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ORDNANCE.

APPLICATION FILED NOV. 12, 1910. RENEWED AUG. 12, 1912.

1,055,820.

Patented Mar. 11, 1913.

3 SHEETS—SHEET 1.

Fig. 1.

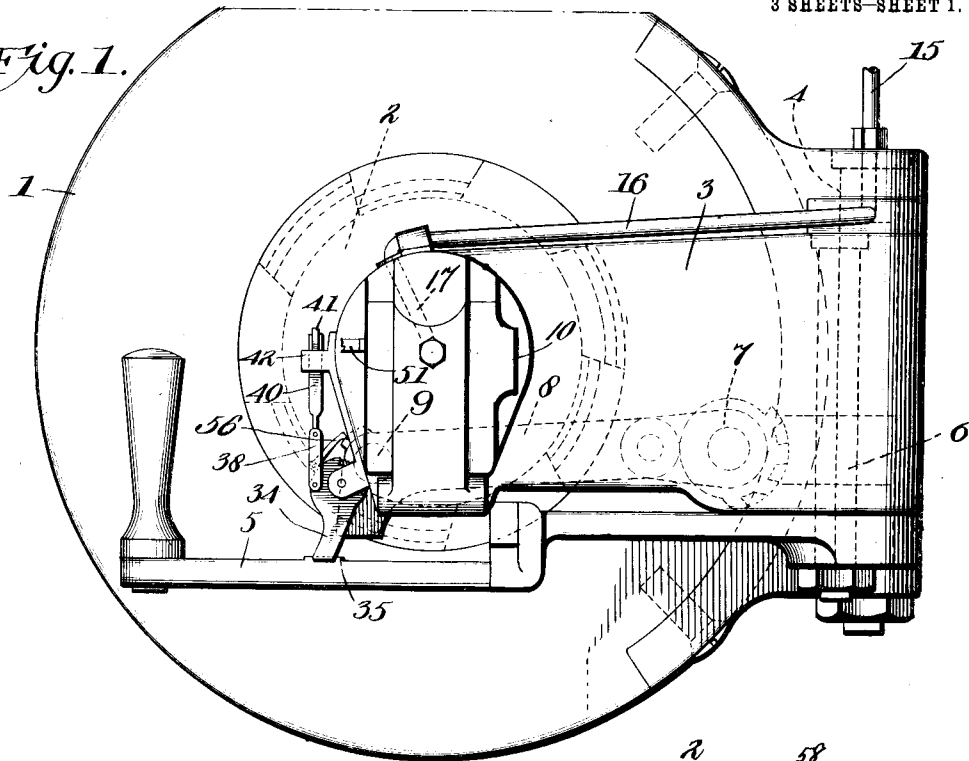
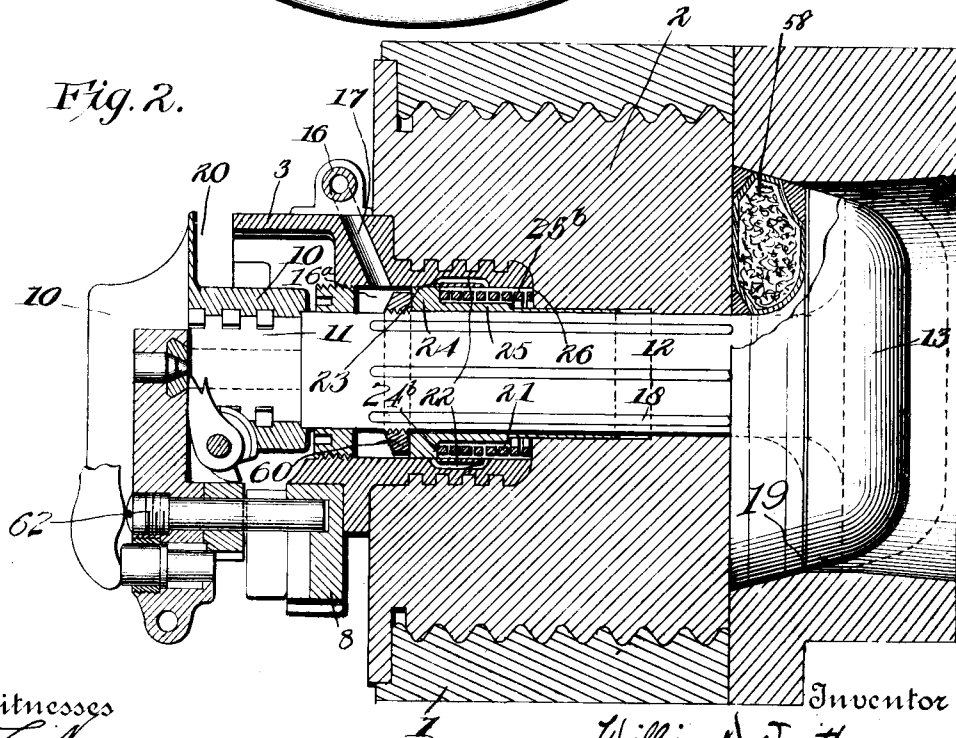


