June 17, 1941. W. SUMMERBELL 2,245,622

BREECHBLOCK OPERATING MECHANISM

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Fig. 1.

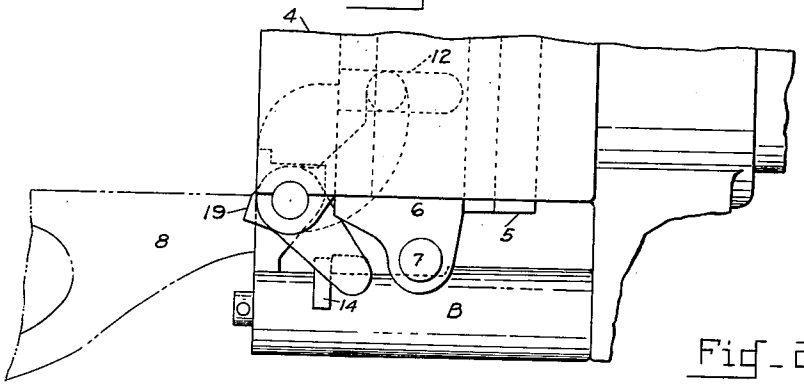


Fig. 2.

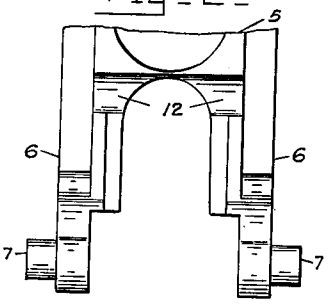
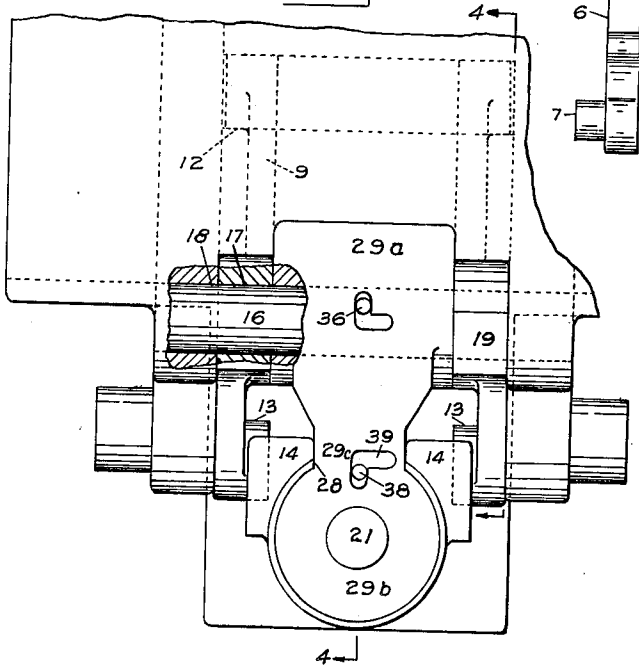


Fig. 3.



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Fig. 4.

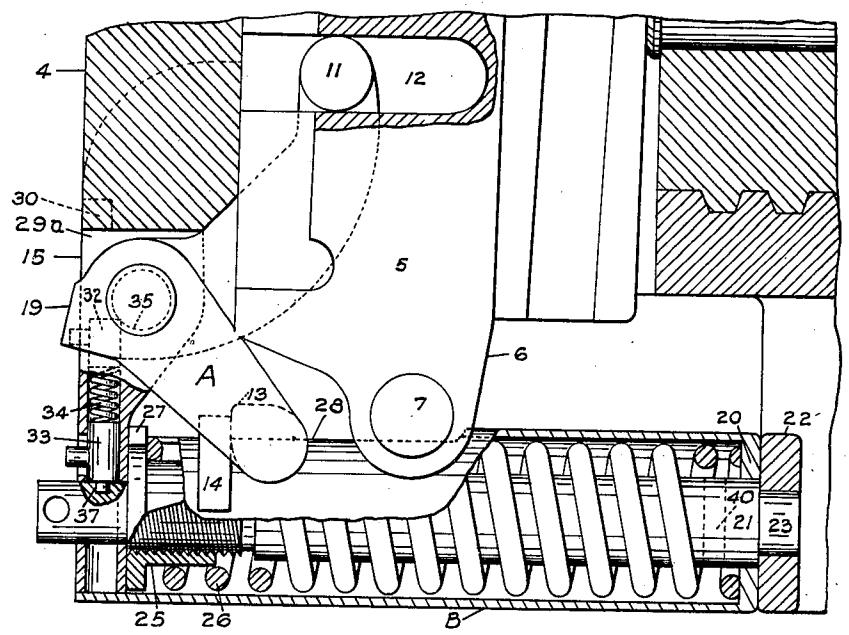
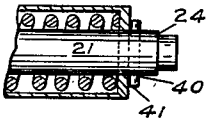


Fig. 9.



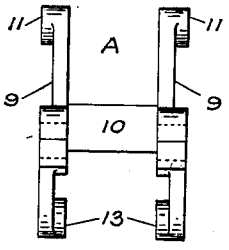


Fig. 5.

