Jan. 18, 1944. W. L. SWARTZ 2,339,661

BREECH MECHANISM FOR AUTOMATIC FIREARMS

Filed Jan. 17, 1940

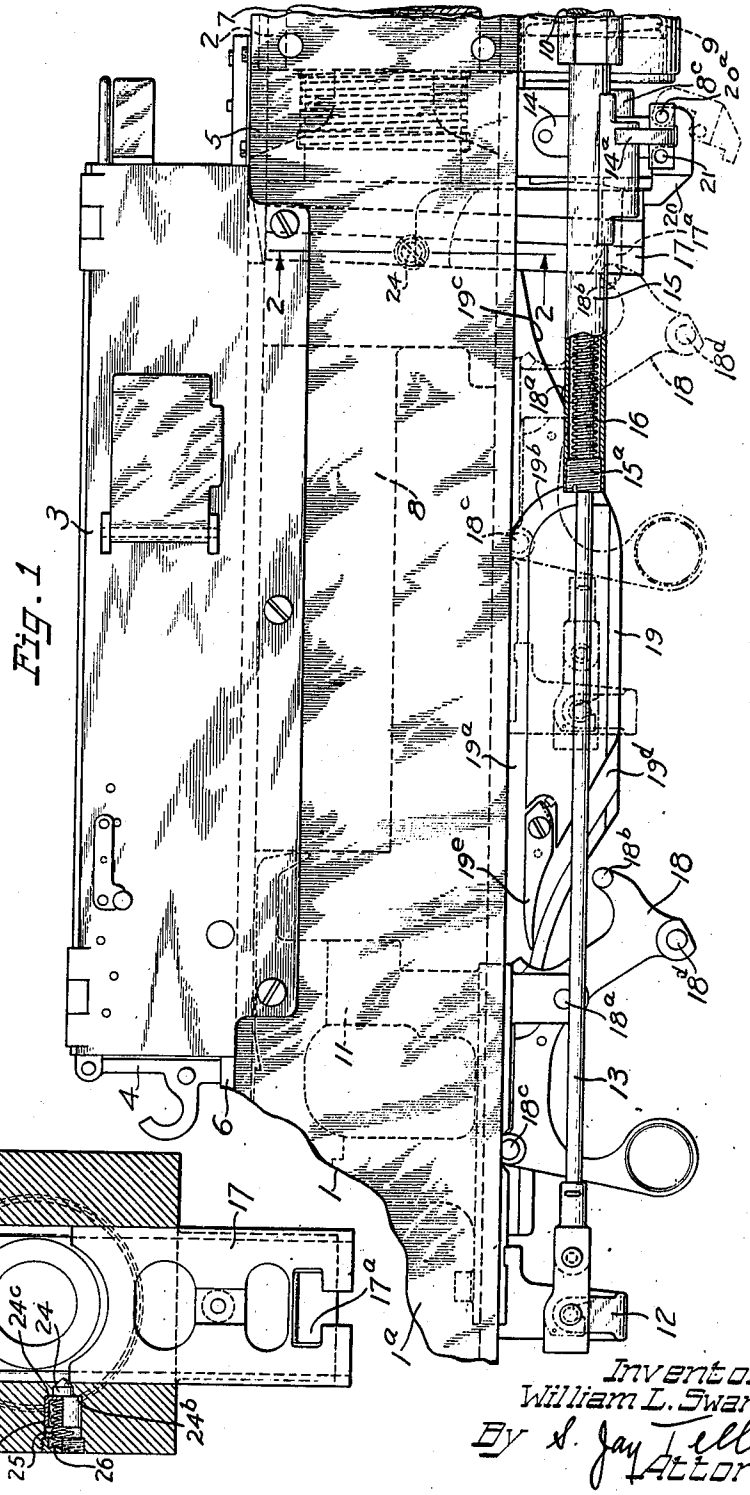


Fig. 1

Fig. 2

Inventor
William L. Swartz
By S. Jay Fuller
Attorney

Patented Jan. 18, 1944

2,339,661

UNITED STATES PATENT OFFICE

2,339,661

BREECH MECHANISM FOR AUTOMATIC FIREARMS

William L. Swartz, Weathersfield, Conn., assignor to Colt's Patent Fire Arms Manufacturing Company, Hartford, Conn., a corporation of Connecticut

Application January 17, 1940, Serial No. 314,272

2 Claims. (Cl. 89—3)

The present invention is particularly applicable to automatic firearms of the type shown in Patent No. 1,525,065 to John M. Browning and in Patent No. 1,852,057 to Frederick T. Moore and Christian Pfeiffer, but it is not so limited.

