

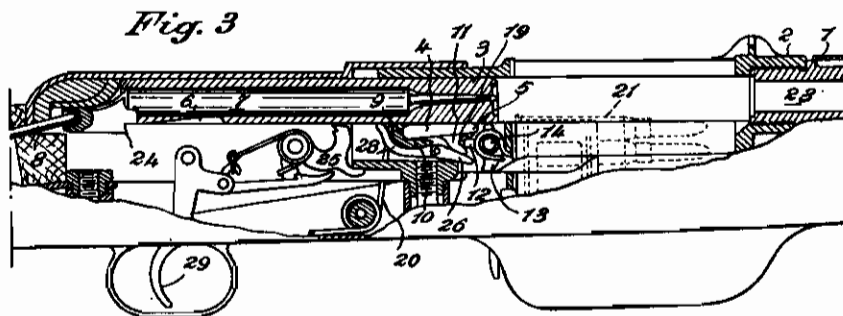
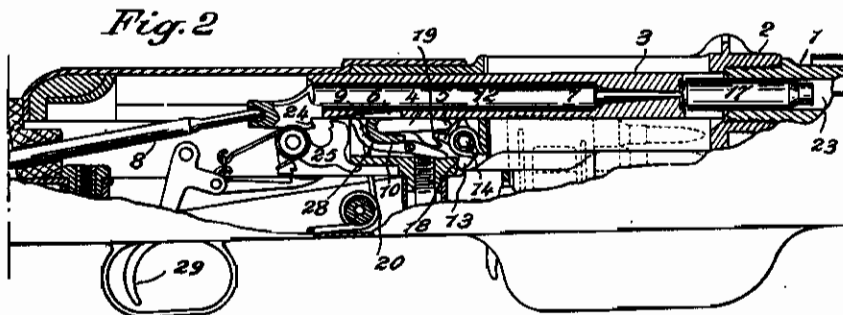
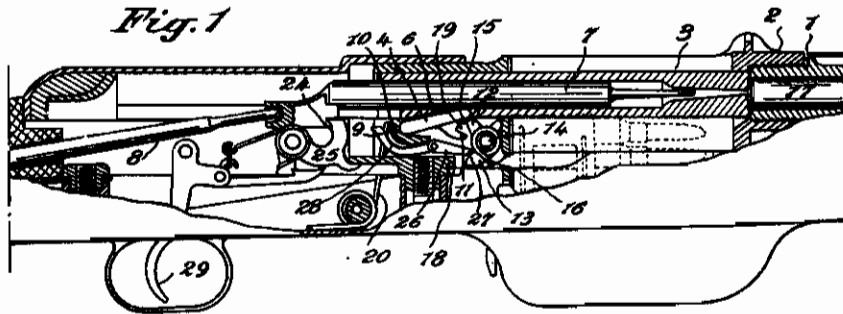
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BOLT CLOSER FOR AUTOMATIC ARMS

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ALIEN PROPERTY CUSTODIAN

BOLT CLOSER FOR AUTOMATIC ARMS

Gino Revelli, Rome, Italy; vested in the Alien
Property Custodian

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The present invention relates to an improved bolt closer for automatic arms having the object of allowing the automatic functioning with much reduced pressures. The results are so far of mechanical nature as strains, frictions and consequent consumption of the moving parts are remarkably diminished; of ballistic nature when considering that the highest pressure of the firing gases is utilized for firing the projectile, which acquires the best efficiency in range, flatness of trajectory and force of penetration or perforation. Furthermore a balanced functioning is obtained with the remarkable reduction of the characteristic strain the automatic arms are subjected to, causing fatigue for the rifleman, straining for the material, dangerous dispersion of firing.

Fundamental characteristic is the lightness and the small obstructing volume of the parts composing the device resulting easily controllable in the right phase with a minimum absorption of energy.

The simple longitudinally sliding bolt may have a cylindrical, parallelipedal or prismatic form.

