

April 20, 1937.

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2,078,155

AUTOMATIC RIFLE

Filed March 1, 1933

2 Sheets-Sheet 1

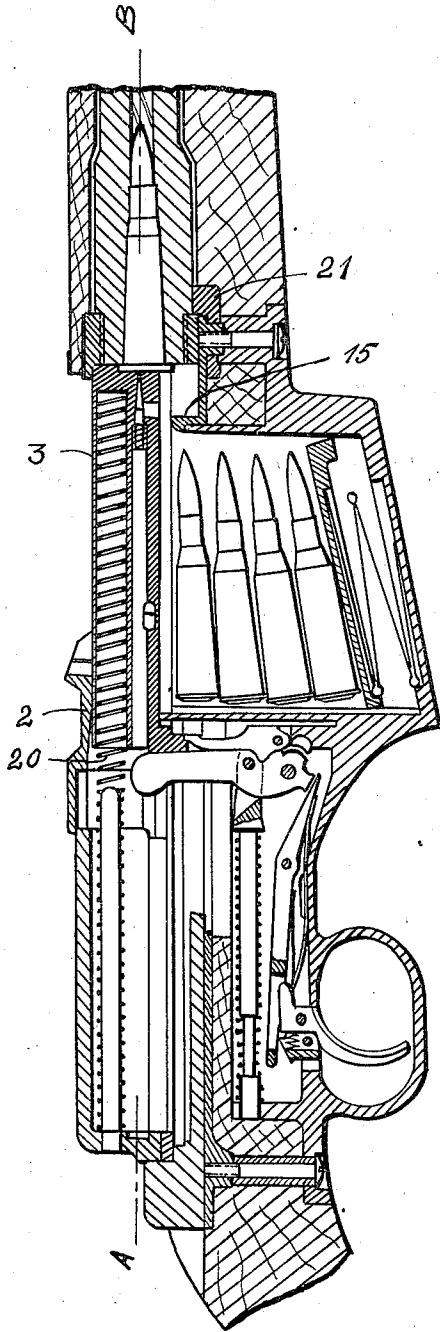


Fig. 1

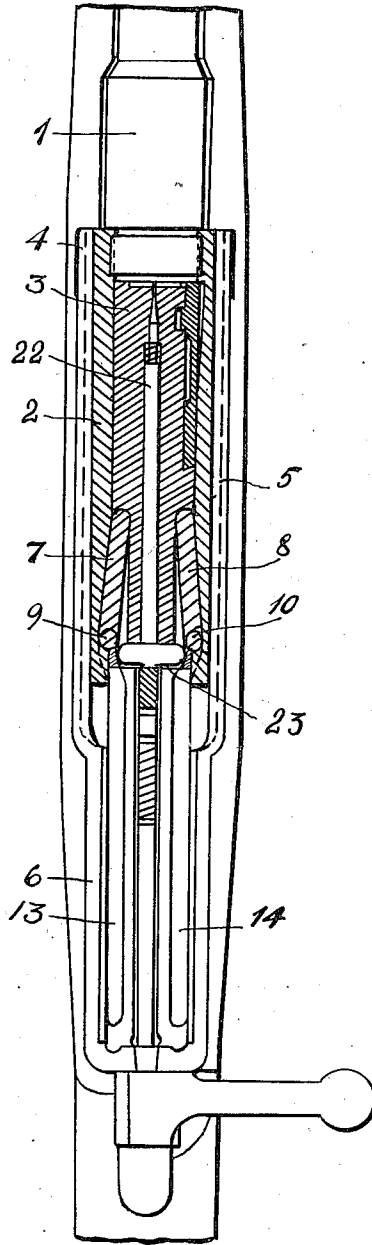


Fig. 2

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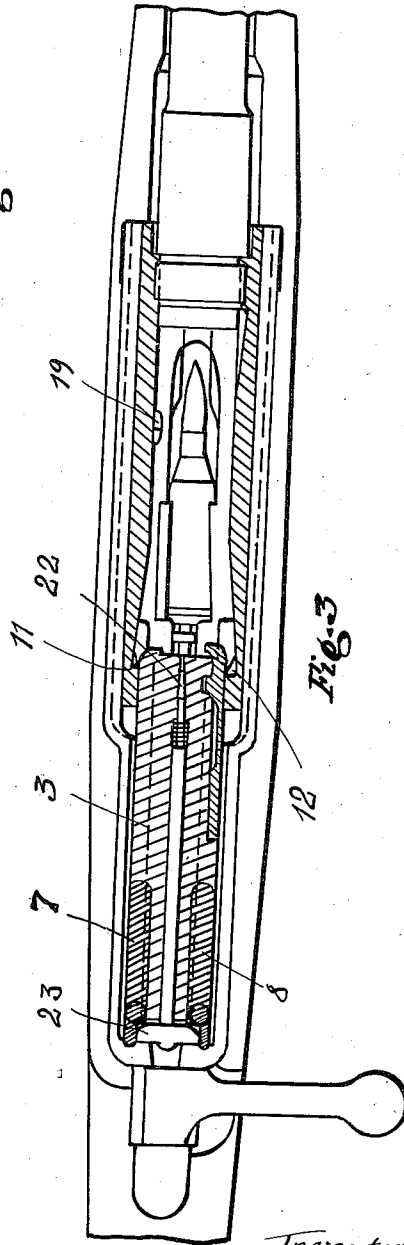
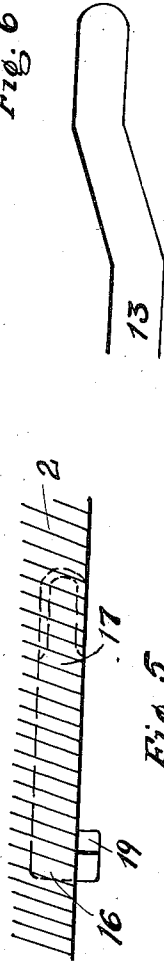
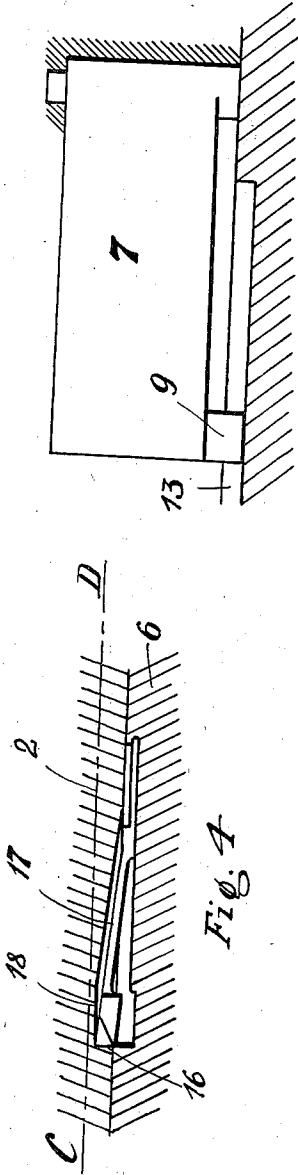
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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AUTOMATIC RIFLE

Carl Pelo, Helsingfors, Finland

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In Finland August 29, 1931

1 Claim. (Cl. 42—4)

The present invention relates to automatic rifles for high explosive cartridges and combines a brief recoil movement of the barrel and breech block with a reliable locking of the breech block to the barrel during the whole time the gas pressure is acting in the barrel.

