June 17, 1947. E. DEHM 2,422,532

BOLT-ACTUATED CARTRIDGE FEEDING MEANS FOR RIFLES

Filed Dec. 11, 1943 4 Sheets-Sheet 1

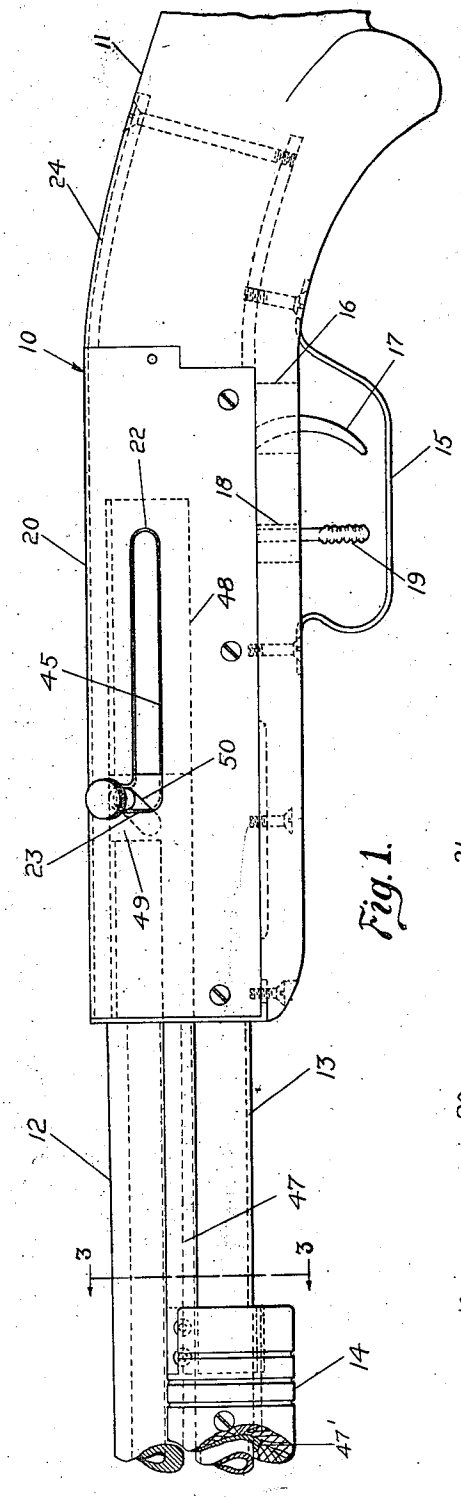


Fig. 1.

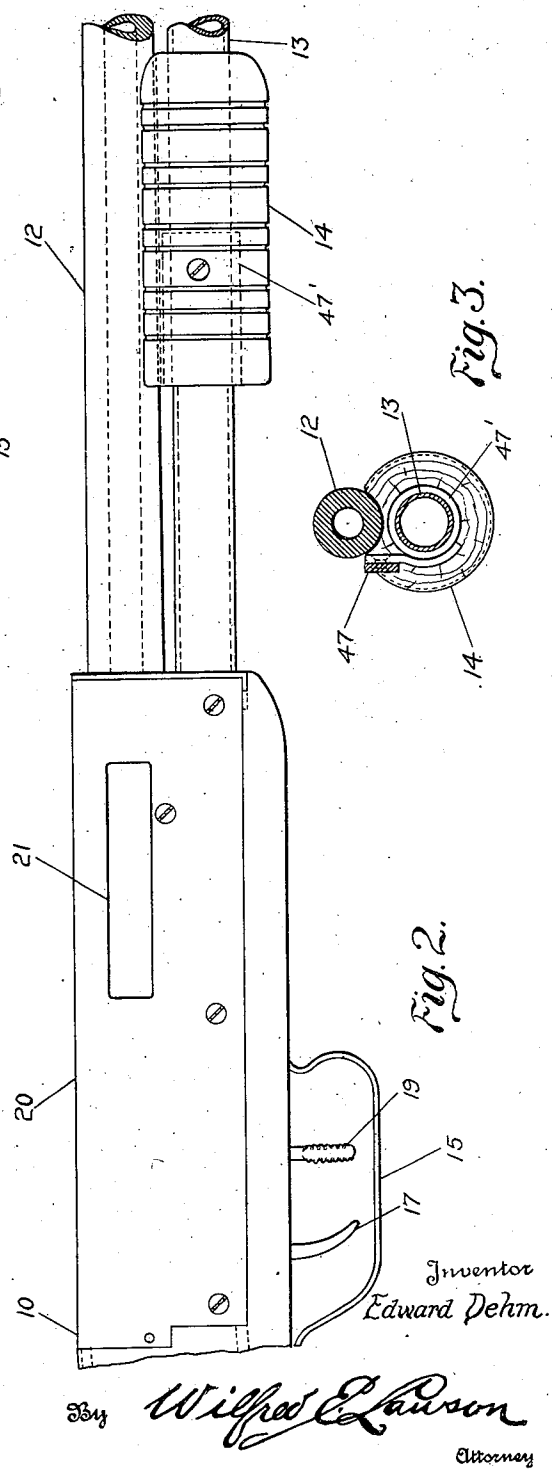


Fig. 2.

Fig. 3.