Fig. 2.



Witnesses
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3 SHEETS—SHEET 2.

Fig. 3.

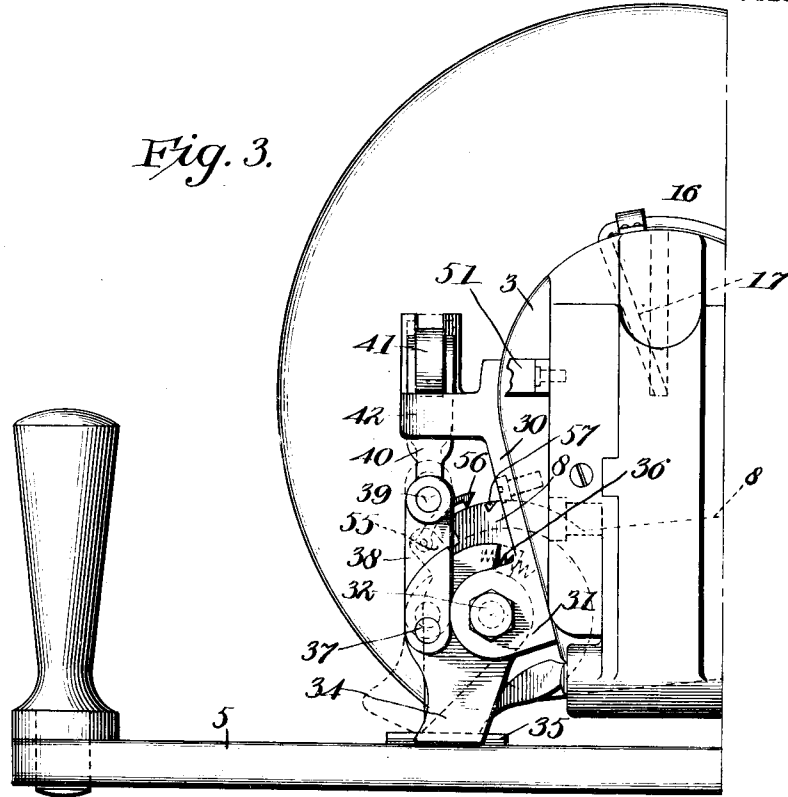
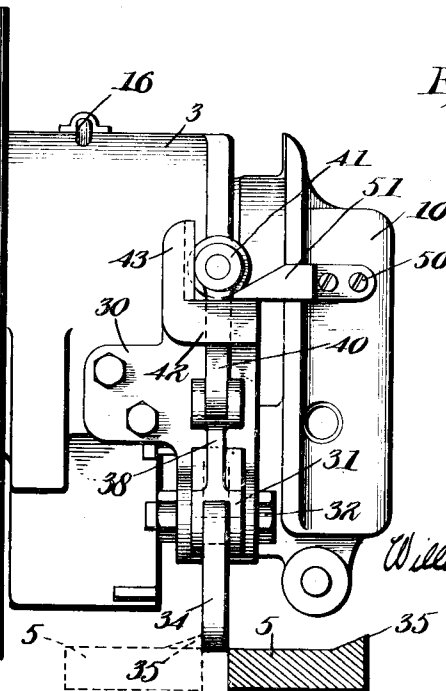


Fig. 4.



