object of the invention is the improvement of the loading mechanism of an automatic firearm, which mechanism serves to transfer a fresh cartridge from the magazine into a position to be inserted into the chamber upon the return of the bolt.

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 the receiver portion of a firearm embodying my invention;

Fig. 2 is a longitudinal sectional view of the parts shown in Fig. 1;

Fig. 3 is a fragmentary sectional view similar to Fig. 2, but showing the cartridge carrier in another position;

Fig. 4 is a view similar to Fig. 3, showing still another position of the parts when a fresh cartridge is about to be inserted into the chamber;

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

Fig. 6 is a side elevational view, partly in section, of the rear end of the receiver, showing the provision for coupling together the bolt and the receiver plug or bumper;

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

Fig. 8 is a side elevational view of the rear end of the receiver from a slightly different angle from that shown in Fig. 1;

Fig 9 is an exploded view of the receiver bumper and bolt, the latter being shown in section;

Fig. 10 is a detail view of the cartridge carrier;

Fig. 11 is a top plan view of the carrier shown in Fig. 10;

Fig. 12 is an enlarged view of the bolt handle and associated structure, certain parts being shown in section for the sake of clearness; and

Fig. 13 is a side elevational view of the bolt handle.

To illustrate a preferred embodiment of my invention I have shown my improvements as applied to a repeating rifle having a barrel 10, magazine 11 and receiver 12, a cartridge 13 being shown in Fig. 2 in the chamber 14.

Within the receiver is mounted a bolt 15 designed to be retracted by the recoil from the firing of the cartridge, the bolt having slidably mounted therein a firing pin 16 (Fig. 9) adapted to be ac-

tuated by a striker 17, also slidably associated with the bolt. A bolt spring 18 serves to urge the bolt forwardly, this spring being disposed within a recess in the bolt and surrounding a pin 19 secured to a disk-like member 20. Also secured to the member 20 is a pin 21 surrounded by a striker spring 22 disposed within a recess or opening in the striker 17.

As shown in Fig. 6, the member 20, against which the springs 18 and 22 react, abuts against a bumper or plug 24 which closes the rear end of the receiver. This bumper is held in place by a screw 25 (Fig. 7) which is rotatably mounted in the bumper and threaded into an opening in the receiver, as shown at 26. The screw 25 is also capable of movement in the direction of its length in the bumper, but is prevented from being removed entirely by a collar 27 on the screw which bears against the bottom shoulder 28 of an enlarged recess 29 forming a continuation of the opening in the bumper 24 in which the screw is disposed.

The portion of the screw adjacent the head 30 projects through the receiver and is received in an L-shaped slot 31 (Fig. 8), thus forming a bayonet joint between these two parts. It will be obvious that when the screw is in the position shown in Fig. 7, in which it is threadedly engaged with the receiver at 26, the bumper is locked to the receiver. However, when the screw has been backed off sufficiently to disengage its threads from the receiver, it may be given a slight movement of rotation in the lateral or circumferential portion of the slot 31, and then, by a longitudinal movement, the bumper may be withdrawn from the receiver.

As shown more especially in Figs. 6 and 9, the bumper is provided with a pair of prongs or fingers 32, each having a hook-shaped end 33. Each of these prongs is adapted to be received in an L-shaped slot in the bolt, this slot having a longitudinal or axial portion 34 and a transverse or circumferential portion 35. In the normal position of the parts shown in Figs. 6, 7 and 8, the fingers 32 are not in locked engagement with the bolt, but slide freely through the longitudinal portion 34 of the slot in the bolt, so that the bolt has free reciprocating movement in the operation of the gun. However, when the screw 25 is disengaged from the receiver and given a partial rotary motion as permitted by the L-shaped slot 31, the hooked ends 33 of the fingers 32 engage the shoulder 36 of the circumferential portion of the slot in the bolt and lock the bolt and bumper together. At this time, as will be presently explained, the bumper, together wtih the bolt and associated parts, may be freely withdrawn from the receiver. It will be understood that at this time the disk 20 will be clamped between the bumper and springs so that this withdrawal will not be affected by the tension of the springs 18 and 22, the tension of which will be carried by the locked engagement of the bumper and bolt so that the entire bolt mechanism will be withdrawn as a unit.