The principal object of the present invention is to provide improved means for preventing movement of the transversely movable breech block, during that period in the cycle of operation of the gun when the block is intended to be in its lower position.

In the accompanying drawing I have shown the embodiment of the invention which I now deem preferable, but it will be understood that the drawing is intended for illustrative purposes only and is not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

Of the drawing:

Fig. 1 is a fragmentary side view of a gun embodying the invention, a certain portion being broken away to show interior parts.

Fig. 2 is a fragmentary vertical sectional view taken along the line 2—2 of Fig. 1 but omitting certain parts.

Referring to the drawing, 1 represents the main casing which comprises spaced side plates connected near their front ends with a trunnion block 2. In the drawing only the right hand side plate 1a is shown. At the top of the casing is a feed box 3 and at the rear of the feed box is a trigger 4. These parts need not be described in detail as the invention does not relate to the details of the feed mechanism or of the firing mechanism. At the front and rear of the feed box are cover plates 5 and 6 which connect the side plates.

The barrel 7 is longitudinally movable in an opening in the trunnion block and it is detachably connected with a barrel extension 8 which is longitudinally movable in the casing, being guided at the top and at the bottom by inward projecting flanges on the side plates. The barrel extension comprises two spaced legs 8a and 8b. The barrel and barrel extension move rearward upon recoil and are returned in the forward direction by the recuperator spring 9. This spring acts through the recuperator rod 10 which is connected at its rear end with a depending lug 8c on the barrel extension 8.

Also longitudinally movable within the casing is a lock frame 11, this frame being shown in Fig. 1 in the rearward position, which it occupies at least momentarily after the firing of each shot. Depending from the lock frame 11 is a yoke 12 to which are connected two transversely spaced tension rods 13. The depending lug 8c of the barrel extension 8 carries a yoke 14 having laterally projecting arms 14a (one of which is shown in Fig. 1). Supported in part on the arms 14a are tubes 15 which receive the tension rods 13 and which also receive reaction springs 16 surrounding the tension rods. These springs abut at their rear ends against plugs 15a in the rear ends of the tube, and abut at their forward ends against projections (not shown) on the rods 13 near the forward ends thereof.

Upon recoil, the barrel, barrel extension and lock frame move rearward simultaneously, and the lock frame is at least momentarily held in its rearward position as shown in Fig. 1. The barrel and barrel extension immediately move forward under the influence of the recuperator spring 9, as already stated, and the tubes 15 move forward at the same time, thus compressing the springs 16 and tensioning the rods 13. Upon subsequent release of the lock frame, the springs 16 in cooperation with the rods 13, move the lock frame forward, this frame with its associated parts serving to push a cartridge into the chamber of the barrel as explained in detail in the aforesaid patents.

A breech block 17 is provided which moves bodily with the barrel extension 8 and which is also movable vertically with respect to the barrel extension, being positioned between the legs 8a and 8b and being guided by ribs 8d and 8e. The vertical movement of the breech block 17 is effected by an actuating lever 18 which is carried by the lock frame 11 and which is moved about its pivotal connection 18a by means of a cam structure indicated in its entirety by 19 and depending from the main casing at the left side thereof. The actuating lever 18 has transversely projecting studs 18b which are adapted to enter a T-slot 17a in the breech block. When out of engagement with the actuating lever, the breech block 17 is retained and supported by a stop 20, shown in Fig. 1. The stop 20 has a flat surface on its top upon which the bottom surface of the breech block rests when it is in lowered position so that the breech block will be properly positioned whereby the studs 18b will accurately enter the T-slot 17a during functioning of the gun to avoid jamming.