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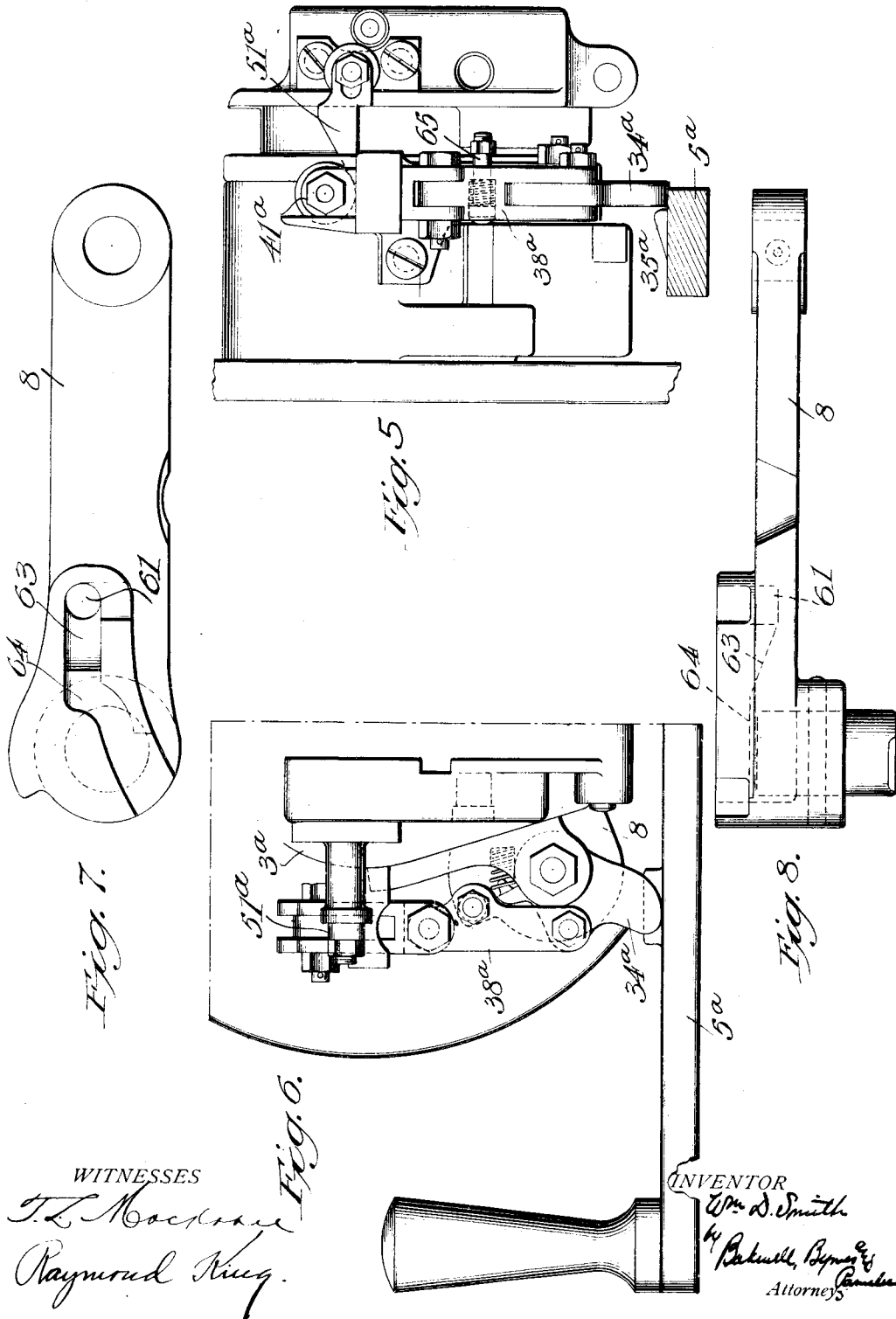
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3 SHEETS--SHEET 3.