The bolt handle mechanism is shown more especially in Figs. 5, 12 and 13, and comprises a cylindrical post or plug 38 having at its inner end a reduced portion 39 freely socketed in a recess 40 in the bolt. The sides of the member 38 are flattened or cut away adjacent its outer end, as shown at 41, to provide a reduced neck portion which slides in the slot 42 in the receiver, the shoulders 43 beyond these cut-away portions engaging the inner edges of this slot to hold the handle in place and engaged with the bolt, and the engagement of the reduced neck portion of the member 38 prevents any rotary movement of the bolt in the receiver.

Pivoted to the member 38 on a pin 44 is the bolt handle 45, this handle being provided with a stem 46 received within a slot 47 in the member 38, and a spring-pressed plunger 48 engages the inner surface of the stem to releasably hold the handle in a predetermined position. The width of the body of the stem 46 is substantially that of the slot 42, but at its inner end the stem is somewhat enlarged laterally or circumferentially of the receiver to provide a locking lug 49 and a guide lug 50. Also provided on the handle 45 opposite the lug 49 is a second locking lug 51, and, as shown in Figs. 1 and 6, the longitudinal slot 42 in the receiver in which the bolt handle slides is provided with laterally extending recesses 53 and 54 adjacent its front end, similarly arranged recesses 55 and 56 adjacent its rear end, and an opening of keyhole shape 57 at its rear end.

As shown in Fig. 5, the handle 45 may be swung through a small angle about the pivot pin 44. When the handle stands in the full-line position shown in Fig. 5, the gun will operate as a semi-automatic gun, as the bolt will be free to move rearwardly under the impulse of the recoil due to the discharge of the cartridge. If, however, it is not desired to have automatic operation, but to use the gun as a single-shot firearm, the handle 45 is moved to the dotted-line position shown in this figure. This effects engagement of the locking lug 49 in the recess 53 at the forward end of the slot 42, and also engagement of the locking lug 51 in the recess 54, and prevents the bolt being moved back by the force of the recoil. The operator may, after discharge of the gun, swing the handle 45 to its full-line position, and thereafter retract the bolt by means of the handle, thus throwing a new cartridge into the chamber and cocking the gun.

To remove the bolt and associated mechanism from the receiver, the operator moves the handle 45 and bolt rearwardly to the position shown in Fig. 6, and then swings the handle through a slight angle about its pivot to engage the locking lugs 49 and 51 in the recesses 55 and 56, and thus prevent the return of the bolt by its spring. The bolt is now in position shown in Fig. 6, wherein the hooked ends 33 register with the circumferential portion 35 of the bolt slot. If now the screw 25 is loosened and the bumper 24 given a slight turn, the hooked ends 33 of the fingers 32 will engage the shoulders 36 of the slot portions 35 and lock the bumper and bolt together. Thus the return of the bolt will now be prevented because it is locked to the bumper, and the handle 45 may be disengaged from the slots 55 and 56.

Normally the bolt is never retracted to a greater extent than shown in Fig. 6, as in this position it is against the disk 20, which in turn is against the bumper 24. However, when the bumper is rotated through a slot angle to bring the fingers 32 into engagement with the shoulders 36, the screw 25 is moved into the longitudinal portion of the slot 31, thus permitting the bumper to be moved longitudinally out of the receiver. Therefore, the bolt may now be moved a slight distance rearwardly by the handle 45 from the position shown in Fig. 6, until the post 38 of the handle stands in the keyhole-shaped portion 57 of the slot 42. This permits the entire handle mechanism, shown in Fig. 13, for example, to be withdrawn freely from the bolt, so that the bolt and