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BOLT-ACTUATED CARTRIDGE FEEDING MEANS FOR RIFLES

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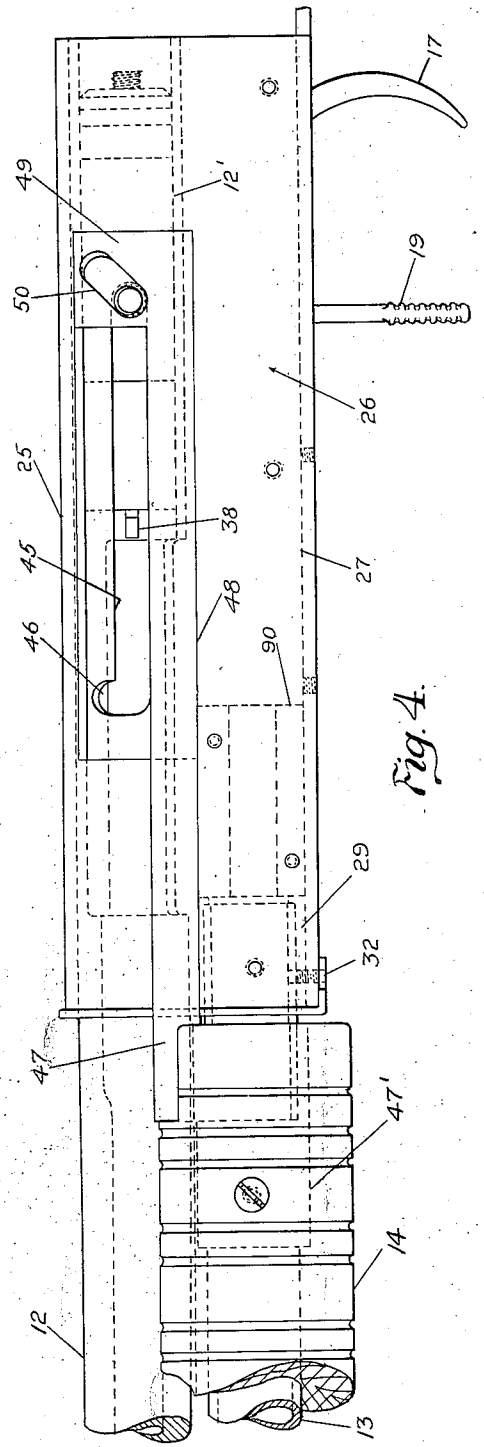


Fig. 4.

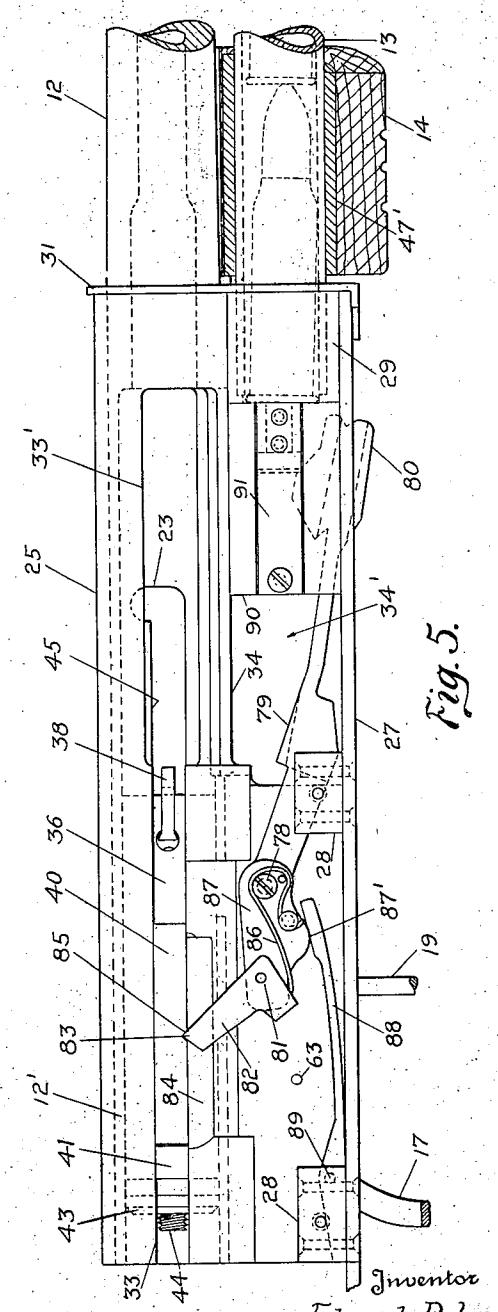


Fig. 5.