UNITED STATES PATENT OFFICE.

WILLIAM D. SMITH, OF WASHINGTON, DISTRICT OF COLUMBIA.

ORDNANCE.

1,055,820.

Specification of Letters Patent.

Patented Mar. 11, 1913.

Application filed November 12, 1910, Serial No. 592,042. Renewed August 12, 1912. Serial No. 714,706.

To all whom it may concern:

Be it known that I, WILLIAM D. SMITH, a resident of Washington, in the District of Columbia, have invented a new and useful
5 Improvement in Ordnance, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

10 Figure 1 is an end elevation of the breech of a gun, showing a well known form of breech operating mechanism provided with my improvement. Fig. 2 is a sectional side elevation of the same. Fig. 3 is an enlarged
15 partial end elevation showing the same parts as in Fig. 1 but on a larger scale. Fig. 4 is a side elevation of Fig. 3 with the operating lever in section. Fig. 5 is a side elevation showing a modified form of the locking
20 mechanism. Fig. 6 is an end elevation of the breech showing the form of Fig. 5. Fig. 7 is an inner plan view of the breech operating link, Fig. 8 is a top plan view of this link.

25 My invention relates more particularly to that class of guns wherein fluid is admitted to clear out the residue of the explosion after firing, in order to prevent "flarebacks," and premature discharges.
30 Such devices are shown, for example, in my Patents 944,973 and 944,974, dated December 28, 1909.

The main feature of the present invention is to provide a positive indicator for
35 showing whether or not the air has performed its function in driving out the residues; and also to form this positive indicator as a locking device, which will prevent the opening of the breech mechanism
40 unless the air has entered and performed its work. This mechanism is so arranged that if the air performs its work the lock is released and the operator can open the breech, but if, for any reason, the air has not entered
45 and blown out the residues, the breech will be positively locked and cannot be opened except by special manual movements of the operator.

The invention also relates to a special
50 means for moving back the spindle in case the spring has not performed its function, to the spindle cushioning means and other features hereinafter described.

65 In the drawings 1 represents the breech of the gun having the usual breech block 2, with its carrier 3 hinged at 4. 5 is the usual

operating lever, which is mounted on the same axis as the breech block, and is provided with the usual gearing 6 and 7, which operate the link 8, which in turn is pivoted
60 to the breech block at 9. In this form of breech mechanism, which is, of course, only one of many forms to which my invention may be applied, the continuous operating
65 of the lever 5 will, through the gearing and link, first turn the breech block on its axis to unlock it from the screw box, and then give it a movement of translation and swing it outwardly from the screw box on
70 the pivot 4. In this form of device the firing mechanism indicated at 10 is carried on at the rear end 11 of the stem 12 of the usual mushroom 13, this stem having a slight longitudinal movement relative to the
75 breech block.

In order to supply fluid to the interior of the gun after the shot is fired I show the axial pipe 15 concentric with the pivot 4. The branch pipe 16 communicates with this
80 pipe 15 and being fixed on the breech block carrier will swing with this block in its movements. The branch pipe connects with the passage 17 through the carrier 3, which passage leads the air into the chamber 16
85 from which it enters longitudinally grooved passages 18 cut in the outer surface of the stem 12. These grooved passages, as shown in Fig. 2, extend to the rear edge of the
90 gas check 58 or to the face of the breech block. The spindle must, therefore, move sufficiently to carry the front ends of these grooves past the straight portion of the gas check or pad before the high pressure air can enter the gun. Surrounding the spindle
95 12 is a sleeve 24, which is of three different diameters, its rear portion being of the largest diameter, the portion 25 of the next smaller diameter, and the forward portion of still smaller diameter. This sleeve is held by the nut 60 and the part 24 acts
100 as an abutment for the spiral spring 21, whose other end abuts against the recess in the breech block. In order to allow a sufficient motion of the stem to uncover the ends of the supply passages, I make this stem
105 somewhat longer than usual and also make the spring 21 longer than as at present. As the carrier 3 remains stationary when the breech is closed, the high pressure air enters through the passage 17 and acts upon
110 the spindle nut 60, which acts as a piston head and forces the spindle forwardly lon-

