





## UNITED STATES PATENT OFFICE

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## LOCKING DEVICE FOR AUTOMATIC FIREARMS

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The present invention relates to a safety mechanism for the type of automatic firearms where the recoiling parts are retained in their rearmost position by a catch released by a trigger, and the hammer or striking lever of which is released by the recoiling parts at the end of their forward stroke and, apart from being of simple and plain construction and easily operated, the object of the invention is to produce a safety device affording the highest possible degree of safety against untimely discharge, particularly in the case where the recoiling parts are not locked.

It is known from certain constructions of breech loading guns that they are provided with a safety member in the form of a sliding pawl that can be pushed, for the purpose of safety against untimely firing, into the track of the hammer or of a stud in the side of the latter, and thereby prevent the hammer from completing its striking the primer or the firing pin, even if the trigger should be inadvertently operated for the release of the hammer.

The safety mechanism according to the invention is of a similar nature, but it is characterized in that the sliding pawl can be carried forward from the position "Fire" (in which position the sliding pawl is entirely out of function), to two different positions of safety, viz., in addition to a position "Unload" in which the sliding pawl, as previously known, has engaged the track for the hammer and prevents it from completing its striking down, and also further forward to a position "Safety" in which the pawl furthermore entirely locks the catch, so that it is impossible for the recoiling parts to become disengaged for their forward stroke.

Furthermore, the safety mechanism according to the invention is characterized in that the sliding pawl, when in the position "Unload," has stopped the hammer in its striking motion, and will be locked by the hammer both against being carried rearward to the position "Fire" (which might otherwise cause the firing of the cartridge last introduced into the chamber of the firearm), as well as against being carried further to the position "Safety" (whereby, as previously mentioned, the catch would be locked, and the retraction of the recoiling parts necessary for the unloading of the firearm would in turn be prevented), and also in that, on the hammer being "struck down," the sliding pawl is locked by the latter against being carried forward to the position "Unload" or to the position "Safety" (which could otherwise, in the case of delayed ignition of a cartridge, cause breakage to the hammer or the sliding pawl).

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A form of construction by way of example for a locking mechanism according to the invention is shown on the drawing wherein—

Figure 1 shows the locking-and-discharge-mechanism and also the rear part of the breech block and breech piece in an automatic firearm, all in side view, with the safety member in the position "Unload" and with the recoiling parts in their foremost position.

Figure 2 shows the same parts with the recoiling parts in their rearmost position and the safety member in the position "Fire."

Figure 3 shows a section along line III—III in Figure 1, and

Figure 4 shows a section along line IV—IV in Figure 2.

In the drawing, 1 is the recoiling breech piece of the firearm, in which a breech block 3 is rotatably carried on a bolt 2. The breech block has a longitudinal bore for a spring-actuated striking pin 4. By a pin 5, pressing against the rear face of the breech piece 1, the latter is influenced by a recoil spring 6 enclosed in a spring chamber 7. Breech piece 1 with breech block 3 is moved in the longitudinal axis in a slide box closed on top by a cover 8 and at its bottom front by a trigger plate 9, also at the rear by a trigger guard 10. In the sidewalls 10a of trigger guard 10, four horizontal pivots 11, 12, 13, and 14 are mounted for a trigger 15, a catch 16, a hammer or striking lever 17 and a rod 18 respectively. Besides a trigger grip 15a, the trigger 15 has also a forward arm 19 engaging in a downward tongue or guard 20 on the catch 16, which latter is designed as a two-pronged, one-arm lever, see Figure 3. The catch 16 has on top a pull-notch 21 for co-action with an edge 22 on breech piece 1. A spring 16a presses against the bottom plane of one prong of the catch, this spring pressing the catch with the pull-notches upwards.

Hammer 17 has at its bottom a fork-bearing for a pin 23 affected by a surrounding striking spring 24. Further, hammer 17 has a side lug 25 and a plane (not shown) co-acting during the retraction of the recoiling parts with a lug or a roll on the breech piece for pressing the hammer rearwards, and finally a rest 26 for a point 27 on rod 18. The latter is designed as a two-armed lever, with its second arm 27a co-acting with a tongue 28 on breech piece 1.

The safety member proper is a slide-pawl 33 with a cleft front slideable longitudinally in the firearm in slots a, guided in sidewalls 10a of the trigger guard, and situated between the trigger and the catch, the bottom plane of which pawl



has a recess 35 to its front, and to its rear on the top plane a tongue 34 and, finally, at its rear-most part an upward lever 36 with a vertical groove 32. As previously mentioned the safety member has three main positions: "Fire," "Unload" and "Safety." In the position "Fire," the rearmost one (see for example Fig. 2) the safety member is out of function; in position: "Unload"—the intermediate one (see for example Fig. 1) it is pushed so far to the forward that, with its front part with recess 35, it is situated forward in the track of lug 25 of the hammer and consequently it prevents the hammer from "striking down," and in the "Safety" position, the foremost one, it is pushed so far forward that the tongue 34 on the rear of its top plane reaches in below catch 16, whereby the latter is prevented from being lowered by the trigger for the disengagement of the breech piece.

