ONE-PIECE BREECH BLOCK FOR AUTOMATIC FIREARMS WITH PIVOTED LOCKING MEMBERS

Fig. 1

Fig. 2

Fig. 3

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ONE-PIECE BREECH BLOCK FOR AUTOMATIC FIREARMS WITH PIVOTED LOCKING MEMBERS

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1. Automatic fire arms may be subdivided into two groups according to their breach mechanism, viz., those one-piece and those with two-piece breech. Automatic fire arms with one-piece breech involve the necessity of a barrel recoil in order to actuate the breach mechanism, whilst in automatic fire arms with two-piece breech the control of the breach mechanism is effected by the relative motion of one breech part in relation to the other.

It is obvious that in the interest of simplicity it would be desirable to use exclusively one-piece breeches. Existing types of fire arms with one-piece breech, however, are of intricate design, in view of the fact that for locking the breach mechanism, in addition to the barrel with the breech casing rigidly connected with it, and the breech block moving inside it, a casing rigidly fixed in a cradle is required for controlling the mechanism for locking the breech block in the breech casing. For this reason, experience has shown that fire-arms equipped with one-piece breech involve a substantially more intricate and expensive design than fire-arms with a two-piece breech. This is, however, the only drawback connected with fire arms equipped with one-piece breech, whilst automatic fire arms with two-piece breech involve numerous disadvantages. For instance, fire arms with two-piece breech must, as a rule, be designed as gas operated guns if it is not considered advisable to use for this purpose the barrel recoil, in order to bring about, by means of a catapult, the rearward motion of the one breech part carrying out the locking operation.

Practice has further shown that in the course of the locking operation the rear breech part striking the front breech part is liable to rebound. For this reason, the gunner's safety can only be ensured provided ignition takes place within the prescribed time. Should this not be the case— as may frequently happen with war ammunition—and ignition take place with a certain retardation, it is just possible—in the most unfavorable case—that it may take place in the precise moment in which, as a result of the rebound of the rear breech part, the breech is unlocked. Destruction of the weapon and danger to the gunner's life are the unavoidable consequences.

The present invention relates to a fire arm with one-piece breech, which for this very reason eliminates the drawbacks connected with the two-piece breech, and besides constitutes an extraordinary simplification as to design, as compared with existing one-piece breeches.

2. The automatic fire arm with one-piece breech according to the present invention is provided with a pre-tensioned energy accumulator which moves the locking organ into locking position as soon as the breech reaches its end position. In the fire arm according to the present invention the principle hitherto constantly observed, which involved making the breach locking of automatic fire arms positive, and in addition also stood in the way of adopting other methods than those mentioned, has been dropped. As will be shown further on, this opens up possibilities of evolving designs which in respect of simplicity are far superior to existing designs, without, at the same time, neglecting in any way the safety devices obviously required in arms manufacture.

In the weapon according to the present invention, as shown in a first constructional example, the tensioning of the energy accumulator is suitably effected by the organ provided for locking the breech. The energy accumulator itself can suitably be designed as a spring of such dimensions as will enable it to take up the major part of the forward travel energy of the breech block, so that the breech block shall strike the cartridge chamber with a lessened shock only.

The dreaded consequences of rebound alluded to above are thus reliably eliminated, whilst securing on the other hand the advantage that in the moment in which the breech block enters the locking position, the reversal movement of the locking organ is also reliably brought about. In the first constructional example the locking organ is shaped as a round lock gilding with its milled ends in a groove of the breech casing and, in the front breech position, rotating so as to catch, through its milled ends, in a hole of the breech casing. The round lock is suitably provided with a lever contacting with a body gilding in the cradle against the action of a spring, thus tensioning the spring until, in the extreme front breech position, this spring, by discharging the accumulated energy, moves the lock into locking position.

The striker is also suitably controlled by the round lock itself, in such a manner that the striker may only be released after the locking position has been reached.

According to a further constructional example a toggle (knee lever) could be used, contacting with a fixed stop of the breech casing and thus locking the breech block, the toggle being controlled in a manner similar to the round lock.

It may also be advisable to have the energy
accumulator, i.e. the spring actuating the locking organ in the end position of the breech block, controlled by the barrel recoil—by way of example—instead of by the forward travel of the breech block. For this purpose, a locking organ to be released through the forward travel of the breech block may be provided.

The accompanying drawings show in Fig. 1–13 several constructive examples of realisation of the present invention. In such drawings:

Fig. 1 is a section through a fire arm schematically represented.

Fig. 2 a view of the locking organ in perspective,

Figs. 3–7 the various positions of the locking organ,

Fig. 8 a section through the striker control mechanism in the open position of the locking organ.

Fig. 9 a section through the striker control mechanism in the locked position of the locking organ,

Fig. 10 a section through a constructive example in which the spring tensioning is brought about by the barrel recoil,

Fig. 11 a section through a fire arm in which a toggle (knee lever) is used as locking organ,

Figs. 12–13 two different positions of the knee lever.

