

VERIFICATION

I am the translator of International Patent Application Serial No. PCT/EP00/00642 which was filed in the German language. To the best of my knowledge, the attached English language translation is a true and accurate translation of the noted German language document.

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Firing lever arrangement for a firearm

The invention concerns a firing lever arrangement according to the preamble of Claim 1, i.e., with a firing lever arrangement for incorporation in a firearm having a bolt assembly arranged to move in the weapon housing in the longitudinal direction of the weapon, with the features:

- a carrier with which the bolt assembly can be moved rearward, and
- a firing lever, which can be mounted on one or the other side of the carrier with its one end during assembly of the weapon and extends essentially across the longitudinal direction of the weapon at least during its operation.

This type of firing lever arrangement is known from DE 94 19 743 U1 (Mauser). The term bolt assembly in conjunction with the invention also means parts directly connected to the bolt assembly or also parts of the bolt assembly, for example, the bolt carrier.

Position terms, like "forward," "top", etc. used subsequently refer to a weapon positioned properly to fire a horizontal shot, in which the direction of shooting is forward.

Traditionally, automatic weapons or submachine guns are only designed for right-handers. The firing lever is generally mounted directly on the bolt carrier or bolt assembly and protrudes laterally from the weapon housing. During shooting the firing lever follows the forward and backward movements of the bolt assembly or bolt carrier. The firing lever is traditionally placed on the right side, i.e., the side corresponding to the use hand when the weapon is used by a right-hander. An example of this is the Soviet AK-74 [sic; 47] assault rifle (Kalaschnikow). Left-handed use of such a weapon is possible, but awkward.

Weapons are now known in which the firing lever is positioned on the left side. However, these weapons are also primarily intended for right-handed use. Thus, in the G3 rifle of the German Army, the firing lever is mounted separated from the bolt assembly on the left side of the weapon. During shooting, the firing lever remains fixed. This arrangement permits right-handers to reload the weapon with the left hand without having to take their right hand from the grip. A left-handed shooter, however, must regrip the weapon during reloading. The time required for him to make the weapon ready to shoot again is therefore increased. The risk that the shooter will be unarmed in combat during this period is therefore higher.

The drawbacks that follow from left-handed use of right-handed weapons compel left-handers in military service to relearn use of the right hand in right-handed weapons. This is quite reasonable in the light of the desired standardization of equipment. However, accuracy and safe handling of the weapon among left-handers can be substantially improved if weapons for left-handed use are made available to them.

Weapons in which the firing lever is arranged in the center represent a compromise in this context, as, for example, in the Israeli Uzi submachine gun. However, an arrangement that permits optimal right- or left-handed use, as required, appears to be much more favorable. An example of this is known from DE 196 13 987 A1 (Heckler & Koch). The firing lever arrangement shown there has a firing lever lying freely above the weapon housing, which can be pivoted around a vertical pin. The firing lever can be pivoted to the right or left for reloading, a locking device holding the firing lever in the rightward or leftward pivoted out position. By releasing the lock, the firing lever is retracted into its longitudinal position by a return spring. The firing lever assumes this position during firing of the weapon and is then moved back and forth together with the bolt assembly. This type of arrangement enables the shooter to operate the firing lever on the side most favorable for him, i.e., right- or left-handed.

Locking of the firing lever makes it possible to apply a high force on the bolt assembly via the firing lever, in both the opening and closing direction. This is particularly advantageous in those functional disturbances that can only be eliminated by forcible closing of the bolt assembly, for example, when a cartridge jams in the cartridge chamber. Other weapons, for example, the aforementioned G3, do not permit such an expedient or require additional designs.

Left-handed use of a firearm additionally presumes an appropriate casing ejection, in addition to the appropriate firing lever arrangement. This ejects the empty casings during shooting traditionally to the right. A left-handed shooter therefore runs the risk of being struck on the right arm by the casings. In firearms in the so-called bullpup design, the magazine is positioned behind instead of in front of the trigger. The casing ejector arranged above the magazine is therefore situated next to or right in front of the face in the aimed weapon. Ejected casings would therefore fly directly onto the head or face of a left-handed shooter. In this case, casing ejection must be rearranged to the left for left-handed use of the weapon. Ejection openings have to be provided on both sides for both-sided use of the weapon. However, this has the drawback that it is not readily apparent externally how the casing ejection is set up, i.e., on which side the casings are ejected during shooting.