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BOLT-ACTUATED CARTRIDGE FEEDING MEANS FOR RIFLES

Filed Dec. 11, 1943 4 Sheets-Sheet 3

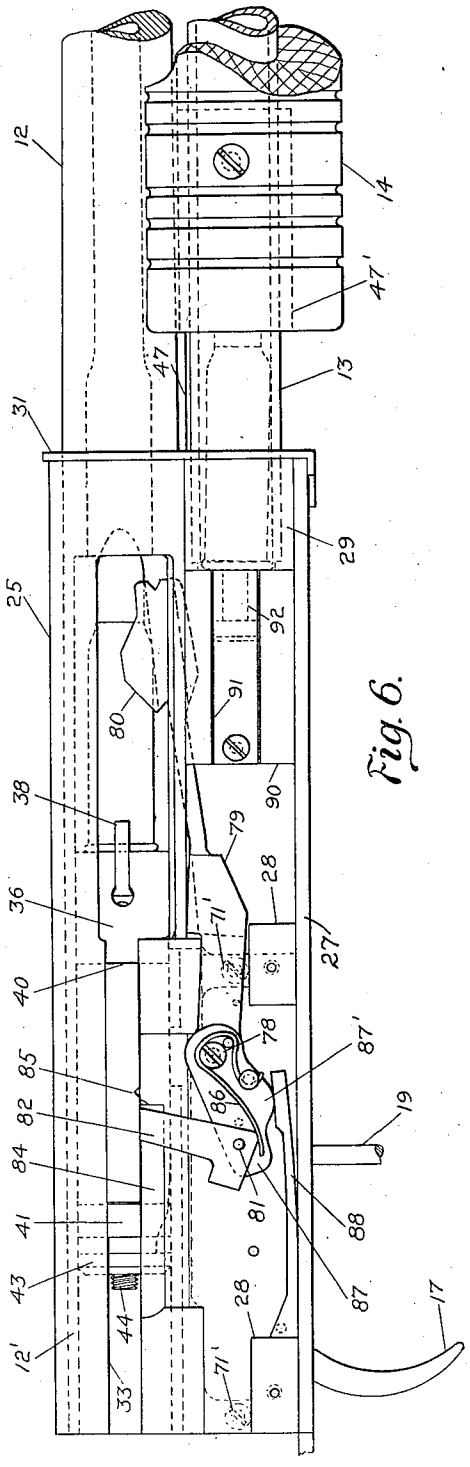


Fig. 6.

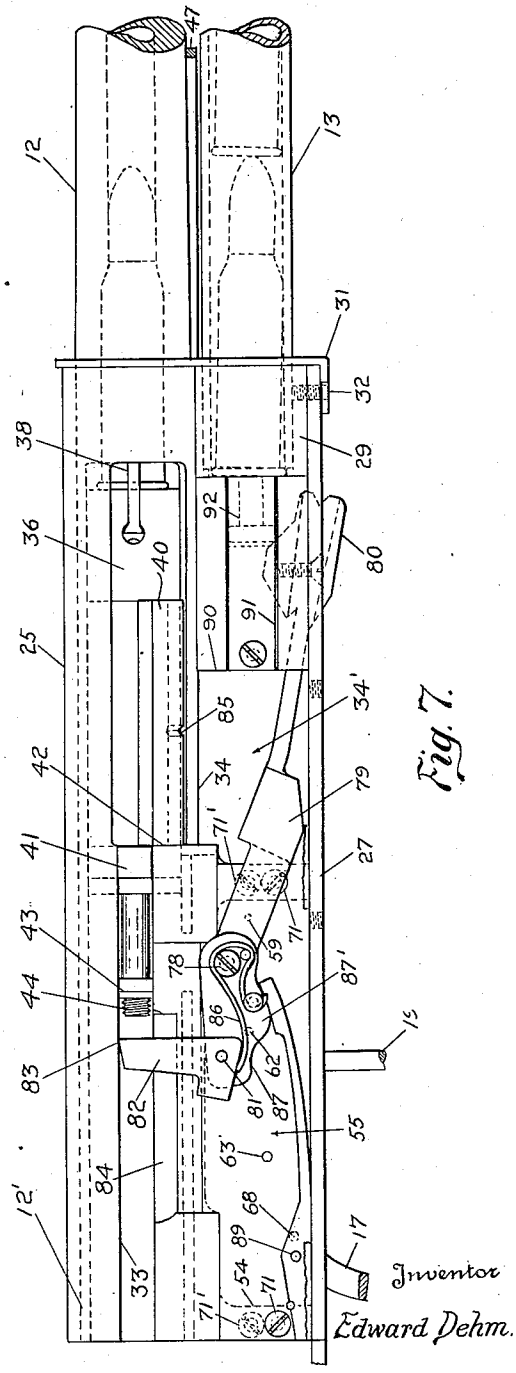


Fig. 7.