The fire arm consists in known manner of a breech casing in which the barrel 2 is inserted by means of a bayonet joint. The breech casing slides on the cradle 3, against the spring 4. The breech block 5 sliding in the breech casing stands under the action of the recess 6 of the round lock. In the cradle is a body 7 which can move forward and backward on the cradle against the spring 4. The locking organ 8 is designed as a round lock has two milled ends 10 by means of which the locking organ slides in slots 11 ending in a hole 12. The round lock 9 is fitted with a lever 13 at the end of which there is a roller 14. In the course of the forward travel of the breech block, as shown in Fig. 3, the roller 14 first strikes the body 7. During the further forward travel of the breech block the spring 8 is tensioned, so that the body 7 takes up the position shown in Fig. 4. As soon as the milled ends 10 of the round lock reach a position in front of the hole 12, coinciding with the breech block front position, the energy accumulated in the spring 8 forces back the body 7 and the lever 13 as well, thus moving the milled ends 10 into locking position, as shown in Fig. 5.

Upon release of the shot the barrel travels rearward together with the breech casing, and the lever 13, i.e. its roller 14, comes into contact with the rear edge of a corresponding recess of the body 7. On the breech casing and barrel moving further back, the lock is caused to rotate out of the locked position, as shown in Fig. 6, and to occupy the position shown in Fig. 7, in which the breech block is able to travel rearward against the action of the recuperating spring, under the action of the remaining gas.

The special design of the locking organ and its control mechanism ensure an extremely simple and reliable striker control. As shown in Figs. 8 and 9, the round lock 9 is provided with two milled recesses 15 and 16 through which the striker is controlled. The striker 17 itself is seated in a hole 18 and stands under the action of a spring 19. As shown in Fig. 8, the striker possesses two turned grooves 20 and 21; the body 22 catches through a nose 23 into the groove 20, whilst a nose 24 of the body 22 catches into the recess 16 of the round lock. The body 22 is slidingly seated in the breech block and stands under the action of a spring 25. The edge of the recess 15 of the round lock catches into the groove 21. The above description and figures clearly show that as long as the round lock 9 occupies the unlocked position, the striker cannot be released since it is held by the edge of the recess 15. In addition, it is locked by the body 22, the nose 23 of which catches into the groove 20. If now the round lock 9 is rotated into its locked position, the edge of the recess 15 first liberates the striker. The striker, however, is still unable to travel forward, since it is still secured by the nose 23. Not before the lock 9 nearly reaches its final locked position will the edge of the recess 16 strike the nose 24, thus forcing downward the body 22 and withdrawing the nose 23 out of the groove 20. The striker is now free and, under the action of the spring 19, is hurled against the detonator. As soon as the lock is rotated back from the locked position into the unlocked position the edge of the recess 15 again catches into the groove 21, moving the striker back into the position shown in Fig. 9, at the same time tensioning the spring 19.

In the further constructive example of a fire arm according to the present invention—as shown in Fig. 10—a body 7 sliding in the cradle is again provided, standing under the action of the spring 8. The spring 8, however, does not contact with a part rigidly connected with the cradle, but, on the contrary, with a part rigidly connected with the barrel. The breech casing 23 swimming around a bolt 25, which, through a nose 26, catches into a corresponding recess 29 of the body 7. The locking lever 27 stands under the action of a spring 30 which has the tendency to keep it within the recess 25 of the body 7. A cam 31 of the locking lever 27 lies in the path of a stop 32 of the breech block 5. The tensioning of the spring 8 is here brought about, not by the forward travel of the breech block, but by the barrel recoil; the locking lever 27 catches into the recess 28 of the body 7, keeping the spring 8 tensioned, so that the body 7, together with the barrel and the breech casing, again travels forward.

When the breech block reaches its front end position, it hits through its stop 32 the cam 31 of the lever 27, thus causing the latter to rotate, and consequently to release the body 7. Under the action of the spring 8 the round lock 9 is thus rotated and the breech block is locked.

Figs. 11 and 12 show a constructive example in which, in place of the round lock, a toggle (knee lever) 33 is provided. The knee lever 33, swivellingly seated in the breech block, catches through its end 34 behind a face 35 of the breech casing, thus locking the breech block.

As shown in Figs. 12 and 13, the control mechanism is similar to the constructive example according to Figs. 1–7.

I claim:

1. Automatic fire arm comprising a barrel, a breech casing, a one-piece breech block slideable in the casing, a locking member associated with the breech block, and a pre-tensioned energy accumulator operative to move the locking member into locking position as the breech block reaches its forward end position, said locking member including a rounded portion and being provided with milled ends, the breech casing having slots within which said milled ends slide and ending in a circular bore within which said rounded por-
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5 tion can rotate when the milled ends clear the slots.

2. Automatic fire arm comprising a cradle, a barrel slidably relative thereto, a breech casing, a one-piece breech block slidably in the casing, a locking member associated with the breech block, a pre-tensioned energy accumulator operative to move the locking member into locking position as the breech block reaches its forward end position, the energy accumulator comprising a spring arranged to be acted upon by a part of the barrel to be tensioned by the barrel recoil, and a locking device acting to hold the spring in tensioned condition and arranged in the forward path of the breech block to be released by the breech block as it reaches its extreme forward position.

3. Automatic firearm comprising a barrel, a breech casing, a one-piece breech block slidably mounted in the casing, a locking member mounted on the breech block and held in non-locking position during the forward movement of the breech block, said casing being provided with a cutout for the locking member so positioned as to enable said member to be moved into locking position relative to the breech block as the block reaches its forward end position, and an energy accumulator acted upon by the breech block to store energy during the forward travel of the block, said energy accumulator acting on the locking member to move the same into position against the breech casing as soon as such member is free to move relative to the breech block.

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