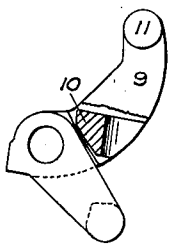


Fig. 6.

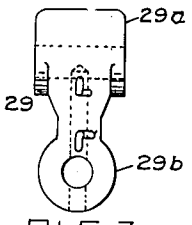


Fig. 7.

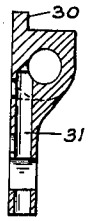


Fig. 8.

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Patented June 17, 1941 2,245,622

UNITED STATES PATENT OFFICE

2,245,622

BREECHBLOCK OPERATING MECHANISM

William Summerbell, Watervliet, N. Y., assignor to Government of the United States of America, as represented by the Secretary of War and his successors in office

Application May 22, 1939, Serial No. 274,986

8 Claims. (Cl. 89—24)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to a breech block operating mechanism.

The purpose of the invention is to provide a semi-automatic breech mechanism for rapid firing small caliber cannon especially adapted for firing on moving targets.

The invention is characterized by a novel arrangement wherein the entire breech closing mechanism is conveniently assembled and applied as a unit to the gun without the necessity of employing tools. In order to conserve space certain elements of the mechanism are placed directly underneath a vertically sliding breech block and supported in a novel manner.

The specific nature of the invention as well as other objects and advantages thereof will clearly appear from a description of a preferred embodiment as shown in the accompanying drawings in which:

Fig. 1 is a view in right side elevation of the breech end of a gun to which the improved breech operating mechanism is applied;

Fig. 2 is a view in rear elevation of the lower part of the breech block;

Fig. 3 is a view in rear elevation with parts broken away of the lower portion of the breech end of the gun;

Fig. 4 is a sectional view taken generally on the line 4—4 of Fig. 3;

Figs. 5 and 6 are views of the block operating lever respectively in rear elevation and in side elevation with parts broken away;

Figs. 7 and 8 are views of the plate respectively in rear elevation and in section;

Fig. 9 is a fragmentary longitudinal sectional view showing arrangement of the sleeve and guide rod prior to assembly in the breech ring.

Referring to the drawings by characters of reference there is shown a portion of a gun comprising a breech ring 4 having an opening for a vertically sliding breech block 5. The breech block is formed with a pair of laterally spaced, depending legs 6—6, each carrying at its lower extremity a laterally and outwardly extending stud 7. On recoil movement of the gun the stud 7 is adapted to ride on cam plates 8 only one of which is shown, for the purpose of causing the breech block to be automatically lowered to the open position and thereby provide for extraction of the empty cartridge case. The breech block when fully open is held in this position in a manner well known in the art by means of extractor levers (not shown). These levers are acted on by insertion of a new round of ammunition to release the breech block. Since these levers form no part of the present invention they are not illustrated.

Mechanism for automatically closing the breech block, when released, comprises generally a lever A and a spring controlled actuating sleeve B. The lever A (Figs. 5 and 6) consists of a pair of similar bell-crank members 9—9 connected by a spacing bar 10. The upper ends of the members 9 are provided with outwardly disposed circular lugs 11—11 for engaging the walls defining a horizontally disposed slot 12 in the inner side of each leg 6 of the breech block. The lower ends of the members 9 are provided with inwardly disposed lugs 13—13 for engaging the forward sides of ears 14—14 on the sleeve B.

The lever A is inserted in an opening 15 in the breech ring 4 and is pivotally mounted on a pin 16 passing through aligned apertures 17 and 18 respectively provided in the lever A and the breech ring. Each of the members 9 is formed with a rearwardly extending lug 19 adjacent to the apertures 17 for the purpose of engaging the upper wall defining the opening 15 in the breech ring and thereby serving to limit rotational movement of the lever A.

The sleeve B is positioned centrally of and directly underneath the breech block and is adapted to be straddled by the legs 6—6 of the breech block when the latter is lowered. The sleeve has an inturned front end 20 slidably supported on a guide rod 21 and adapted to engage a lug 22 on the breech ring. The rod has a reduced front end 23 insertable in an opening in the lug 22 and it is consequently formed with an annular shoulder 24 which engages the lug. A nut 25 threaded on the rear end of the rod is disposed within the sleeve and forms a seat for a helical spring 26 which embraces the rod and has its front coil seated on the inturned end 20 of the sleeve. The upper portion of the nut is formed with a key 27 insertable in a slot 28 cut in the upper rear surface of the sleeve and serves to hold the nut against rotational displacement.

A plate 29 (Figs. 7 and 8) has a parallel-sided upper portion 29a disposed in the opening 15 in the breech ring and mounted on the pin 16. A transverse rib 30 on the portion 29a engages a correspondingly recessed portion of the opening 15 and by reason of the engagement of the upper surface of the portion 29a with the breech

ring the plate 29 is held against turning on the pin 16.

The plate 29 includes a circular lower portion 29b inserted in and supporting the sleeve and it has an opening for receiving and supporting the rod 21. The plate also has a connecting portion 29c passing through the slot 28 in the sleeve. The plate 29 serves in addition as a rigid support for the nut 25 so that the sleeve may be retracted to compress the spring 26.