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BOLT-ACTUATED CARTRIDGE FEEDING MEANS FOR RIFLES

Filed Dec. 11, 1943 4 Sheets-Sheet 4

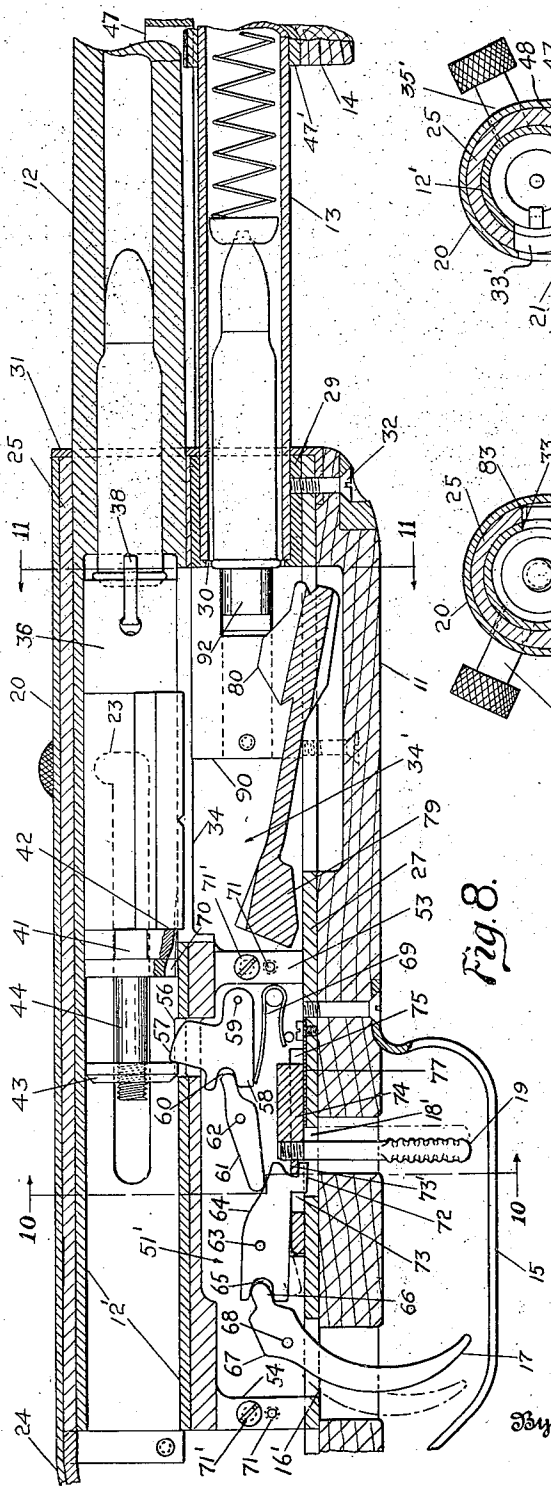


Fig. 8.

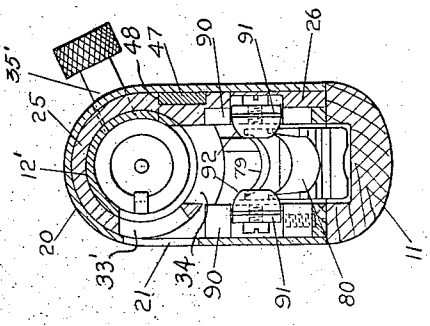


Fig. 11.

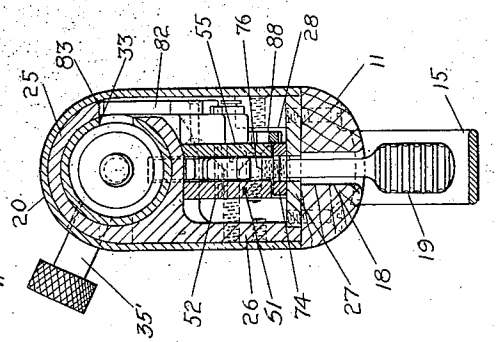


Fig. 10.

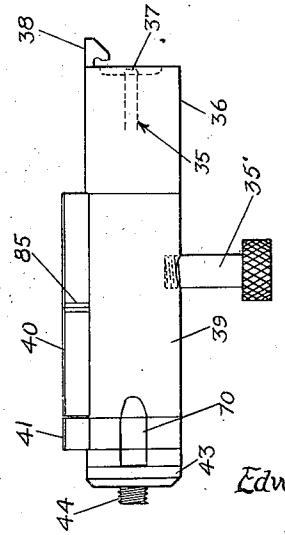


Fig. 9.

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2,422,532

BOLT-ACTUATED CARTRIDGE FEEDING MEANS FOR RIFLES

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Application December 11, 1943, Serial No. 513,944

5 Claims. (Cl. 42—17)

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This invention relates generally to the class of firearms and pertains particularly to improvements in bolt-actuating cartridge feeding means for rifles.

A primary object of the present invention is to provide a rifle structure of the bolt action type with means operatively coupled with the bolt whereby the bolt may be unlocked, drawn back and then moved forwardly and locked in the usual manner by employing only two movements of the hand to accomplish these functions instead of the four separate movements which are normally required for moving the bolt to effect the extraction of a cartridge shell and the reloading of the gun.

Another object of the invention is to provide a bolt action rifle having a pump feed with means operatively coupling the pump mechanism by which cartridges are fed from the magazine to the breech of the gun, with the bolt to simultaneously effect the actuation of the latter.

Still another object of the invention is to provide in a pump operated or pump-action bolt action rifle, a novel mechanism for effecting the shifting of cartridges from the chamber in which they are received from the magazine to the breech of the gun simultaneously with the forward movement of the bolt by which the cartridge is shoved into the firing chamber.

Still another object of the invention is to provide a novel safety or locking means for the gun trigger which is so arranged that it may be readily shifted to locked or unlocked position by the trigger finger without having to move the hand from firing position.

Other objects and advantages of the invention will become apparent as the description of the same proceeds and the invention will be best understood from a consideration of the following detailed description taken in association with the accompanying drawings forming a part of the application, it being understood, however, that minor changes may be made in the structure so long as such changes do not materially depart from the scope of the invention as expressed in the appended claims.

In the drawings:

Figure 1 is a view in side elevation of the left-hand side of the breech portion of a rifle constructed in accordance with the present invention.

Figure 2 is a view in side elevation of the right-hand side of the breech casing.

Figure 3 is a transverse section taken on the line 3—3 of Figure 1.

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Figure 4 is a view in side elevation of the left-hand side of the breech casing with the cover and the bolt arm and adjacent parts of the stock removed.

Figure 5 is a view in side elevation of the right-hand side of the breech casing with the cover housing removed showing particularly the bolt guide and the cartridge elevating mechanism.

Figure 6 is a view in elevation of the right-hand side of the breech casing with the cover removed showing the bolt advanced part way for the elevation of a cartridge into the cartridge chamber.