bumper assembly are loose in the receiver and may be freely withdrawn as a unit, the parts being held together by the engagement of the hooked ends 33 of the fingers 32 in the slots 35, with the springs compressed between these two parts. The parts may, of course, be reassembled by reversing the process just described, and it will be obvious that this provides an easy and convenient way for removing the operating parts from the receiver when such is desired. It will also be understood that normally the handle 45 cannot be disengaged from the bolt due to the fact that the body portion of the post 38 is larger than the slot 42, and the shoulders below the flattened portion 41 prevent the handle being removed through this slot. The recesses 53, 54, 55 and 56 merely permit the swinging of the handle member 45 from full to dotted-line position shown in Fig. 5, but do not permit the withdrawal of the post 38 therethrough. The lower end of the stem 46 is provided with recesses 59 and 60 to receive the plunger 48, and thus releasably hold the handle in either its full or dotted-line position.

At the rear of the magazine 11, a carrier or cradle 62 is pivotally attached to the receiver at 63. This carrier is shown more especially in Fig. 11, and is provided with a hollow body portion 64 adapted to receive the cartridge, which body portion opens upwardly so that the cartridge may be delivered through this opening to the chamber. At the rear portion of the cradle, overhanging flanges 65 and 66 are provided to hold the cartridge in the cradle until it has been moved forwardly to some extent by the bolt. Also adjacent its forward end the carrier is provided with a tail portion 67 to close the opening at the rear of the magazine when the carrier is lifted to transfer a cartridge to the receiver. A spring-pressed plunger 68, mounted in a portion of the receiver, engages the lower rear corner 69 of the carrier, tending to swing the carrier upwardly about its pivot 63. As shown more especially in Fig. 2, this upward movement is prevented when the bolt is in its forward breech-closing position by a cam surface 70 formed on the bolt, which engages a lug 71 on the carrier disposed forwardly of its pivot. However, when the bolt is moved rearwardly and the cam surface disengages the lug 71, the spring is then free to swing the forward end of the latter upwardly about its pivot and transfer a fresh cartridge into position to be moved into the chamber.

As shown more especially in Figs. 10 and 11, the body portion 64 of the carrier is provided with a slot 72, and a lifting finger 73 is pivoted to the carrier at 74 and designed to project through this slot under the force of a spring 75 mounted in the carrier and acting against a tail portion 76 of the finger 73. Movement of this finger may be limited by a stop 77 formed on a part of the receiver, and adapted to engage the tail portion 76 when the lifting finger has been moved upwardly to its furthest extent, as shown in Fig. 4.

The operation of this cartridge transfer mechanism may now be described. As shown in Fig. 2, the gun is in cocked position ready to be discharged. When the cartridge 13 is fired, the bolt 15 is forced rearwardly, thus moving the cam surface 70 from engagement with the lug 71. The carrier 62 is then thrown upwardly about its pivot 63 by the spring-pressed plunger 68 to the position shown in Fig. 3, wherein the fresh cartridge 13a is in position to be forced into the chamber. It will be noted that the rear end of the cartridge is in engagement with the

overhanging flanges 65 and 66, and thus the lifting finger 73 is held downwardly against the tension of its spring 75 by the engagement of the forward end of this finger with the cartridge. The bolt is now moved forwardly by the bolt spring 18, and the forward end of the bolt engages the rear end of the cartridge, moving it forwardly out of engagement with the flanges 65 and 66. At this time the spring 75 moves the forward end of the lifting finger upwardly to a slight extent, thus moving the rear end of the cartridge upwardly so that the latter is in a correct position to enter the chamber. It will be noted that the lifting finger 73 has a delayed action, and a slight movement under impulse of its spring independently of the carrier 62 in order to properly position the cartridge in front of the chamber.

When the bolt is returned to its forward position, shown in Fig. 2, the cam surface 70 reengages the lug 71, thus moving the carrier downwardly into the position shown in Fig. 2. At this time the tail 76 of the lifting finger 73 engages the stop 77, and the lifting finger is moved in a reverse direction about its spring so that its forward end is lowered in the slot 72, thus permitting a fresh cartridge to slide from the magazine into the body portion or cradle of the carrier without interference.