According to the invention in the outside surface of the bolt there is provided a cavity destined to receive a blocking device comprising a lever or square plate provided with an adjoint piece shaped like a small ear. In correspondence of one of the two short sides, this plate is rounded in the point destined to bear on the breech or fixed part of the arm while in correspondence of the other short side there is a surface substantially plane as the said corresponding seat provided in the bolt.

When the bolt is at the end of the forward stroke bearing on the barrel in correspondence of the cartridge chamber, said plate by seating in said cavity blocks the bolt.

With the improved bolt closing device according to the invention the advantage is obtained that the action of the recoil displaces the mass comprising the barrel, the bolt, the striker, the movable breech solidarily for a pre-established extent. This tract is determined in relation to the power of the cartridge and the type of the arm. During this tract the bolt and movable breech to which the barrel is solidary, remain blocked. The arm advances in conditions of extreme security while the projectile receives the greatest thrust possible.

Once run said pre-established tract of solidary movement of said parts, a disengagement occurs between bolt and movable breech. This disengagement takes place by means of a device the structure of which according to the invention is

such as to allow that in very short time but with a certain progressiveness there takes place the displacement of the blocking member. Things are arranged in such a way that the lever arms of the playing parts allow to reach the aim mentioned.

In short, after the firing of the cartridge seven movements are determined as follows:

(1) A recoil movement with the movable parts solidary to each other through said blocking device.

(2) Prosecution of the recoil movement with engagement of the angle pawl of the blocking member with the fixed breech.

(3) Prosecution of the recoil movement with engagement of said pawl with the inferior ear of the blocking member and consequent disengagement of the bolt as regards the moveable breech, this breech being stopped.

(4) Prosecution of the retrocession of the bolt alone (with the relative striker) till the recoil stroke is completed.

(5) Solidary forward stroke of the bolt and striker under the action of the striker spring till the striker engages the stopping pawl of the firing device.

(6) Forward stroke of the bolt owing to inertia, the striker being unmoveable, held by said pawl and engagement of the blocking member into the corresponding seat provided in the bolt.

(7) Disengagement of the striker from the relative stopping mechanism and percussion of the bottom of the new cartridge automatically, in a known way, substituted to the preceding one in the apposite chamber.

The pawl of the blocking member shaped like an angle lever cooperates by means of one of its arms with an adjoint piece carried by the blocking member in the way further on explained better.

The invention is illustrated in the accompanying drawings in which:

Fig. 1 shows in partial longitudinal section a portable arm (rifle) with a cartridge in the apposite chamber, herein blocked by the bolt and with the striker cocked and ready for firing.

Fig. 2 shows the phase of the disengagement of the parts during the expulsion of the cartridge case.

Fig. 3 is a view similar to the preceding illustrating the position of the parts after firing and the expulsion of the case.

With reference to fig. 1 the barrel 1 of the rifle is screwed and solidarily connected to the moveable breech 2 solicited to remain in the posi-

tion illustrated in fig. 1 by the action of a spring illustrated in 20. Against the back end of the barrel 1 there bears the bolt 3 blocked in this position by the pawl 4 whose anterior end 5 is lodged in the seat 6 (fig. 2) provided in the outside surface of the bolt 3. Within the bolt 3 there is lodged the striker 7. This latter is acti-

5 10 15 20 25 30 35 40 45 50 55 60
 oned by the thrusting rod 8, which in a known way is solicited by a compressing spring situated in the butt of the arm (not illustrated).
 The blocking pawl 4 ends posteriorly with a cylindrical surface in 9 bearing on the relative seat 10 fixed in the moveable breech 2 of the arm. The blocking member 4 may execute an angular movement from the position illustrated in fig. 1 to the position illustrated in the fig. 2. Inferiorly the blocking member 4 is provided with an ad-joint piece 11 destined to cooperate with the upper arm 12 of the angle lever 12—13 fulcrumed in 14. In the block position illustrated in fig. 1 the angle lever 12—13 holds with the end of its arm 12 the blocking member 4 within the relative seat 6 bearing against the lower projection 15 of the pawl 4. The angle lever 12—13 is solicited to be carried to and remain in the position illustrated in fig. 1 by a spring 16.