When the lock frame moves forward from the position shown in Fig. 1, a cartridge is pushed into the chamber of the barrel, as already stated. At the same time, a stud at 18c on the left side of the actuating lever 18 travels along the cam

groove 19a until it reaches the position shown by dot-and-dash line in Fig. 1. In this position the studs 18b on the actuating lever are about to enter the T-slot 17a in the breech block. Continued forward movement of the lock frame and of the actuating lever causes the stud 18c to move downward along the cam groove 19b thus rotating the actuating lever in the counterclockwise direction and moving the breech block upward to its breech-closing position where it serves as an abutment for the cartridge.

Upon recoil, the barrel and barrel extension and the lock frame initially move rearward in unison and during such movement a stud at 18d on the left side of the actuating lever 18 engages the cam surface 19c. This engagement of the stud 18d with the cam surface 19c moves the lever 18 in the clockwise direction and the lever in so moving causes downward movement of the breech block. This clockwise movement of the lever 18 carries the stud 18c into the cam groove 19d. Continued rearward movement causes the stud 18c to move past the spring-pressed switch 19e until the parts finally reach the position shown by full lines in Fig. 1. It will be understood that just before the lock frame and the associated parts reach the full line position shown in Fig. 1, the barrel and barrel extension and associated parts, start to move forward to the position shown in Fig. 1, this forward movement separating the breech block 17 from the actuating lever 18.

Further and more detailed illustration and description of the operating mechanism for the breech block are to be found in the before-mentioned patents, and the foregoing brief description is sufficient for purposes of disclosing the present invention.

It is highly desirable that the breech block be readily removable from the gun for inspection, cleaning or replacement. In order to permit such ready removal, the stop 20 is relatively movable in the direction shown in dot-and-dash lines in Fig. 1, and it is pivotally connected at 20a with the yoke 14. The stop is normally held in its upper operative position by a manually releasable means such as a spring-pressed detent 21. When the detent 21 is withdrawn, the stop 20 can move to its lower inoperative position as shown by dot-and-dash lines in Fig. 1. This releases the breech block 17 and permits it to drop downward entirely out of the gun.

The breech block 17 can be put in place readily without interference by the stop 20, and after it is in place the stop can be restored to the position shown by full lines in Fig. 1, the stop thus again retaining the block.

The movable stop 20 and the detent 21 do not of themselves constitute any part of the present invention, these being shown and claimed in the co-pending application of George Webb for Breech mechanism for automatic firearm, Serial No. 314,271, filed on even date herewith.

It will be observed that with the breech block in the position shown in Fig. 1 the slot 17a is properly positioned to receive the studs 18b on the actuating lever 18 as the said lever moves forward. During firing, the gun is subject to some vibration which might take the breech block out of the position shown in Fig. 1. During operation, the gun is not always in the horizontal position as shown, but it may be in an inclined position or may even be in an inverted position. Under all possible conditions of use it is essential that the breech block be in the position shown in Fig. 1 at the moment when the forward movement of the lock frame is about to effect the entrance of the studs 18b into the slot 17a. To prevent movement of the breech block out of the position shown, a suitable means is provided such as the spring-pressed detent 24 shown clearly in Fig. 2. As shown, this is mounted in an aperture 24a in the left leg 8b of the barrel extension, and is adapted to engage an upper edge portion of the block 17. The detent 24 is provided with a shoulder 24b adapted to abut a seat 24c in the aperture 24a to operatively position the detent so that the inner end thereof may be in position to engage, but preferably and normally exert no appreciable pressure on, the upper edge of one side of the breech block. The detent 24 is pressed into its operative position by means of a spring 25 which abuts against a plug 26 threaded into the aperture in the barrel extension leg. This detent serves to resist movement of the breech block 17 upward out of its lower position and thus prevents any movement resulting from vibration or resulting from the action of gravity. However, the detent 24 is cammed out of the way when the breech block is positively moved upward by the actuating lever 18.

It will be observed that the detent 24, engages the block 17 in such a way that it resists upward movement thereof, without however interfering with free downward movement of the block when the stop 20 is moved out of the way to release the block.