For locking together the breech block and the barrel for the first portion of the backward stroke and the last portion of the forward stroke of the moving parts, viz. the breech block and the barrel, together with the barrel extension, it has already been proposed to use pivotal catches, which have been located either in the barrel extension or in the breech block. As far as such catches have been located in the barrel extension, they possess grave drawbacks. It is for instance to be noted, that the body of the catches create an unnecessary "dead weight", in other words, advantage is not taken of the fact that they form one part of the bulk of the breech block, necessary for the recoil, but on the contrary they unnecessarily burden the barrel extension, which as it is, is sufficiently heavy, since it is firmly attached to the barrel, and consequently the weight of the rifle is increased more than is necessary. For such catches, located in the barrel extension, it has already been proposed to use as guiding means, guide grooves, provided in an immovable part of the rifle, in which grooves the catches engage by means of guide pins. Although such guiding action generally must be considered to be both rather simple and without doubt, more reliable than the known catch-guiding-arrangements with springs, impact surfaces or so on, these rifles in all events all possess the same drawbacks, as do this type of rifles, where the catches are located in the barrel extension. But the guide grooves themselves in this case create certain drawbacks, because of the shortness of the stroke of the barrel extension. The grooves naturally must be as short as this stroke and consequently they must either be very suddenly curved, or, if this is to be avoided, they must have a shape by which the straight and curved portions of the grooves are not distinctly separated. In the former case both the guide grooves and the guide pins are submitted to high wear and in the latter case the whole guiding action will be uncertain and unreliable.

Thus the known rifle constructions for different reasons have possessed serious drawbacks both concerning their weight as well as their reliability and simplicity.

The present invention has for its object to

remove all these drawbacks by combining the following two measures:

Locating the catches in the breech block and guiding the same with guide grooves provided in the rifle frame or a part connected thereto. Such a construction of the rifle is quite new and gives rise to all advantages of locating the catches in the breech block instead of in the barrel extension as well as all the advantages which may be obtained by guiding the catches by guide pins and guide grooves, all the drawbacks of the known constructions at the same time being avoided. Particularly it is to be noted that the guide grooves according to the invention will have the same great length as the stroke of the breech block. Consequently their straight and curved parts may be located distinctly apart without using suddenly curved portions, and thus the reliability of their guiding effect will be the best obtainable, the whole rifle being as reliable, as well as simple and light.

The invention will be described in greater detail hereinafter, in connection with the accompanying drawings, which show an example of carrying out the invention. Conjointly with this description, certain other specific traits of the invention, in addition to the above-mentioned general characteristic, will also be explained.

In the drawings:

Figure 1 is a longitudinal section of the central part of the rifle, with the moving parts in their forward or firing position.

Figure 2 is a view, partly in horizontal, longitudinal section along the line A—B of Figure 1 and partly in plan, showing the firing pin pushed forward and the breech block locked to the barrel extension.

Figure 3 is a view similar to Figure 2 showing the same section with the moving parts in the position occupied after the completion of the recoil movement.

Figures 4 and 5 are diagrams on a larger scale of a detail of the rifle.

Figures 6 and 7 are diagrams on a larger scale of two other details of the rifle.

Under the action of the recoil, caused by firing, the barrel 1 together with the barrel extension 2 rigidly attached thereto, and the breech block 3, slide backward. By means of guide bars 4 and 5 on the lower edges, the barrel extension is slidably mounted in the frame 6, which is provided with corresponding grooves for guiding the barrel extension. The frame is for instance screwed onto the stock of the rifle. The breech block 3 is provided with catches 7, 8 which are mounted in

recesses on each side. One of these catches is shown on a larger scale and in side elevation in Figure 6. The catches are pivotally secured to the breech block in such a way that their rear ends can move outwardly, and are provided respectively with downwardly extending guide pins 9 and 10. The barrel extension is provided on each side of its inner surface with abutments 11 and 12, which form supports for the catches 7, 8 of the breech block when such catches are in their locking position.

In the bottom of the frame there are two guide grooves 13 and 14, which extend mainly in a direction parallel to the linear direction of the rifle. Their foremost ends, however, are at a greater distance from one another than their rear ends. The guide pins of the catches engage in these guide grooves. Figure 7 shows the front part of one of the guide grooves on a larger scale.

At the foremost position of the breech block the guide pins 9, 10 are in the front ends of the said grooves. By this arrangement the catches 7, 8 are swung outwardly, so that their ends rest against the abutments 11, 12 in the sides of the barrel extension 2. The guide pins 9, 10 prevent the catches from changing their position, and in this manner the breech block 3 is locked to the barrel extension 2.