At the firing instant the case 17 reacts against the bolt 3, soliciting the same to retrocede with the striker 7 contained therein, entraining first solidarily under the action of the blocking pawl 4 the moveable breech 2 and the barrel 1. These parts form in the whole a remarkable mass so that the retrocession of the case 17 is somewhat slow and the action of the explosion gases on the projectile causes a maximum effect giving to the projectile a speed neatly higher, the other conditions being the same, than that obtained with the usual automatic arms.

After a certain tract in the recoil movement has been run, the arm 13 of the lever 12—13 carried by the moveable breech 2 engages against the fixed stop 18 and begins a left-hand rotation against the action of the spring 16. The end of the arm 12 slides on the supporting surface of the said adjoint piece 15 of the pawl 4, then abandoning such a surface and penetrating into the notch 19 existing between the adjoint piece 15 mentioned and the adjoint piece 11 of the same pawl 4. While prosecuting the retrocession of the moveable breech, said lever 12—13 engages with its arm 12 against the upper surface of the piece 11 and lowers this latter together with the pawl 4 solidarily thereto, causing an angular movement around the axis of the cylindrical surface 9. The lowering movement of the pawl 4 is progressive since the engagement between the arm 12 and the piece 11 begins between the root of the arm 12 and the end of the piece 11, the progressive displacement occurring as far as towards the end of the arm 12 and respectively the root of the piece 11.

When the blocking pawl 4 has completely abandoned the seat 6 provided in the outside surface of the bolt 3, this latter solicited by the reaction of the case 17, abandons the moveable breech 2 and retrocedes independently, together

with the striker 7 entirely compressing the relative spring by means of the rod 8. Meanwhile the moveable breech 2 (and the barrel 1 solidarily thereto) has come back from the position illustrated in fig. 2 to the position illustrated in fig. 3 under the action of its own spring 20.

Starting from the position illustrated in fig. 3 the bolt 3 is pushed forward by the relative spring through the rod 8 and in such movement seizes the upper cartridge 21 of the loader 22 and thrusts the same into the chamber 23. The advance of the bolt 3 and striker 7 takes place solidarily till the back tooth 24 of the striker engages the pawl 25 of the firing apparatus. The striker is then stopped in its advance while the bolt 3 prosecutes owing to inertia thrusting the new cartridge into the apposite chamber. The parts are now returned to the original position illustrated in fig. 1.

With the object of preventing the percussion of the striker against the bottom of the case of the cartridge before the closure has been completed by the bolt, there is provided, according to the present invention, a safety lever 26, which with an end 27 cooperates with the arm 13 of the angle lever 12—13 while with the other end 28 comes on the stroke of the tooth 24 of the striker 7 (figures 2—3) when the angle lever 12—13 is in the position of disengagement for the pawl 4. In this way till the pawl 4 is not snapped within the apposite notch 6 provided in the bolt and consequently the lever 12—13 is not returned into the position of fig. 1, an eventual defect of the firing apparatus or an eventual untimely actioning of the trigger 29 cannot produce the percussion of the cartridge, since the striker is held in its advance stroke by the end 28 of the safety lever 26 engaging the tooth 24 of the same striker.

A spring, not illustrated, solicites the safety lever 26 to be taken into the engagement position with the tooth 24. Things are arranged in such a way that by means of a convenient proportionality settled between the different arms of relative levers the lowering of the automatic safety lever 26 may take place in the right phase, that is in the exact instant when the engagement of the blocking pawl 4 into the notch 3 of the bolt 6 is positively completed.

In order to prevent the point 30 of the striker 7 from touching the capsule of the cartridge's bottom before the definitive closure of the bolt there may be, according to the present invention, between the bolt and the striker arranged a spring capable of transmitting from the striker to the bolt the advancing force during the phase of closure, this spring, however, allowing the percussion of the cartridge after the closure has been effected.

The present invention has been illustrated and described in a preferred form of realisation but it is understood that constructive changes may be introduced therein without surpassing the limits of protection of the present industrial patent.

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