In combination with a readjustable casing ejection, the firing lever arrangement known from DE 196 13 987 A1 of the applicant alternately permits right- and left-handed use of the weapon. Since the firing lever is retracted when not in use and then lies along the direction of the weapon, its position, however, permits no conclusions as to whether the weapon is set up for right- or left-handed use, that is, how the casing ejection is set up. A left-handed weapon therefore is externally equivalent to a right-handed weapon. This can lead to confusion, which can result in significant burdens or even injuries owing to "incorrectly" emerging casings. This hazard must be countered with increased precautionary measures during issuing of weapons or with appropriate marking of the weapons. The furnishing of left-hand weapons is therefore connected with additional expense.

In this connection, the firing lever arrangement of the Mauser (DE 94 19 743 U1) offers the advantage that it is recognizable without difficulty according to the incorporation position of the firing lever whether the corresponding firearm is set up for right- or left-handed use.

The present invention seeks to reduce the problems just outlined in known firing lever arrangements with simple means.

It achieves this objective with the object of Claim 1, i.e., in that the firing lever arrangement with the features of the principal clause of Claim 1 additionally has a recoil spring and a corresponding spring guide rod and the firing lever in this firing lever arrangement is secured in the incorporated state in its position by the spring guide rod. Securing by the spring guide rod permits (as further shown in the following comments), the firing lever to be permanently converted in simple fashion between right and left operating positions. At the same time, the firing lever is reliably secured in its corresponding position by this.

Assembly of the weapon in conjunction with the invention is understood to mean standard assembly of the weapon as is possible and permitted for the shooter. The same naturally applies for corresponding disassembly of the weapon. Extensive assembly or disassembly is not meant, as can be performed only in a shop or at the manufacturer. It is therefore possible in simple fashion to position the firing lever on the side more favorable for the shooter – a compromise in the form of a center arrangement (as in the aforementioned Uzi) drops out.

From the position of the firing lever, it is clearly marked and visible from the outside whether the weapon is set up for right- or left-handed use. In firearms in which the casing ejection must additionally be converted for left-handed use, this advantageously occurs with incorporation of the firing lever. Disassembly of the weapon is generally also required for

this purpose, so that conversion of casing ejection and refitting of the firing lever can occur in one working step.

The carrier and bolt assembly can be joined together in shape-mated or force-fit fashion, especially so that force transfer is possible in the opening and closing direction of the bolt assembly. It is also conceivable to design the bolt assembly, especially the bolt carrier, simultaneously as (firing lever) carrier and to mount the firing lever with one end directly on the bolt assembly or bolt carrier.

For a case in which the firing lever is not supposed to move with the bolt assembly during shooting, the carrier is designed so that it (and therefore the firing lever) is not force-coupled to the movement of the bolt assembly. For example, the carrier can be arranged so that it can be moved independently of the bolt assembly in the weapon housing and perhaps engages on it from the front. After reloading, the carrier returns to its initial position and remains fixed there (as in the aforementioned G3 rifle).

The firing lever arrangement according to the invention permits particularly rigid design of the firing lever. This has the advantage that (with appropriate connection between the carrier and bolt assembly) force can be applied to the bolt assembly in the opening and closing direction in the simplest manner via the firing lever. The firing lever is also always "ready for use" and need not be pivoted out for reloading.

The present invention is therefore successful in retaining and combining the advantages of several known firing lever arrangements known in the prior art.

Mounting of the firing lever on the carrier can be accomplished in different ways. In principle, both shape-mated and force-fit connections are considered for this purpose. In a preferred embodiment (according to Claim 2), the carrier is penetrated by at least one transversely running recess and the firing lever can be introduced to this recess. The firing lever can thus be alternately introduced into the recess from one or the other side of the carrier. As an alternative, it is conceivable that the carrier has a transversely running recess on both sides, the transversely running recesses being arranged offset one behind the other for reasons of space.

After introduction into the transversely running recess part of the firing lever protrudes above the carrier and can be grasped with the fingers for reloading. The firing lever can be designed rigid or laterally pivotable.

In a preferred embodiment (according to Claim 3), the firing lever has at least one retaining hole that extends in the longitudinal direction of the weapon in the incorporated state of the firing lever and is penetrated by the spring guide rod. Retaining hole is understood to mean essentially a recess that prevents, in cooperation with the spring guide rod, the firing lever from being laterally released. In addition to a hole-like bore, this can also be a correspondingly designed retaining edge, for example. For refitting of the firing lever, it is sufficient to pull the spring guide rod from the retaining hole. The firing lever can then be moved to the other side of the weapon and resecured by reinsertion of the spring guide rod into the retaining hole.