gitudinally of the axis of the gun to such a distance that the front ends of the grooved passages are uncovered by passing the straight portion of the opening through the gas check, thus admitting fluid into the gun to drive out the residue of the explosion. This fluid flows out in an annular sheet around the mushroom head, issuing between it and the gas check. In this mechanism a spring is employed to return the mushroom after it is moved forward in the gun; and to assist the action of this spring, as well as to assist in the cushioning of the forward movement of the spindle, I provide side passages 22 in the carrier sleeve, the ends 23 of which are so located that they will be uncovered by the shoulder 24^b of the sleeve 24 when the mushroom moves forward, thus admitting air in front of the shoulder 24 and assisting the spring to retract the mushroom, as well as cushioning the forward movement. The shoulder 25^b on the sleeve is a square shoulder which engages shoulder 26 of the breech block on the forward movement of the stem before the spring has become solid, this shoulder receiving the shock and preventing injury to the spring.

I will now describe my improved positive indicator and locking device, which is actuated by and depends upon the movement of the spindle, and which not only shows whether or not the air has properly entered, but also prevents the opening of the breech unless the air has so entered and performed its function.

In the form which my invention takes as applied to the gun mechanism just described, the bracket 30 is fastened to the left hand edge of the carrier 3, this bracket having lower lugs 31, between which is pivoted at 32 a latch 34. This latch normally lies in the path of a lip or lug 35 which projects up from the operating lever 5, consequently when this latch is in its normal position the lever cannot be moved and the breech cannot be opened. The spring 36 normally holds this latch pressed downwardly and pivoted to the latch at 37 is a link 38 having a bifurcated upper end, to which is pivoted a second link 40, also bifurcated at its upper end to receive the roller 41. The link 40 slides up and down through the hole in the guide lug 42, fastened to the bracket 30, this lug having at one side an upward guide 43 to support the roller on one side. To the left hand side of the firing mechanism 10 I secure a wedge-shaped piece 51, which is arranged to engage the under side of the roller 41 when the firing mechanism moves forwardly. In such case the wedge acts to lift the link system and consequently swing the latch against the pressure of its spring into the dotted line position in Fig. 3. This takes the latch out of the path of the lip 35 and allows the breech

to be opened. When the high pressure fluid is admitted and the firing mechanism 10 is forced forward, it therefore lifts the latch out of its locking position and releases the lever 5. The air now having performed its proper function, I provide means on the return of the firing mechanism, for preventing it from again locking the lever 5 until after the breech has been opened. For this purpose I provide the latch 34 with a lug 55, to which is pivoted a dog 56, arranged to drop into a notch 57 in the operating link 8 of the breech block. On lifting the link system this dog 56 drops into the notch and will therefore hold the latch lifted when the firing mechanism returns. The lever 5 will therefore be free to be operated after the air has entered and performed its function. When, however, the lever 5 is operated to open and close the breech, it will, through the link 8, move the pivot 9 along a path substantially concentric to the bore of the gun, and thereby will move the notch 57 downwardly and to the right, as shown in Fig. 3, and thus disengage the dog from the link. The spring 36 will thereupon immediately restore the latch to its normal full line position, whereupon the lever 5 is again locked. When the lever is brought back to close the breech block the incline on the face of 35 will lift the latch, which will then drop in front of this projection and lock the lever. In case the air has not been properly admitted to clean out the residues and it is desired to open the breech, this can be done by manually lifting the latch.