Figure 7 is a view corresponding to Figure 6 but showing the bolt completely advanced and locked and with the cartridge elevator lowered.

Figure 8 is a central vertical longitudinal section through the breech portion of the gun and part of the barrel and cartridge tube with the bolt in advanced, locked and cocked position and particularly illustrating the trigger operating and safety mechanism.

Figure 9 is a view of the underside of the bolt per se.

Figure 10 is a section taken on the line 10—10 of Figure 8.

Figure 11 is a section taken on the line 11—11 of Figure 8.

Referring now more particularly to the drawings wherein like numerals of reference designate corresponding parts throughout the several views, the numeral 10 generally designates the breech casing of the rifle which is secured to the forward end of the stock 11. Extending forwardly from the breech casing is the barrel 12 and beneath and parallel with the barrel is the magazine cylinder 13 upon which is slidably mounted the pump grip 14.

The underside of the forward part of the stock which extends beneath the breech casing carries the usual trigger guard 15 and is provided with the necessary opening 16 for the extension downwardly of the trigger 17. Forwardly of the trigger opening 16 a second opening is formed which is designated 18 and through which extends downwardly into the trigger guard and forwardly of the trigger the safety actuating pin 19 which is operatively coupled with safety mechanism for the control of the operation of the trigger 17 as hereinafter described.

In accordance with the present invention the breech casing structure 10 includes a removable steel housing or cover 20 which is substantially U-shaped in transverse section and has formed therein upon the right hand side of the gun, the shell ejection opening 21 while upon the oppo-

site side is formed the elongated bolt lever opening 22 which, at its forward end, terminates in the short upward extension 23. This cover 20 has securely fixed to the top part thereof at its rear end, the downwardly curving securing tang 24 which fits in the top of the stock and cooperates, as hereinafter described, with a corresponding part to secure the breech casing to the stock.

The breech casing beneath the cover 20 comprises the sleeve 25 through which the rear end of the barrel 12 extends in the form of an extension of the barrel which is designated 12'. Integral with one side of the sleeve 25 and tangential to the same is a skirt 26 which forms a side wall of the breech casing. This side wall extends the full length of the breech casing as shown in Figure 2 while it has in opposed relation with it and upon the opposite side of the casing, a side of the cover 20.

The numeral 27 designates the bottom plate for the breech casing and is disposed between the lower longitudinal edge of the skirt 26, at one side, and the longitudinal edge of the cover 20 upon the opposite side. This bottom plate carries at different points along its two opposite longitudinal edges and upon its top side, the attaching lugs 28 by means of which the desired connection is made between the plate, cover and skirt 26 to maintain the parts in position.

There may also be mounted upon the bottom plate at the forward end thereof the magazine block 29 through which is formed the passage 30 for the movement of cartridges rearwardly from the magazine tube 13. The rear end of the magazine tube extends into this passage as illustrated. It will be understood however, that this block 29 might be formed as an integral part of the sleeve 25.

At the forward end of the breech casing sleeve 25 is a face plate 31 through the upper part of which the barrel extension extends into the breech casing sleeve and thru the lower part of which the magazine cylinder extends as shown. This plate serves to secure the barrel and cylinder in proper relation and it also provides a shield for the forward edge of the cover 20. The lower or bottom edge of the shield plate 31 may have a rearward tongue for extension under the forward end of the bottom plate, to be secured thereto as illustrated.

Extending longitudinally of the breech casing from the rear end and through the major portion of the length and formed through the sleeve and the barrel extension, is the bolt guide slot 33. The guide slot at its forward end and through a portion of its length is increased in width to provide the laterally opening shell discharge port 33'.

Through the same longitudinal extent as the port 33' there is formed through the sleeve and barrel extension, the downwardly opening cartridge admission port 34 through which the cartridges are lifted upwardly from the receiving chamber 34', into which they enter from the magazine cylinder, to be driven forwardly into the firing chamber by the breech bolt which is generally designated 35.

The barrel extension 12' which forms the rearward extension of the barrel, provides the bolt chamber in which the breech bolt 35 is reciprocated.

The breech bolt is illustrated particularly in Figure 9 and as shown it comprises the cylinder portion 36 which carries at its forward end the firing pin 37 and the shell extractor 38. Intermediate its ends the cylinder is suitably circumferentially recessed to receive the collar 39 along the outer side of which extends the rib 40 while rearwardly of this collar the cylinder carries the fixed guide finger 41 which is of the same width and thickness as the rib 40 with which it alines during the time that the bolt is retracted. This guide finger 41 maintains constant sliding engagement in the guide slot 33 whereas the rib 40 runs in the slot 33 only during a portion of the time that the bolt is moving forwardly or rearwardly or while it is stationary in retracted position. When the bolt is in the forward locked position the rib 40 functions as the locking means through the oscillation of the collar so as to move the rib in a circumferential direction in the forward enlarged portion of the guide which is designated 33' and referred to as the shell port. At such time the rear end of the rib engages the shoulder 42 as illustrated in Figure 7. At this time also it will be understood that the firing pin will be in cocked position.

The rear end of the bolt carries the hammer head 43 which is connected by the pin 44 with the firing pin. As is well known by those versed in the art, bolts of this type have the pin portion 44 engaged by a helical spring, not shown, within the cylinder, which is compressed when the head 43 is drawn rearwardly with respect to the cylinder and when released the spring projects the pin 44 forwardly to actuate the firing pin 37. No details of construction of the interior of the cylinder are shown and it is not believed that such illustration is necessary in view of the well understood construction and function of firing bolts of this character, an example of which is shown in the patent to Gates, Number 934,158 of September 14, 1909.