The carrier advantageously has a continuous hole running in the longitudinal direction that is penetrated by the spring guide rod (Claim 4). The recoil spring is then supported with its front end on the carrier or on another component connected to the bolt assembly. It is also conceivable that the recoil spring is supported with its front end directly on the firing lever.

In another preferred embodiment (according to Claim 5), the spring guide rod, instead of being arranged in the center, runs outside of the center axis of the weapon. In principle, no changes are produced in this case with respect to arrangement and fastening of the firing lever. If the firing lever is to be held in position by the spring guide rod offset laterally relative to the center of the weapon, it is advantageous to design the firing lever so that it has two retaining holes. Depending on which side of the carrier the firing lever is then arranged, either one or the other retaining hole is then penetrated by the spring guide rod (Claim 6).

The mentioned holes (retaining and through holes) can have both round and angular cross sections.

In another preferred embodiment (according to Claim 7), the carrier is arranged in front of the bolt assembly. In this manner, the firing lever is offset forward and the distance to the face of the shooter is increased. The firing lever can thus be mounted on the side of the weapon facing the face of the shooter so that the shooter need not remove his hand from the grip for reloading. This arrangement proves to be particularly advantageous in weapons in the bullpup design in which the bolt assembly in the aimed weapon is situated next to or directly in front of the face. The carrier must therefore be offset forward if one intends to mount the firing lever on the side of the weapon facing the face of the shooter.

The invention is now further explained with reference to a practical example. In the enclosed schematic drawing:

Figure 1a shows a side view of a firing lever arrangement according to the invention with retracted spring guide rod and without firing lever;

Figure 1b shows a weapon housing with the firing lever arranged as depicted in Figure 1a and with the shoulder support disassembled;

Figure 1c shows a top view of the arrangement from Figure 1b with a firing lever that is shown twice, in its two incorporation positions;

Figure 2a shows a side view of the weapon housing from Figure 1b additionally with a firing lever that is incorporated on the right side and is penetrated by the spring guide rod, and with the incorporated shoulder support;

Figure 2b shows a top view of the arrangement depicted in Figure 2a;

Figure 3a shows a side view of another firing lever arrangement according to the invention with a retracted spring guide rod without the carrier and without the firing lever;

Figure 3b shows a weapon housing with the firing lever arrangement depicted in Figure 3a with a carrier and with the disassembled shoulder support;

Figure 3c shows a top view of the arrangement from Figure 3b with a firing lever that is shown twice in its two incorporation positions;

Figure 4a shows a side view of the weapon housing from Figure 3b additionally with the incorporated shoulder support.

Figure 4b shows a top view of the arrangement depicted in Figure 4a with a firing lever incorporated on the right side and penetrated by the spring guide rod, as well as an additional depiction of the firing lever in its second incorporation position.

The same reference numbers are used for (functionally) identical parts in all the figures of the drawing.

Figures 1 and 2 show a carrier 4, which is connected to the bolt carrier 1 via an elongated hollow connector 5. A recoil spring 3 coaxially encloses a spring guide rod 2 and is supported with its front end against the carrier 4 and with its rear end against a shoulder of the spring guide rod 2. A cover 6, for example, made of plastic, protects the spring guide rod 2 and the corresponding recoil spring 3 from soiling. The carrier 4 has a front abutment 4a and a rear abutment 4b, each of which is provided with a through hole 14a, 14b for the spring guide rod 2. These two through holes 14a and 14b form the through hole of the carrier mentioned at the outset in conjunction with Claim 4. If the front end of the spring guide rod 2 is pushed through the through hole 14b of the rear abutment 4b, the recoil spring 3 hangs up on this abutment 4b and is supported on it.

The front end of spring guide rod 2 is retracted in Figure 1a up to the abutment 4b so that a transversely running recess 4c is exposed between the two abutments 4a and 4b. A

firing lever 10 can now be introduced with its one end, as shown in Figure 1c, from one of the two sides to fit into the transversely running recess 4c of the carrier 4.

Figure 1b shows the firing lever arrangement from Figure 1a arranged in a schematically and partially depicted firearm 7 in the bullpup design. The carrier 4 emerges upward from the weapon housing 8 and is therefore exposed. The cover 6 travels with the bolt carrier 1 and thus supports the recoil spring 3. For incorporation of firing lever 10, the spring guide rod 2 must be pushed far enough rearward so that the recess 4c is exposed. For this purpose, it is sufficient to move the shoulder support 9, on which the rear end of the spring guide rod 2 is supported, rearward by the required distance (in Figures 1a and 1c the shoulder support 9 is completely disassembled). The spring guide rod 2 is then automatically pushed rearward by the pressure of the recoil spring 3.