A sear 80 is pivoted at 81 to the receiver, the sear engaging at its upper rear corner a bent 82 formed on the striker 17, the sear being actuated by a trigger 83 of the usual form, pivoted to the receiver at 84. Pivoted to the forward end of the trigger at 85 is a dog 86 having a corner 87 engaging a bent 88 on the sear to move the latter downwardly about its pivot 81 out of engagement with the bent 82 of the striker when the trigger is pulled.

Usually the trigger will be pulled rearwardly a sufficient distance to disengage the members 87 and 88, so that the sear 80 will be free immediately after it is released to move upwardly again and engage the bent 82 of the striker when the latter is carried rearwardly with the hammer after discharge. However, this disengagement is insured by a lug 89 at the upper end of the connector member 86, which lug is engaged by a portion 90 on the striker 17, so that, as the striker reaches its forward position to discharge the shell, the connecting member 86 will be moved about its pivot 85 and disengaged from the sear 80, thus permitting the latter to be moved upwardly or in a counterclockwise direction by its spring 91. The member 86 is normally held in engagement with the sear by a spring-pressed plunger 92 carried by the trigger 83.

The striker spring, as shown in Fig. 9, acts at its front end against a headed pin 95, slidably associated with the striker 17 and projecting forwardly a slight distance from the front end of the striker, to engage the shoulder 96 formed on the bolt adjacent the firing pin 16 when the striker is in its forward position. It will thus be seen that the tension of the spring 22, after the gun has been discharged and the striker is in its forward position, is borne by the pin 95 and not by the striker itself. Therefore, when the parts are in this position the striker will have slight play to and fro, which permits the firing pin to assume a retracted position out of engagement with a cartridge in the chamber. It will, of course, be understood that when the gun is discharged the inertia of the forward movement of the striker under impulse of the spring 22 will

cause the striker to drive forwardly against the shoulder 96, as the pin 95 is slidably mounted in the striker. The impact of the striker, however, against this shoulder will cause it to return slightly, to the position shown in Fig. 9, thus also permitting the firing pin 16 to return from its extreme forward position, so that its front end is flush with the adjacent portion of the bolt, as shown in this figure.

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 bolt reciprocably mounted therein longitudinally of the receiver, said receiver having a longitudinally extending slot in the wall thereof, a plug removably engaged with the bolt, a handle pivoted to the plug to swing in a plane transverse to the movement of the bolt and means on the handle to engage with a part of the slot and restrain the bolt against longitudinal movement.

2. A firearm comprising a receiver, a bolt reciprocably mounted therein longitudinally of the receiver, said receiver having a longitudinally extending slot in the wall thereof, a plug removably engaged with the bolt, a handle pivoted to the plug to swing in a plane transverse to the movement of the bolt, said plug being disposed in a recess in the bolt and normally retained therein by engagement of the handle with the edges of the slot and means on the handle to engage with a part of the slot and restrain the bolt against longitudinal movement.

3. A firearm comprising a receiver, a bolt reciprocably mounted therein longitudinally of the receiver, said receiver having a longitudinally extending slot in the wall thereof, a plug removably engaged with the bolt, a handle pivoted to the plug to swing in a plane transverse to the movement of the bolt, means on said handle to engage with a part of the slot and restrain the

bolt against longitudinal movement said plug being disposed in a recess in the bolt and normally retained therein by engagement of the handle with the edges of the slot, and said slot having an enlarged portion permitting detachment of the handle and plug from the bolt when the handle is moved to a position opposite the enlarged portion.

4. A firearm comprising a receiver, a bolt reciprocably mounted therein, said receiver having a longitudinally extending slot in the wall thereof, a plug removably engaged with the bolt, a handle pivoted to the plug to swing in a plane transverse to the movement of the bolt, said plug being disposed in a recess in the bolt and normally retained therein by engagement of the handle with the edges of the slot, a bumper closing the rear end of the receiver, interengageable means on the rear end of the bolt and the front end of the bumper for connecting the bumper and bolt together upon movement of the bolt to its rearmost position, whereby the bolt may be removed from the receiver by removal of the bumper therefrom.

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