

Self-Loading Weapon

5 The invention concerns a fully automatic self-loading weapon with a functional part that is moveable by the release of a round and with a connectable and disconnectable single-shot device that permits release of a single round (principal clause of Claim 1).

10 Functional part is understood here to mean a design element that is moved by the energy released during firing of a round, for example, the barrel, a gas cylinder, the breech, other parts necessarily moved by these elements, say, a hammer, etc. A solid body moveable fully independently mechanically from the barrel and breech can also form such a functional part, if during the recoil motion of the weapon, which occurs as a result of release of a round, it then attempts to preserve its position and is consequently displaced relative to the weapon.

15 Terms like "front", "top", etc. refer to the weapon in normal firing position with a horizontal axis of the bore; "front" points in the direction of firing.

20 A switchable single-shot device is often provided in fully automatic self-loading weapons, especially small arms, but also machine guns, etc., which is designed to permit release of only a single round after it is engaged. A shot selector is provided which makes it possible for the shooter to operate the weapon alternately in single-shot or sustained firing.

25 The single-shot mechanism is generally controlled by a functional part of the aforementioned type, but can also in principle have an independent mechanism, perhaps a delay mechanism. This type of delay mechanism makes sure that after release of a round the connection between the trigger, which is still pulled back, and a locking device is interrupted right after release so that this can hold back the hammer or the firing pin piece (in the case of a weapon shooting up) or the breech (in the case of a weapon firing automatically) in order to prevent release of a second round.

30 Whereas it is possible in sustained fire to cover terrain sections and force the opponent to take cover, single shots are prescribed for precise individual firing. However, it has turned out that the chances of hitting a single target are improved if it is brought under fire with sustained fire. However, only the first rounds of a burst are on target; the subsequent rounds,

on the other hand, are more or less far from the target because the weapon migrates as a result of recoil and under some circumstances can pose a threat to persons who are situated close to the firing line. Moreover, excessive, ultimately unsuccessfully released rounds reduce the cartridge supply of the shooter.

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It is certainly possible without difficulty for a trained shooter to release any desired short bursts of only two or three rounds. However, when the shooter concentrates during firing on such a limited number of shots, the required attention on the actual target is lost. Moreover, weapons generally should be designed so that even less trained persons can handle them perfectly.

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To remedy this problem the applicant has developed, among other things, devices that are capable of releasing extremely precise single shots and are additionally equipped with a three-shot mechanism that can be selected by a shot selection lever and then ensures during activation of the trigger that a burst of precisely three rounds is released.

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However, this three-shot mechanism is relatively complicated.

With this prior art as point of departure the underlying task of the invention is to modify a weapon of the type mentioned at the outset so that release of a reliably short burst is made possible with simple means.

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This task is solved according to the invention (Claim 1) in that after release of a round with the single-shot device disconnected, this can be activated by moving the functional part so that only a single additional round is released.

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The invention now reduces not only the known three-shot burst to two shots, but does so without any additional mechanism, in which, controlled by the movement of the functional part, it converts automatically to single-shot operation after release of the first round in sustained firing so that a second shot occurs in a weapon set on single firing, which thus interrupts firing after the second round.

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A prerequisite is naturally that the single-shot device does not require the release of a trigger pulled in sustained firing in order to be operated (as for example in the G3 weapon of the German army) so that the invention could not be implemented in all known trigger devices without additional modification of the existing components.

It should be pointed out here from the outset that the trigger device of the applicant disclosed in German Patent Application DE 19626077 is best suited for implementation of the invention. The entire contents of this patent application are therefore fully included in the present disclosure by reference.

As already mentioned above, the functional part can be versatile. In an ordinary weapon in which the firing pin is rigidly connected to the breech, the breech would be the most expedient functional part.

In a weapon having a hammer, the breech could also be used. In this type of weapon, however, it is most advantageous according to the invention to use the hammer itself as functional part (Claim 2), because it is situated closest to the single-shot device being engaged.

It should also be noted that the switching process according to the invention to a single shot does not occur so soon that there is a hazard that the single-shot device will interrupt the motion required to release a round after firing of the first round. The shooter could not rely on the fact that two rounds actually are released in a weapon that is set at "two-shot". However, if the hammer itself is used as functional part, the time of engagement of the single-shot device can be determined simply by design without adding tolerances as would be possible during transfer from a functional part lying farther away.