Figure 1c shows a top view of the arrangement depicted in Figure 1b. It is apparent that the spring guide rod 2 runs outside of the center axis on the right side of the weapon 7. The firing lever 10 is designed rigid in this practical example and shown in its two possible incorporation positions 10a and 10b. It has two retaining holes 12a and 12b through which it can be inserted from both sides (incorporation positions 10a and 10b) into carrier 4 and fastened by means of a spring guide rod 2. Despite the off-center arrangement of the spring guide rod 2, it is therefore not necessary to produce a separate firing lever for right- and left-handed use of the weapon.

Figure 2 shows the arrangement from Figures 1b and 1c, but with the incorporated firing lever 10 (incorporation position 10a). The firearm 7 is now assembled, i.e., the shoulder support 9 is incorporated in the weapon housing 8 and forces the spring guide rod 2 forward. The retaining hole 12a of the firing lever 10 is penetrated in this fashion by the spring guide rod 2 and the firing lever 10 held in its position on this account. For conversion of the weapon from right- to left-handed use and vice versa, it is sufficient to loosen the shoulder support 9 and pull it rearward far enough so that the spring guide rod 2 slides from the retaining hole 12a of the firing lever 10 and this can be switched to the other side. The spring guide rod 2 is then pushed forward again by means of shoulder support 9, this time through retaining hole 12b, and the shoulder support 9 is then fastened.

Figures 3 and 4 show another firing lever arrangement according to the invention, similar to Figures 1 and 2. The essential difference relative to the arrangement depicted in Figures 1 and 2 is that the carrier form 4' is not rigidly connected to bolt assembly 1, but can be moved independently of it. Because of this carrier 4' after reloading (in the initial position depicted in Figures 3 and 4) remains fixed, i.e., does not move with bolt assembly 1 during shooting.

The carrier 4' has (like the carrier 4) two abutments 4a' and 4b', as well as a transversely running recess 4c' to accommodate firing lever 10. In contrast to abutments 4a, b (from Figures 1 and 2), the abutments 4a', b' are connected to each other above recess 4c' and the recess 4c' is therefore closed upward. To secure firing lever 10, the spring guide rod 2 in the assembled weapon 7 penetrates one of the retaining holes 12a or 12b (depending on the incorporation position 10a or 10b), as well as the through holes 14a' and 14b' of carrier 4'. The recoil spring 3 is then supported with its front end against an abutment 11 connected to the bolt assembly 1.



Patent Claims

1. Firing lever arrangement for incorporation in a firearm (7) having a bolt assembly (1), which is arranged moveable in a weapon housing (8) in the longitudinal direction of weapon (7), with:

- a carrier (4, 4') with which the bolt assembly (1) can be moved rearward and
- a firing lever (10), which can be mounted with its one end optionally on one or another side of carrier (4, 4') during assembly of weapon (7) and extends essentially across the longitudinal direction of weapon (7) at least during its operation,

characterized by the fact that

- the firing lever arrangement has a recoil spring (3) and a corresponding spring guide rod (2) and the
- the firing lever (10) in the incorporated state is secured in its position by the spring guide rod (2).

2. Firing lever arrangement according to Claim 1, characterized by the fact that carrier (4, 4') is penetrated by at least one transversely running recess (4c, 4c') and firing lever (10) can be introduced into at least one recess (4c, 4c').

3. Firing lever arrangement according to Claim 1 or 2, characterized by the fact that firing lever (10) has at least one retaining hole (12a, 12b) that extends in the longitudinal direction of the weapon in the incorporated state of firing lever (10) and is penetrated by the spring guide rod (2).

4. Firing lever arrangement according to one of the Claims 1 to 3 for a firearm (7) with a recoil spring (3) and a corresponding spring guide rod (2), characterized by the fact that the carrier (4, 4') has a through hole (14a, 14b, 14a', 14b') running in the longitudinal direction that is penetrated by spring guide rod (2).

5. Firing lever arrangement according to one of the Claims 1 to 4 for a firearm (7) with a recoil spring (3) and a corresponding spring guide rod (2), characterized by the fact that the spring guide rod (2) runs outside of the center axis of weapon (7).

6. Firing lever arrangement according to Claim 5, characterized by the fact that firing lever (10) has two retaining holes (12a, 12b), one of which is penetrated by the spring guide rod (2).



7. Firing lever arrangement according to one of the Claims 1 to 6, characterized by the fact that the carrier (4, 4') is arranged in front of bolt assembly (1).

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