When a shot is fired, the barrel and the parts connected thereto begin their backward stroke. When the bullet has left the barrel and the pressure of the gas has dropped, the guide pins 9, 10 of the catches 7, 8 are in the position where the foremost ends of the grooves 13, 14 begin to converge in order to enter the rear parallel parts of the grooves. During the continued rearward stroke of the barrel and the breech block the guide pins 9, 10 slide along the converging parts of above said grooves 13, 14, the catches 7, 8 thereby being swung so that they disengage from the barrel extension 2. When the breech block has slid so far that the guide pins have entered the rear parallel parts of the guide grooves, the breech block is wholly released from the connection with the barrel and the barrel extension.

The barrel and the barrel extension continue to slide rearwardly, until the barrel extension strikes against an abutment 15 in the front part of the frame, and the movement ceases. On the left side of the front part of the bottom of the frame, directly under the left edge of the barrel extension, a spring 17, provided with a stop-head 16, is placed. Figures 4 and 5, of which Figure 4 shows the device from the side and Figure 5 a horizontal section along the line C—D of Figure 4, show diagrammatically a suitable construction of this resilient stop-head. The stop-head 16 is pressed upwardly under the influence of the spring 17, towards the lower edge of the barrel extension 2, in which there is a recess 18. When the barrel extension has reached its rear end position, the recess 18 is just above the stop-head 16, which thus engages the barrel extension and locks it in the said rear position. The stop-head 16 is in addition provided with a part 19 which projects into the path of the breech block 3, which part 19 is struck by the breech block in its forward stroke and is thereby pressed down so that the barrel extension 2 is disengaged from the stop-head 16 and is thus now able to move forward,

together with the block. The stop-head 16—19 thus prevents any possible premature forward movement of the barrel extension 2, since the latter cannot move forward until the breech block has advanced far enough for the catches 7, 8 to begin their movement into locking position, viz. in order to start the locking.

A stop-head provided with a leaf-spring has been described above. It is however understood that the stop-head also can have another form. For instance, it may consist of a pin that moves in linear direction influenced by a coil spring, while retaining its principle of function.

20 is the recoil spring of the breech block, viz. the spring which brings back the breech block when it has left the barrel extension and continued its course to its rearmost position. The barrel extension may, if desired, be provided with recoil or buffer springs, but since these springs as well as the other recoil devices of the rifle fall outside the scope of this invention, it is not further referred to.

The forward stroke of the moving parts is stopped when the barrel extension strikes the abutment 21. The breech block, moving forward, inserts a new cartridge from the magazine in known manner.

In order that the point of the firing pin 22 will be drawn into the breech block during the rear stroke of the moving parts, provision is made for the catches 7, 8 to strike the bevelled corners of an abutment 23 provided on the rear end of the firing pin. This drawing back of the firing pin consequently occurs independently of a recoil spring of the usual kind hitherto provided for this purpose.

For the sake of completeness the drawing contains the entire mechanism of a rifle. Since, however, the other parts of the mechanism, for instance, the trigger mechanism, the device for ejecting the cartridge cases, etc. do not concern the invention itself, they are not here described. The construction preferably should be such that the breech block stops in open position, when the magazine has been emptied.

The cartridge magazine can be either attached or detachable and can be provided for either a single row or a double row or several rows of cartridges. The breech block should be made so as it can be drawn by hand if desired, and necessary devices to prevent unintentional firing must be provided. But since these devices also fall outside the scope of the present invention, they are not referred to in this connection.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

In an automatic firearm, in combination, a recoil barrel, a barrel extension rigidly connected to said barrel, a breech block slidably mounted in the barrel extension, a receiver frame, catches pivotally connected to said breech block for releasably locking said breech block to said barrel extension, guide grooves in said receiver frame, and means on the catches cooperating with said guide grooves serving to guide the catches positively throughout the entire movement of the breech block.