The applicant has developed a trigger device to which reference was already made above and which, like the trigger device of the G3 weapon, has a longitudinally shiftable and pivotable trigger lever on the top of the trigger which causes the interruption process in single-shot use. If the trigger is released and the front tip of the trigger lever has fallen into the corresponding locking recess of the hammer, which is therefore secured, then the hammer forces the trigger lever down so that it is situated with its rear end above a protrusion of the trigger. The protrusion in turn is situated behind the pivot point of the trigger.

If the trigger is now pulled rearward by the shooter, the protrusion is moved upward, which in turn engages beneath the rear end of the trigger lever and pivots it with its front end downward and from engagement with the locking recess. The hammer backs off and at the same time the trigger lever is pushed forward so that it slides with its rear end forward from the protrusion and assumes its original pivot position in which it can again engage in the hammer lock.

The hammer now forces the trigger lever rearward again, but this is situated with its rear end on the front side of the protrusion of the trigger, which is still pulled back.

If the trigger is now released, the protrusion then moves downward beneath the trigger lever, this is released and forced rearward. The initial position before release of the shot is reproduced.

However, whereas the trigger must be pulled back again in the G3 weapon in sustained firing as during single firing in order to pivot the trigger lever downward with its front edge so that it cannot fall into the locking protrusion when it is released from the protrusion of the trigger, in the trigger device of the applicant the trigger also assumes the same pivot position during sustained firing as during single firing. Instead of pivoting the trigger lever out from engagement with the hammer, it is prevented by a slide from sliding in front of the protrusion of the trigger. The slide therefore forms part of the shot selection device.

Thus, it is initially an advantage in this type of trigger device to connect the hammer, which forms the functional part, or also functional part per se to the shot selection device (Claim 3) and it is also an advantage in a shot selection device that has the aforementioned slide, to secure this in its sustained firing position with a holding catch and to mount the holding catch in the motion path of the hammer so that after release of a first round it can be knocked from engagement with the slide (Claim 4). This holding catch can be mounted loosely so that it is capable avoiding the hammer during its backward motion (cocking motion). However, it is of particular advantage that the holding catch has a detent designed so that it avoids the hammer during its cocking motion, but is engaged by it during its striking motion and carried along until the hammer is released from engagement with the detent as a result of the circular path that it covers (Claim 5).

After the holding catch is pivoted by the entrained detent and has released the slide, it is moved back to its initial position by a spring in order to be able to engage behind the slide again when the trigger lever holds the hammer cocked after the second round. If the trigger is now released and pulled back again, the described process repeats to release two rounds. To permit sustained fire, the holding catch must therefore be pivoted out from engagement with the slide and held in this pivoted out position.

For this purpose it is particularly advantageous to use a known shot selection shaft, which carries an operating lever on one or both ends and which can pass through the slide so that it can permit movement of the slide for a single shot through protrusions on its outside as a function of its rotational position and prevents sustained fire.

In this case either the holding catch according to the invention advantageously has a protrusion and the shot selection shaft a recess or the holding catch has a recess and the shot selection shaft has a protrusion, which are arranged so that the corresponding protrusion falls into the corresponding recess when the shot selection shaft is still situated in a position in the single-shot area (Claim 6). By falling in, the holding catch is permitted to engage in the slide, blocking it. At the same time a locking position for the operating lever is created. If this is pivoted farther, the shot selection shaft is rotated and the protrusion of the holding catch runs on the outer periphery of the shaft or the protrusion of the shaft on the outer edge of the holding catch so that this pivots out from the shot selection shaft and thus from engagement from the slide and becomes inoperative in so doing.

The object of the invention is further illustrated with reference to the enclosed schematic drawing.

In the drawing:

Figure 1 shows a longitudinal section through a handle with a trigger device of an automatic weapon equipped with the two-shot device according to the invention in elevation and

Figure 2 shows a partial outer view of the handle of Figure 1.

In the trigger device depicted in Figure 1 parts familiar to one skilled in the art are omitted for the sake of better clarity and for the purpose of better understanding of the invention.

5 A hammer 1 is situated in the cocked position in Figure 1, in which the front tip of a trigger lever 2 engages into the rear recess of the two locking recesses of hammer 1 and the hammer 1 then forces the trigger lever 2 rearward against the action of a trigger lever spring 7. The trigger lever 2 has an elongated hole with which it is mounted to move lengthwise and pivotable around the pivot of a trigger 3.

10 The trigger 3 is situated in its rest position in which it is prevented from pivoting farther forward around the pivot and has on its upper, rear end a protrusion, on which the rear end of the trigger lever 2 sits. For this reason it cannot yield to the torque applied by the hammer 1 loading it on the front end.