In order to provide means for positively moving the spindle back to its normal position if the spring has failed to return it, I arrange the lever 8, as shown in Figs. 7 and 8. The hole 61, which is entered by the operating stud 62 on the firing mechanism, I make deeper than usual to accommodate a greater forward movement of the spindle above described, and from this hole a beveled incline 63 leads up to the usual inclined groove 64 in the link. By means of this bevel, if the spindle is moved forward and is not returned by the spring, the movement of the link will, through the inclined cam surface thereon, force the stud backwardly and thus positively move the spindle back to its normal position.

In Figs. 5 and 6 I show a modified form of locking device. In this case parts similar to parts are marked with the same numerals with the letter "a" attached. In this case the latch 34^a is practically the same as before, but the dog 56 is done away with and an endwise movable spring pressed pin 65 is mounted in a transverse hole in the lower link, 38^a. The under end of this pin 65 has a rounded head which, if the lever 5^a is in a locked position, is pressed against the outer vertical face of the link. When, how-

ever, air is admitted and performs its cleaning out function the movement of the spindle, acting through the same wedge 51^a, will lift the link system and will spring the latch, and will thereby raise the spring pressed pin above the top of the link 8, whereupon its head will be forced over the top of the link and will rest thereon. The latch system is thus held in a raised position, thereby unlocking the operating handle 5. When the breech block is opened the link 8 moves out from under this spring pressed pin, whereupon the link system drops down to its normal locking position. When the breech block is again closed the latch will ride up the incline 35^a on the lever and drop in front of it. This incline is not of sufficient height to lift the link system to its locking position during this action.

The advantages of my invention will be apparent to those skilled in this art. I not only provide a positive indicating device which will show whether or not the air has been admitted and performed its function, but I also positively lock the breech against opening until the air has been so admitted and cleaned out the residues. At the same time the device allows the locking device to be unlocked by hand in case it is desired to open the block when the air has not properly entered. The incline on the operating link 8 also serves to positively return the spindle in case the spring has not returned it, air being allowed to enter the spring cavity around the spindle, and also aids in cushioning the forward movement of the spindle and assists in returning the spindle.

Many changes may be made in the former arrangement of the breech mechanism, the firing mechanism, the locking means, etc., without departing from my invention, which may be applied to different types of guns having different types of breech mechanism and firing mechanism, and also having different methods of advancing the spindle. The means for injecting fluid may also be varied without departing from my invention.

What I claim is:—

1. In a gun, the combination with a breech block, of a fluid injector carried by the block and movable relatively to the block, a positive indicator having connections arranged to be actuated by the movement of the fluid injector and means to retain the indicator in its shifted position.

2. In a gun, the combination with a breech block, of a spindle extending through the block and carrying the mushroom, means for moving the spindle longitudinally, means for injecting fluid through said spindle in one position thereof, a positive indicator actuated by the movements of the spindle and means to retain the indicator in its shifted position.

3. In a gun the combination with a breech block, of a fluid injector carried by the block and movable relatively thereto, and a locking device for the breech block actuated by movement of the fluid injector.

4. In a gun, the combination with a breech block, of a fluid injector carried by the block and movable relatively thereto, and a movable stop in the path of the breech mechanism, said stop having connections actuated by the movement of the fluid injector.

5. In a gun, the combination with a breech block, of a fluid injector carried by the block and movable relatively thereto, a locking device arranged to be actuated by the movement of the fluid injector, and mechanism for holding the locking device in unlocked position after actuation, until the breech is opened.

6. In a gun, the combination with a breech block, of a fluid injector carried by the block and movable relatively thereto, a locking device arranged to be actuated by the movement of the fluid injector, and mechanism for holding the locking device in unlocked position after actuation until the breech is opened, said locking mechanism being moved out of and then into position by the closing of the breech.