The sliding of the safety member from one main position to another is effected by means of a locking-trunk 30 (see Figure 4), rotatably mounted in bearing block 29 and inserted in the left sidewall of the trigger guard, which trunk has an outside finger grip 37, while on its inner end it has a crank 31 engaging groove 32 in the rear arm of the safety member, besides which its circumference has three recesses 38 in one and the same section which recesses in connection with a spring-actuated pivot 39 co-acting with them indicate the three main positions of the safety member. Any operation of the safety member is effected with the recoiling parts resting in their rearmost position, retained by tongue 21 of the catch.

The safety mechanism operates in the following manner:

In the position of the safety member 33 shown in Figure 2, position "Fire," the member is out of function; neither the catch 16 nor the hammer 17 are locked.

If the trigger grip 15a is worked, arm 19 will draw the pull-notch 21 of catch 16 free of its engagement with the edge 22 of breech piece 1, and under influence of the recoil spring 6, pin 5 will press the breech piece 1 with breech block 3 forwards into firing position. Just before this latter position is reached, tongue 28 on breech piece 1 will press the pole arm 27a forwards, and thereby the point 27 will leave the rest 26 of hammer 17. Under the influence of striking spring 24, the hammer will now rotate and strike the striking pin 4 which latter will be pushed forwards into breech block 3 and ignite the fuse of the cartridge inserted into the chamber at the forward stroke of the recoiling parts.

When the recoiling parts are in their foremost position, and the hammer 17 has "struck down," the safety member is locked in the position "Fire," as the tongue 25 of the hammer 17 is of so great circular extension that its cylindrical face, when the hammer is struck down, still reaches down in front of the forward end of the safety member, thereby preventing the same from being pushed forwards.

In the position of the safety member shown in Figure 1, position "Unload," the catch is still unlocked, but the safety member is pushed so far to the forward that its foremost part with recess 35 is situated in the track of tongue 25 on hammer 17.

When, after the trigger having been worked, and toward the end of their forward stroke, the recoiling parts have pressed tongue 27 of the rod out of rest 26 on the hammer 17, the

latter will start to rotate, actuated by striking spring 24, but soon thereafter its motion will be stopped by tongue 25 striking the bottom face of the safety member in the bottom of recess 35. This is the situation illustrated in Figure 1. The hammer will thus be prevented from "striking down," and consequently the cartridge last introduced into the chamber will not be fired, nor will the recoiling parts be thrown rearward again. If now the magazine or cartridge belt of the firearm is removed, or if the feeding of cartridges therefrom is stopped, a subsequent loading grip (during which the trigger is worked), will cause the cartridge in the chamber to be thrown out in the same manner as is the case with an empty cartridge, so that from such moment the firearm will be unloaded, as no fresh cartridge is introduced.

From the moment when tongue 25 of the hammer has engaged recess 35 in the bottom plane of the safety member, the latter will be locked so that it can neither be retracted from tongue 25, nor can it be pushed further forward, until the hammer has been cocked once more by the recoiling parts being carried back to rest in their rearmost position.

In the position "Safety" where, as previously mentioned, the safety member has been pushed still further forward above tongue 25, and even so far as to allow tongue 34 at the rear of its top face to tread in below catch 16, a double safety is effected as the catch can not be pressed down, through the trigger being worked, for the disengagement of the recoiling parts, and neither will the hammer, even if disengaged, be able to "strike down," in the case that the former safety should fail.

I claim:

1. In an automatic firearm including a striking pin adapted to be struck by a hammer, the combination which comprises, a recoil mechanism capable of axial movement within said firearm to a rearward position and to a forward position, a trigger, a trigger-actuated catch for retaining said recoil mechanism in its rearward position, a hammer adapted to be released by said recoil mechanism at the end of its forward movement, said hammer being provided with a side lug, a slide pawl slidable axially of said firearm, said pawl being disengaged from said hammer and said catch while in its rearward position, and being slidable forwardly to two different safety positions, in one of which, when partly slid forwardly to the "unload" position, said slide pawl engages said side lug on said hammer and thereby prevents said hammer when released from striking said striking pin, without however impeding movement of said recoil mechanism, and in the second of said forward positions, the "safety" position, when slid forward fully to the limit of its forward axial movement, said slide pawl is positioned so as to block movement of said catch, thereby preventing release of said recoil mechanism for forward movement thereof.

2. In an automatic firearm as defined in claim 1, the arrangement wherein said slide pawl is provided with an extending tongue, said tongue, when said slide pawl is in its forward or "safety" position, being positioned so as to extend into the path of movement of said trigger-actuated catch, thereby blocking movement of said catch and preventing release of said recoil mechanism for forward movement thereof.

3. In an automatic firearm as defined in claim 1, the construction in which said slide pawl is



provided with a recess in which said side lug on said hammer is adapted to be positioned when said slide pawl is in the partly-forward "unload" position, thereby locking said pawl in said position, and preventing said hammer from striking said striking pin when said hammer is released.

4. In an automatic firearm as defined in claim 1, the construction in which said side lug on said hammer is provided with a curved outward face portion, said face portion being so positioned, when said hammer is released when said slide pawl is in its most rearward position, as to prevent forward movement of said slide pawl, which is thereby retained in said rearward or "fire" position.

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