Upon the opposite side of the breech sleeve from the guide slot 33, the sleeve and barrel extension have a longitudinal slot therethrough as indicated at 45. This slot coincides with the previously referred to slot 22 in the cover and has the lateral extension 46 at its forward end. As previously explained in connection with the slot 22 this slot 45 is designed for the extension outwardly of the bolt actuating arm 35'. This arm is secured in the bolt sleeve 39 so that as the bolt moves forwardly the arm will move in the slot 45 and as the bolt reaches the forward end or extremity of its movement the arm 35' may be turned into the offset 46 of the slot so as to turn the collar 39 and move the locking rib down into position for engagement against the shoulder 42.

The above described operation of the bolt is accomplished with the longitudinal movement of the hand grip 14. This hand grip is attached to a sleeve 47' encircling the tube 13, Figure 3, and connected to the hand grip by this sleeve 47' is the flat bar 47 which extends rearwardly through the shield plate 31 and is slidably mounted in a suitable recess 48 formed in the outer side of the breech sleeve and covered by the cover body 20.

At its rear end the bolt actuating slide bar 47 is formed to provide the plate 49 which moves lengthwise of the slot 45 and which has formed therein the elliptical obliquely extending cam slot 50 through which the bolt arm 35' extends. The cam slot has its lower end forwardly of its upper end and the upper end of this slot projects above the top of the bolt arm slot 45. Consequently when the bar 47 is shifted forwardly a forward pull will be applied to the bolt arm so as to move the bolt forwardly but when the bolt arm

reaches the forward end of its slot its forward movement will be stopped but the forward pull of the bar 47 will cause the rear edge of the cam slot to press against the bolt arm, making this latter ride up in the slot so as to move into the offset 46, thereby turning the bolt sleeve into locking position. The reverse of this operation will be readily apparent.

Between the breech sleeve and the bottom plate 27 there is provided a box 51 in which is housed the trigger mechanism. This box comprises a permanent wall 52 with the ends of which are integrally formed the front and rear walls 53 and 54 respectively. This permanent wall 52 is secured in position upon the side of the central longitudinal plane of the sleeve nearest the skirt 25', to the breech sleeve, by the screws 71 which pass through the end walls into suitable bosses, formed upon the inner face of the skirt 25'. Completing the trigger mechanism box is the right-hand removable wall plate 55 which positions against the end walls to which it is secured by the screws 71. The bottom part of the breech sleeve and the barrel liner therein are provided with the downwardly opening port 56 for the reception of the upwardly extending point or spur 57 of the sear 58, Figure 8. This sear is pivotally supported in the box upon the transverse pin 59 and is provided in its rearwardly directed edge with the notch 60 in which is engaged one end of the lever 61, which is pivotally mounted upon the transverse pin 62, the other end of this lever being directed rearwardly and downwardly as shown. Upon the transverse pin 63 which lies rearwardly of and below the pin 62 is pivoted a cam pawl 64. The top edge of this cam pawl is engaged by the rear end of the lever 61 while the rear edge thereof is provided with the notch 65 in which is loosely engaged the lug 66 which is carried by and extends forwardly from the head 67 of the trigger, which head is oscillatably mounted upon the pivot pin 68 which extends across the box at the rear end thereof as shown in Figure 8.

In the forward part of the mechanism box 51 is mounted a spring 69 which engages beneath the sear 58 and normally urges the same upwardly whereby to bring the point 57 above the bottom of the bolt chamber. As will be readily understood when the bolt is disposed within the bolt chamber, the guide 41 being disposed in the guide slot 33 it will bear against the point of the pawl spur 57 to force the pawl downwardly against the tension of the spring 69. However the bolt, adjacent the rear end thereof, is provided with the tapered recess 70 which stops at the forward face of the hammer head 43. Thus as the bolt is pushed forwardly in its chamber the point of the sear will rise in the recess 70 and will engage the forward face of the hammer head 43, holding this against further movement while the remainder of the barrel moves forwardly. This will compress the hammer spring, not shown; and when the locking spur 40 is turned down in the shell discharge port 33' so as to lock the bolt against return movement, it will be seen that the hammer pin will be held in cocked position ready for firing to drive the firing pin 37 forwardly against the cartridge.

When the trigger 17 is pulled back it will be seen that the cam pawl will be rocked to raise the forward end against the rear end of the lever 61, depressing the forward end of the latter which in turn will depress the sear to withdraw the point thereof from in front of the restrained

hammer head 43. This allows the hammer spring, not shown, to drive the hammer pin forwardly against the firing pin 37.

The removable wall plate 55 is secured to the end walls by the screws 71 and the pivot pins 59, 62, 63, and 68 are supported between this wall and the fixed wall 52.

The forward end of the cam pawl 64 carries, in close proximity to the top of the bottom plate 27, the downwardly and forwardly extending latch finger 72. This finger extends through the recess 73 which is formed through the slidable safety latch plate 74. This latch plate is mounted in slot 75 in the lower edges of the walls 52 and 55 and is maintained in proper position for forward and backward sliding movement by the rib 76 carried upon its top surface and snugly disposed between the opposing faces of the walls 52 and 55 as shown in Figure 10. The forward edge of the opening or aperture 73 is undercut to form the lip 73' beneath which is engaged the latch finger 72 when the plate 74 is shifted rearwardly by the pin 19. The rearward movement of this plate is limited by the size of the opening 18' in the bottom plate 27, which corresponds with the opening 18 in the under part of the stock which engages against the underside of this bottom plate. Likewise the trigger 17 passes through an opening 16' corresponding to or alined with the opening 16 in the underpart of the stock.