15 If the trigger 3 is now moved rearward, i.e., pulled, the protrusion of trigger 3 presses against the rear end of trigger lever 2 and pivots it with its front end downward so that the trigger lever 2 with its front end emerges from the locking recess of hammer 1 and allows this to strike.

20 At the moment at which the trigger lever 2 is released, it is forced forward by trigger lever spring 7 and upward with its front end and slides with its rear end from the protrusion of trigger 3. It then assumes an oblique position so that it slides along hammer 1 with its front end.

25 Hammer 1 in the meantime strikes the firing pin of a breech (not shown), the cartridge is ignited and the breech is moved rearward so that it recocks the hammer 1 (moved clockwise as seen in the drawing). The hammer 1 with its rear locking recess then runs beneath the front end of trigger lever 2, reaches its dead point and reverses its direction of motion, since in the meantime the breech has also moved forward again. The rear locking recess then runs on the front end of trigger lever 2 and forces this rearward. The trigger lever 2, however, cannot yield farther, since it is stopped with its rear end against the protrusion of trigger 3, which is still pulled.

If trigger 3 is now released, it returns to the position depicted in Figure 1. Its protrusion then dips beneath the rear end of trigger lever 2 and the trigger lever 2 is moved by hammer 1 rearward so that it sits with this rear end again above the protrusion and assumes the position according to Figure 1.

With the previously described features the weapon can only be fired in single shots.

The hammer 1 also has a front locking recess into which a locking device can engage, which is designed as part of a release 5, which is mounted on the front part of the handle on its top and protrudes upward into the motion path of the breech (not shown).

If the hammer 1 is now cocked by the rearward moving breech, the front locking recess passes over the locking device and falls into it after the dead point is reached and the hammer 1 has reversed its direction of motion.

When the breech reaches its frontmost position it strikes against release 5 and thus causes hammer 1 to strike.

If the aforementioned single-shot device is operative, the hammer 1, however, is only moved over a short distance until the front end of the trigger lever 2 falls into the rear locking recess.

A slide 4 is mounted to move in the handle, which is perforated and passed through by a shot selection shaft 12, which has cams on its outer surface that can engage with the walls of the perforation. In a first angular position of the shot selection shaft 12 (sustained firing position) the slide 4 is situated in its rear position and is secured there. In a second angular position (single-shot position) the slide 4 can be moved in the longitudinal direction over a certain zone.

The slide 4 has a downward extending slide finger 4b on the front bottom, which engages from the top into a recess in trigger lever 2.

When the slide is situated in the single-shot position, the trigger lever 2 can be moved unhampered in its longitudinal direction and disengage the interruption process. In this case an arm spring 11 acts against this movement with its upper arm, but is overcome by the stronger trigger lever spring 7.

5 If, on the other hand, the slide 4 is secured in its rear position (sustained fire position), then the slide finger 4b holds the trigger lever 2 in its position depicted in Figure 1 so that it can only pivot but cannot move in its longitudinal direction. If trigger 3 is now pulled and the trigger lever 2 pivots so that this must release engagement with hammer 1, the trigger lever 2
10 can no longer pivot back, but must release the hammer 1 as long as trigger 3 remains pulled. Control of the striking process was then assumed by release 5.

This is the design of the proven trigger device of the applicant.

15 According to the invention the hammer 1 has a hammer protrusion 1a, the radius of whose motion path is greater than that of the other hammer 1. A holding catch 10 is also mounted to pivot with its rear end on a bearing pin 13 and pivoted downward by the second, lower arm of the torsion spring 11.

20 A detent 8 is mounted to pivot in the front end of the holding catch 10, which is pivoted forward by a detent spring 9 against the holding catch 10. In the position of Figure 1 the detent 8 extends into the motion path of the hammer protrusion 1a.

25 The holding catch 10 has on its front bottom a downward extending holding catch hook 10a, which in the position of Figure 1 engages behind a slide support 4a of slide 4 from the front and thus secures the slide 4 in its rear position, although it is supposed to move forward in the depicted position of the shot selection shaft 12.

30 If the trigger 3 (in the position depicted in Figure 1) is now pulled, the hammer 1 strikes (moves counterclockwise) and is recocked after releasing a round (moves clockwise). The hammer protrusion 1a then passes the upward facing slope of detent 8 and forces this temporarily into the holding catch 10 under the influence of detent spring 9.