The plate 29 is provided with a vertically extending bore 31 for housing an upper latch 32, a lower latch 33, and an interposed coil spring 34. The upper latch engages an annular groove 35 in the pin 16 to normally hold it in place and it carries a pin 36 extending through plate 29 whereby it may be moved. The lower latch engages an opening or recess 37 in the rod 21 to hold the rod against rotational movement which would cause the nut 25 to be displaced and alter the predetermined load on the spring. The lower latch 33 carries a pin 38 which extends through an angled slot 39 in the plate 29 and the pin may be swung into the lateral arm of the slot to hold the latch out of engagement with the rod.

In operation, the breech block 6 is lowered by means of its studs 7 which ride on the cam plate 8 during recoil of the gun. The lowering of the breech block, acting through lugs 11 on lever A, causes the lever A to be rotated on pin 16 and the lugs 13 engaging the ears 14 of the sleeve, retract the sleeve to compress the spring 26. The spring being thus energized, automatically restores the breech block to the closed position, when the breech block is released by the act of loading a round into the barrel.

For the purpose of assembling and disassembling the guide rod 21 is provided with an opening 40 for receiving a pin 41 which is inserted when the sleeve has been retracted sufficiently to the rear to clear the opening. The pin, when inserted, limits forward movement of the sleeve under action of the spring 26 and will be removably held in place through the pressure exerted by the sleeve. At the same time the spring cannot move the rod rearwardly with respect to the sleeve.

In disassembly, the breech block is opened to retract the sleeve B and the pin 41 is inserted in opening 37 in the guide rod. The breech block holding means, which may be extractor levers as previously indicated, is disengaged and the block is permitted to rise under manual control, in order to ease the sleeve against the pin 41. The pivot pin 16 is now removed and the entire unit including lever A, sleeve B and plate 29 is removed. Assembly is accomplished by reversing the above procedure.

I claim:

1. In a recoil gun having a breech ring, a vertically sliding breech block in the breech ring and means for lowering the block, a breech closing mechanism comprising a plate fitting in the rear of the breech ring and having a circular portion below the breech ring, a pin in the breech ring for mounting said plate, a guide rod having its rear end supported by the circular portion of the plate and having its front end inserted in the breech ring forwardly of the breech block, a sleeve having a slotted rear end slidably supported by the circular portion of the plate and having its front end slidably supported on the rod, a nut on the rear part of the rod and engaging the slotted portion of the sleeve, a spring between the nut and the front end of the sleeve, a lever mounted on the pin in the breech ring and engaging the breech block and the sleeve.

2. In a recoil gun having a breech ring, a vertically sliding breech block in the breech ring and means for lowering the block, a breech closing mechanism comprising a plate in the rear of the breech ring, a pin in the breech ring for mounting said plate, a guide rod carried by said plate and supported in the breech ring forwardly of the breech block, a sleeve slidably supported by the rod and by the plate, a spring between the rod and the front end of the sleeve, and a lever mounted on the pin in the breech ring and engaging the breech block and sleeve.

3. In a recoil gun having a breech ring, a vertically sliding breech block in the breech ring and means for lowering the block, a breech closing mechanism comprising a plate mounted in the rear of the breech ring, a sleeve slidably mounted on the plate, means for slidably supporting the front end of the sleeve, a resilient member between the plate and the front end of the sleeve, and a lever mounted in the breech ring and engaging the breech and the sleeve.

4. In a gun having a vertically sliding breech block a breech ring having an opening in its rear end, said vertically sliding breech block fitting in the breech ring, a plate fitting in the opening in the breech ring, a breech block closing lever fitting in the opening in the breech ring, a pin for mounting both the plate and lever, and a lever actuating member slidably supported by the plate.

5. In a gun, a breech ring, a vertically sliding breech block in the breech ring, a lever mounted in the breech ring in rear of the breech block and engaging the breech block, a lever actuating unit disposed underneath the vertically sliding breech block and means for supporting the unit from the breech ring in front and in rear of the breech block.

6. A breech block closing unit comprising a rod, a sleeve on the rod, a spring between the rear part of the rod and the front end of the sleeve, a removable member engaging the rod for holding the spring compressed, a plate latched to the rod and slidably supporting the sleeve, said plate having an aperture for a mounting pin, and a lever engageable with the sleeve and having an aperture alignable with the aperture in the plate.

7. A breech block closing unit comprising a rod, a sleeve on the rod, a spring between the rear part of the rod and the front end of the sleeve, a removable member engaging the rod for holding the spring compressed, a plate latched to the rod and slidably supporting the sleeve, and said plate having an aperture for a mounting pin.

8. In a gun, a breech ring, a plate in the breech ring, a pin in the breech ring for mounting the plate, a lever mounted on said pin, a lever actuating mechanism including a guide rod, a pair of latches carried by the plate for respectively engaging the pin and the guide rod, and a single spring between the latches.

WILLIAM SUMMERBELL.