In order to hold the safety latch plate 74 against accidental movement a flat spring 77 is secured to the top of the bottom plate 77 and extends beneath and presses upwardly against the safety latch plate 74 to frictionally hold the plate in set position.

Upon the outer side of the removable wall plate 55 is mounted the mechanism for automatically shifting a cartridge upwardly through the chamber 34 through the shell admission port into the forward end of the bolt chamber where it can be shifted forwardly by the bolt into the firing chamber. This mechanism is housed in the space between the wall 55 and the adjacent side of the cover 26 and it comprises the rock plate 87 which is pivotally mounted by the screw 78 against the side of the wall 55, from which extends forwardly the arm 79 which, upon the top forward end thereof has formed the cartridge receiving cradle 80. This arm 79 forms an elevator for the introduced cartridge.

Rearwardly of its pivot 78 the rock plate 87 has pivotally attached thereto by means of the pin 81 an upwardly extending thrust arm 82 which is cut obliquely across at its upper end to form the point 83.

The thrust arm 82 lies in a recess 84 formed in the sleeve 25 at the lower edge of the guide slot 33 and the rib guide 40—41 extends across this recess in traveling along the guide slot 33 and the point 83 of the thrust arm engages the underface of the rib 40 as shown in Figure 5, in the notch 85 which is formed across the underface of the rib. This engagement of the point of the front arm in the notch 85 is accomplished when the bolt is drawn backwardly for the purpose of removing the shell of a cartridge and for reloading the gun.

It will be seen upon reference to Figure 5 that when the point of the thrust arm is engaged in the notch 85 the thrust arm will be oscillated rearwardly against the tension of the spring 86 which is carried upon the rock plate.

The bolt will then be in retracted or cocking position. As the bolt is then moved forwardly the

point 83 of the thrust arm 82 will oscillate or pivot in the notch 85 and the thrust arm will be forced downwardly thereby effecting the oscillation of the elevator to the position shown in Figure 6. The thrust arm will continue to rock as the bolt moves forwardly until its end face comes into position flat against the underside of the rib 60. As also illustrated in Figure 6, the rib will ride along on the end of the thrust arm while the forward end of the bolt is forcing the cartridge into the gun barrel breech, until it slips off of the end of thrust arm. After the portion 61 of the rib has also passed the end of the thrust arm, such arm will be released so that the elevator will drop and the arm will be raised to the position shown in Figure 7. Such release of the arm and downward movement of the elevator will occur before the forward end of the bolt strikes the elevator.

It will also be seen that the lower edge of the rock plate is provided with a lug 87' which is engaged by the spring arm 88 which is secured rearwardly of the rock plate to the pin 89 carried by the removable wall plate. The lug 87' is rearwardly of the pivot for the rock plate therefore the spring 88 normally tends to swing or urge the rear end of the rock plate upwardly thereby depressing the elevator arm 79 to its lowered position.

At opposite sides of the forward end of the cartridge receiving chamber 34 are mounted plates 90 to each of which is secured a longitudinally extending flat spring 91 which carries upon its other or forward end a stop 92. These stops are maintained by the spring in a position where each extends into the circular area defined by the passage 30 through which the cartridges are introduced from the cartridge cylinder into the cartridge receiving chamber 34. Consequently the stops 92 are engaged by the cap end of the cartridge and are prevented from entering the chamber 34, except at such times as the elevator 80 is moving up or down as hereinafter described.

As best illustrated in Figure 8 the cradle 80 of the elevator arm 79 is disposed, when in lowered position, just below the stops 92 and each side of the cradle at the forward end is in a position to engage and ride across the adjacent stop as the cradle is raised, thereby forcing the stop outwardly against the tension of the supporting spring 91. This will permit the cartridge to be projected into the receiving chamber 34 and onto the cradle. Since the upward movement of the cradle is continuous and rapid it will be seen that as soon as the cartridge has cleared the magazine cylinder the cradle will be raised above the stops 92 so that the stops will be returned by their springs to their former positions and will prevent another cartridge entering the chamber beneath the elevator cradle.

From the foregoing it will be readily apparent that in the rifle of the present invention use may be made of the highly efficient bolt action while at the same time eliminating the necessity of making certain movements heretofore required in the operation of the bolt, by the provision of the sliding hand or pump grip 14 which is operatively coupled with the bolt in a novel manner whereby the bolt will be automatically unlocked, forced rearwardly and then moved forwardly to cock the hammer and then locked in the forward position, by the execution of two movements only of the left hand.

It will also be apparent that a novel and efficient mechanism is provided whereby necessary power will be transmitted through the bolt in its forward movement to the cartridge elevating mechanism whereby to shift a cartridge into the bolt chamber in advance of the forwardly moving bolt so that the latter will thrust the cartridge home in the firing chamber and the hammer will at the same time be locked in cocked position so that the gun is ready for firing.

It will also be apparent that a simple but highly efficient means is provided in the present gun structure for locking the trigger when it is desired to prevent the accidental firing of the gun while it is cocked, such trigger locking means being conveniently located for actuation by the trigger finger without requiring moving the trigger hand from firing position.