Since the slide 4 and therefore the trigger lever 2 cannot be moved forward, the hammer 1, after it has been released from the locking device, restrikes the trigger lever 2 and almost simultaneously entrains the detent 8 with the hammer protrusion 1a. The detent 8 is pivoted out together with the holding catch 10 on which it is mounted upward from the motion path of the hammer protrusion 1a so that the holding catch hook 10a is raised upward above the slide support 4a. The slide 4 is now forced forward by the compression spring 7 over the trigger lever 2 and the trigger lever 2 can assume its front position and hold the rear lock of hammer 1, when it runs against it again in the aforementioned manner.

If trigger 3 is now released, the hammer 1 pushes trigger lever 2 back, which again passes over the protrusion of hammer 1, the torsion spring 11 pulls the slide 4 back and the holding catch hook 10a can fall downward again in front of the slide support 4a, since the holding catch 10 is pressed downward by spring 11.

During repulling of trigger 3 a repeated two-shot burst can now be released.

The shot selection shaft 12 has on its top a recess into which (in the position shown in Figure 1) a protrusion on the bottom of holding catch 10 falls. If the shot selection shaft 12 is rotated, this protrusion and thus the holding catch 10 are forced upward into a position in which the detent 8 is out of engagement with the motion path of hammer protrusion 1a. The slide 4 can therefore be established in the rear sustained firing position by the corresponding angular position of the shot selection shaft 12 or be released for single-shot firing to longitudinal movement.

The shot selection shaft 12 also has on its bottom a recess into which an extension (not shown) on the rear upper end of trigger 3 can enter. If the shot selection shaft 12 is rotated so that this engagement is no longer possible, trigger 3 is blocked and the weapon thus secured.

A shot selection lever 14 is shown in Figure 2 which sits rigidly on the end of the shot selection shaft 12 and can move alternately into the position "S" (safe), "E" (single-shot), "2" (two-shot) and "F" (sustained fire). The numeral 13 denotes a mounting pin for the holding catch 10.



Patent Claims

1. Fully automatic self-loading weapon with a functional part (1) that can be moved by release of a round and a connectable and disconnectable single-shot device (4) which permits release of individual rounds, characterized by the fact that after release of a round with the single-shot device (4) disconnected, this can be activated by moving functional part (1) so that only a single additional round is released.

2. Weapon according to Claim 1, characterized by the fact that a trigger device with hammer (1) is provided and that the hammer (1) forms the functional part.

3. Weapon according to Claim 2, characterized by the fact that a trigger lever (2) is mounted to pivot and move longitudinally on a trigger (3), can be moved forward in single-shot operation and is secured by a shot selection device (12, 14) in its rear position in sustained firing and that a release device (4) is provided that protrudes into the motion path of hammer (1) and is set up to move the shot selection device (12, 14) into a position in which the trigger lever (2) is released.

4. Weapon according to Claim 3, characterized by the fact that the release device includes a slide (4, 4a) that engages behind the trigger lever (2) in the sustained firing position and is loaded by a spring (11) forward into a single-shot position and that a holding catch (10, 10a) engages behind the slide (4) in the sustained firing position, can be entrained by hammer (1, 1a) and then releases slide (4).

5. Weapon according to Claim 4, characterized by the fact that a spring-loaded detent (8) is arranged on the holding catch (10) so that it protrudes into the motion path of hammer (1, 1a) and can be forced to the side during its cocking motion, but on the other hand during the striking motion of hammer (1, 1a) is carried by it and lifted from its motion path, during which it carries along the holding catch (10, 10a).

6. Weapon according to one of the Claims 4 or 5, characterized by the fact that a shot selection shaft (12) is provided which passes through slide (4) and secures its sustained firing or single-shot firing position, that the holding catch (10) has a protrusion that lies against the shot selection shaft (12) and that the shot selection shaft (12) has a recess into which the



protrusion of holding catch (10) can fall when the shot selection shaft (12) is situated in an intermediate position between sustained firing and single-shot firing position.

Summary

5 The invention concerns a fully automatic self-loading weapon, preferably a fully
automatic small arm, with a functional part (1) that can be moved by the release of a round,
and a connectable and disconnectable single-shot device (4), which permits release of single
shots. To restrict the number of rounds of a burst to only two rounds, after release of one
10 round with the single-shot device (4) disconnected this can be activated by movement of the
functional part (1) so that only a single additional round is released.

A hammer (1) preferably forms the functional part.
(Figure 1)

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