7. In a gun, the combination with a breech block, of a fluid injector carried by the block and movable relatively thereto, a movable stop in the path of the breech mechanism to prevent its being opened, and means operated by movement of the fluid injector for moving the stop out of its locking position.

8. In a gun, a breech block having fluid admitting means, and breech locking mechanism controlled by the movement of said fluid admitting means.

9. In a gun, the combination with a breech block, of a fluid injector carried by the block and movable relative thereto, a breech block operating link, and means on the breech block operating link arranged to positively force the fluid injector to its normal position, substantially as described.

10. In a gun, the combination with a breech block, of a fluid injector carried by the block and movable relatively thereto, and a breech block operating link having an inclined face arranged to positively force the fluid injector to its normal position when the link moves the block.

11. In a gun, the combination with a breech block, of a fluid injector carried by the block and movable with relation thereto, a pressure chamber, a piston connected to the fluid injector and located within the pressure chamber, a spring arranged to return the fluid injector, and ports arranged to equalize the pressure on both sides of the piston when said piston has been advanced a predetermined distance, substantially as described.

12. A safety device for a breech loading gun having a removable breech block, comprising a mushroom head having a spindle extending through the breech block, pressure inlet ports arranged to be controlled by the movement of the mushroom head, a fluid pressure supply for said ports, means for advancing the mushroom head to open the ports to admit fluid pressure to the bore of the gun, breech block removing mechanism, a latch for said mechanism, and latch releasing mechanism arranged to be actuated by the movement of the mushroom head to unlatch the breech block removing mechanism; substantially as described.

13. A safety device for a breech loading gun having a removable breech block, comprising a mushroom head having a spindle extending through the breech block, pressure inlet ports arranged to be controlled by the movement of the mushroom head, a fluid pressure supply for said ports, means for advancing the mushroom head to open the ports to admit fluid pressure to the bore of the gun, breech block removing mechanism, a latch for said mechanism, latch releasing mechanism arranged to be actuated by the movement of the mushroom head to unlatch the breech block mechanism, and means to retain the latch in its unlatched position; substantially as described.

14. A safety device for a breech loading gun having a removable breech block, comprising a mushroom head having a spindle extending through the breech block, pressure inlet ports arranged to be controlled by the movement of the mushroom head, a fluid pressure supply for said ports, means for advancing the mushroom head to open the ports to admit fluid pressure to the bore of the gun, breech block removing mechanism, a latch for said mechanism, latch releasing mechanism arranged to be actuated by the movement of the mushroom head to unlatch the breech block mechanism, means to retain the latch in its unlatched position, and means controlled by the movement of the breech block removing mechanism to release the latch and permit it to

return to its latching position; substantially as described.

15. A safety device for breech loading guns having a removable breech block, comprising a mushroom head having a spindle extending through the breech block, pressure inlet ports arranged to be controlled by the movement of the mushroom head, a fluid pressure supply for said ports, means for advancing the mushroom head to open the ports to admit fluid pressure to the bore of the gun, breech block removing mechanism, a latch for said mechanism, and a cam arranged to be actuated by the movement of the mushroom head to raise the latch out of engagement with the breech block removing mechanism; substantially as described.

16. A safety device for breech loading guns having a removable breech block, comprising a mushroom head having a spindle extending through the breech block, pressure inlet ports arranged to be controlled by the movement of the mushroom head, a fluid pressure supply for said ports, means for advancing the mushroom head to open the ports to admit fluid pressure to the bore of the gun, breech block removing mechanism, a latch for said mechanism, a cam arranged to be actuated by the movement of the mushroom head to raise the latch out of engagement with the breech block removing mechanism, and means to retain the latch in its unlatched position; substantially as described.

17. In a gun, a breech block having fluid-admitting means and breech block locking mechanism arranged to be actuated by the movement of the fluid-admitting means to unlock the breech block, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM D. SMITH.

Witnesses:

A. L. HOUGH,
B. G. FOSTER.