I claim:

1. In a bolt action rifle, a barrel, a barrel breech extension forming a cylindrical bolt chamber, the barrel receiving a cartridge from said chamber, a bolt slidably mounted in the chamber and including an axially turnable collar, a guide slot extending longitudinally of the bolt chamber and having a shoulder at its forward end, a locking rib carried by the collar and having sliding movement in the guide slot and adapted to be turned with the collar for engagement against said shoulder when the bolt is in its forward position to lock the bolt, a reciprocable member supported forwardly of the barrel extension, and an operative coupling between the reciprocable member and the bolt collar which is so constructed and arranged that upon forward movement the bolt will be shifted forwardly and the collar will be turned to secure the bolt rib against said shoulder and upon rearward movement the collar will be turned to disengage the bolt rib from said shoulder, means for feeding cartridges into position beneath the chamber, the chamber having a bottom opening, means for receiving and lifting a cartridge upwardly through said bottom opening into the chamber, and means engaged by the locking rib during its movement forwardly in the guide slot, and coupled with said cartridge receiving and lifting means, for actuating the cartridge receiving and lifting means.

2. In a bolt action rifle, a barrel, a barrel breech extension forming a cylindrical bolt chamber, the barrel receiving a cartridge from said chamber, a bolt slidably mounted in the chamber and including an axially turnable collar, a guide slot extending longitudinally of the bolt chamber and having a shoulder at its forward end, a locking rib carried by the collar and having sliding movement in the guide slot and adapted to be turned with the collar for engagement against said shoulder when the bolt is in its forward position to lock the bolt, a reciprocable member supported forwardly of the barrel extension, means operatively coupling the reciprocable member and the bolt collar which is so constructed and arranged that upon forward movement the bolt will be shifted forwardly and the collar will be turned to secure the bolt rib against said shoulder and upon rearward movement the collar will be turned to disengage the bolt rib from said shoulder, said bolt chamber having a cartridge admission port, a cartridge receiving chamber in communication with said port, means for moving a cartridge from the cartridge receiving chamber through the port into the forward end of the bolt chamber, and means connected with said cartridge moving means and actuated by said rib upon forward movement of the bolt to effect the actuation of the cartridge from the cartridge chamber into the bolt chamber in advance of the bolt.

3. In a bolt action rifle, a barrel, a barrel breech extension forming a cylindrical bolt chamber, the barrel receiving a cartridge from said chamber, a bolt slidably mounted in the chamber and including an axially turnable collar, a guide slot extending longitudinally of the bolt chamber and having a shoulder at its forward end, a locking rib carried by the collar and having sliding movement in the guide slot and adapted to be turned with the collar for engagement against said shoulder when the bolt is in its forward position to lock the bolt, a reciprocable member supported forwardly of the barrel extension, means operatively coupling the reciprocable member and the bolt collar which is so constructed and arranged that upon forward movement the bolt will be shifted forwardly and the collar will be turned to secure the bolt rib against said shoulder and upon rearward movement the collar will be turned to disengage the bolt rib from said shoulder, said bolt chamber having a cartridge admission port, a cartridge receiving chamber in communication with said port, means for moving a cartridge from the cartridge receiving chamber through the port into the forward end of the bolt chamber, and means connected with said cartridge moving means and actuated by said rib upon forward movement of the bolt to effect the actuation of the cartridge moving means to shift a cartridge from the cartridge chamber into the bolt chamber in advance of the bolt, comprising a thrust lever pivotally connected with the cartridge moving means and having an end arranged for engagement by said rib, and means for detachably locking the end of the thrust lever with the rib to effect the transmission of a moving thrust to the cartridge moving means, the rib riding freely across the end of the thrust lever upon retractive movement of the bolt.

4. In a bolt action rifle, a barrel, a barrel breech extension forming a cylindrical bolt chamber, a cartridge receiving chamber paralleling said bolt chamber, a cartridge port between said chambers, a bolt slidably mounted in the first chamber and including an axially turnable collar, a guide slot in and extending longitudinally of the wall of the bolt chamber and terminating in a lateral shoulder, a locking rib carried by the collar and adapted to move to a position for locking engagement with the shoulder upon turning of the collar when the bolt is in its forward position, an elevator supported within the cartridge receiving

chamber to receive and shift a cartridge through said port into the bolt chamber, resilient means normally urging the elevator away from the bolt chamber, a thrust lever pivotally coupled with the elevator and having an end positioned for extension across the slot in the path of movement of said rib, said rib engaging the said end of the thrust lever and moving across and in contact therewith upon retraction of the bolt, the rib effecting the free oscillation of the thrust lever upon such retraction without moving the elevator, and means for effecting a locking connection between the rib and the said end of the thrust lever upon retraction of the rib with the bolt to a predetermined extent whereby upon forward movement of the bolt and rib a combined downward thrust and forward swinging will be imparted to the lever to effect the raising movement of the elevator, the rib being of such length with respect to the full extent of forward travel of the bolt as to move out of engagement with the thrust lever before the limit of such forward movement of the bolt is reached to allow the elevator to lower under the action of said resilient means.

5. A bolt action rifle mechanism as stated in claim 4, in which the said means for establishing a locking connection between the end of the thrust lever and the rib, comprises a notch formed in the face of the rib which has sliding contact with the end of the lever, the said end of the lever having a contact face oblique to the length of the lever to form a high corner point for connection with the notch and to permit a prescribed degree of oscillation of the thrust lever during the forward movement of the bolt before the point disengages from the notch.

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