It should be quite apparent from the foregoing and reference to the drawing that the detent 24 is so located as not only to prevent upward accidental movement of the breech block by gravitation or as the result of vibration; but also provides for ready removal of the breech block for inspection or replacement. This is due to the fact that the detent 24 projects from the leg 8b of the barrel extension in position to engage the top edge of the breech block. Hence, when the stop 20 is moved on its pivot 20a to the dot-and-dash line position of Fig. 1, the breech block may freely slide or drop out because there is no positive locking engagement of the detent with the breech block as in prior constructions of which I am aware and wherein the detents enter the breech blocks adjacent their lower ends. Under my invention, the detent 24 engages with or projects across the top edge of the breech block when the bottom of the breech block is resting flatly on the stop 20 to locate and maintain the T-slot 17a in accurate alignment to receive the studs 18b as they approach the breech block to engage in the T-slot 17a to effect raising and lowering of the breech block in accordance with the functioning of the gun.

In actual practice I have found that my construction and arrangement of means for supporting and stabilizing the breech block far surpasses any means heretofore provided, of which I am aware. This is due to the fact that the detent extends laterally through one of the legs of the barrel extension and is so located relative to the stop 20 and the end of the breech block 17 that the block is firmly but yieldably held against upward movement except when actuated by the studs 18b on the actuating lever.

Thus my invention provides means in a firearm of the type described, for holding the breech block in its proper lowermost position and against accidental upward movement due either to vibration or gravitation resulting from the position of the mount. Said means holds the breech

block in said position in a manner greatly superior to any that has heretofore been possible by prior means since the latter resulted in disturbing the location of T-slot 17a with respect to the studs 18b for free and unobstructed entrance of the studs into said channel.

In the foregoing specification and the following claims, a number of descriptive terms have been used such as "upward," "downward," "vertical," "top," and the like. All of said terms are used in a relative sense with relation to the position of the firearm shown in the drawing when the same are held in a vertical position. Said terms are to be considered in the same relative sense regardless of the position in which the gun may be disposed.

What I claim is:

1. In an automatic firearm, the combination of a casing, a longitudinally reciprocable barrel, a barrel extension connected with the barrel and positioned within the casing, a breech block guided on the barrel extension for downward and upward movement out of and into breeech closing position, mechanism adapted to engage the breech block for moving the same downward and upward in timed relation with the reciprocation of the barrel and barrel extension, a stop carried by the barrel extension and having a face adapted to engage the lower end of the breech block for limiting downward movement thereof and properly positioning the same for engagement by said mechanism, the said stop being movable out of its normal position so as to permit free downward movement of the breech block from the barrel extension, and a spring-pressed detent extending transversely through the barrel extension in a direction substantially normal to the longitudinal axis of the barrel and positioned to engage one side of the top of the breech block when its lower end is in engagement with said stop so as to resist upward movement of the breech block away from said stop and permit free downward movement of the breech block when said stop is moved out of its normal position, said detent also permitting the breech block to properly seat itself against said face of said stop when the stop is in its normal position.

2. In an automatic fire arm, the combination of a casing, a longitudinally reciprocable barrel, a barrel extension connected with the barrel and positioned within the casing, a breech block guided on the barrel extension for downward and upward movement out of and into breech closing position, mechanism adapted to engage the breech block for moving the same downward and upward in timed relation with the reciprocation of the barrel and barrel extension, a stop carried by the barrel extension and having a face adapted to engage the lower end of the breech block for limiting downward movement thereof and properly positioning the same for engagement by said mechanism, the said stop being movable out of its normal position so as to permit free downward movement of the breech block from the barrel extension, a spring-pressed detent extending transversely through the barrel extension in a direction substantially normal to the longitudinal axis of the barrel and positioned to engage one side of the top of the breech block when its lower end is in engagement with said stop so as to resist upward movement of the breech block away from said stop and permit free downward movement of the breech block when said stop is moved out of its normal position, said detent also permitting the breech block to properly seat itself against said face of said stop when the stop is in its normal position, and cooperative means disposed on said detent and barrel extension for limiting the movement of the detent in breech block engaging direction.

WILLIAM L. SWARTZ.