TRIGGER MECHANISM WITH A BREECH BOLT SENSING ELEMENT

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FIG. 1

FIG. 2

FIG. 3

FIG. 4

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The present invention is directed to firearms and in particular to firearms trigger mechanisms.

A particular feature of the invention is the provision of a trigger mechanism of simple design and of a minimum number of piece parts where the individual parts lend themselves readily to mass production methods.

A further feature of the invention is the provision of a trigger mechanism which is inoperative when the weapon's breech is open or unlocked.

A still further feature of the invention is the provision of a trigger mechanism including a novel sensing or control lever in combination with a hammer, a sear and a trigger finger piece.

A still further feature of the invention is the provision of a novel trigger mechanism which is readily adaptable to all types of weapons including full automatic, semi-automatic, slide actions and lever actions ranging from .22 caliber and centerfire weapons to shotguns.

A trigger device embracing certain features of the invention may include a main frame, a firing means movably mounted in the frame and normally disposed in a latched position, spring means for urging the firing means towards a firing position, a sensing element movably mounted in the frame and movable from a first position to a second position, a sear mounted upon the sensing element and movable relative thereto, said sear being operable to engage and latch the firing means in opposition to the urging of the spring means, and a trigger finger piece pivotally mounted in the frame, said finger piece being operable to engage and move the sear to unlatch the firing means only when the sensing element is in the first position.

Other features and advantages of the present invention will become more apparent from the succeeding specification when considered in conjunction with the appended drawings, in which:

Fig. 1 is an elevational view, partially in section, of a slide action weapon with which the principles of the present invention may be associated;

Fig. 2 is a view similar to Fig. 1 showing the trigger mechanism in a fired position;

Fig. 3 is also similar to Fig. 1 showing the sensing element in the free or second position having been manually depressed and the trigger is shown disengaged from the sear;

Fig. 4 is a view of a portion of the sensing element as observed in the plane of line 4—4 of Fig. 2 and as viewed in the direction of the arrows.

Referring now to the drawings and, in particular, to Figs. 1, 2, 3 and 4, there is shown a receiver 10, an action slide 11, a bolt slide 12, a bolt 13 and a firing pin 14.

Rigidly mounted in the receiver is a trigger frame 16 including a trigger guard 17 and a depressible safety button 18.

Pivotally mounted to the frame 16 by means of a pin 19 is a sensing element or lever 21 terminating at one end in a lug 22 and at the other end in a manual operating arm 23. The lever is formed with a web portion 24, as is most apparent in Fig. 4, which joins the main body of the lever with a plate 26 to define a generally U-shaped structure.

The plate 26, formed with a projection or stop 27 at its forward edge (right side as viewed in Fig. 2) carries a sear 28 pivotally mounted thereto by means of a pin 29. The sear is formed with a claw or latch 31 operative to engage and retain a cooperating claw 32 formed on a firing means or hammer 33 pivotally mounted to the frame 16 by means of a pin 34.

Note that the opposite end of the sear is provided with a tooth 36 operative to engage one or the other of a pair of notches 37 and 38 formed in a trigger finger piece 39 in a manner and for a purpose which will become more apparent hereinafter.

The trigger finger piece 39, pivotally mounted to the frame 16, by means of a pin 41, is movable from a normal or cocked position shown in solid lines in Fig. 3 to a fired position represented by the dotted lines of Fig. 3.

Note that a light wire coil spring 40 about the pin 29 terminates at 42 upon the sear and at 43 upon the finger piece thus operating to tend to rotate the finger piece in a counterclockwise direction towards its normal position while the sear is urged in a clockwise direction towards the stop 27 of the sensing lever as is apparent in Fig. 2.

At this point, it is well to point out that by virtue of the fact that the sear is mounted upon the lever 21, specifically the plate 26 thereof, the spring 40 is effective to exert a turning moment upon the lever 21 about its pivot pin 19 tending to rotate the lever in a clockwise direction to the position shown in Fig. 2.

Actually, the spring 40 constantly tends to rotate the lever 21 but is effective to do so only when the hammer 33 is released as is apparent in Fig. 2.

The turning moment developed by the spring 40 is effective to rotate the lever 21 when the sear is rotated to contact the lug 27.

The spring 40 is of a given potential which is less than the potential of a similar coil spring 46 carried by the hammer pin 34.

One end of the hammer spring terminates at 47 while the other end bears upon the frame 16 as at 48 with the result that the hammer is constantly urged in a clockwise direction.

By virtue of the fact that the sear is mounted upon the lever 21, the twisting moment developed by the hammer spring, is effective while the hammer is in the latched position to impart a twisting moment to the lever in a counterclockwise direction about the pin 19 and in opposition to the moment set up by the weaker spring 40.

This occurrence insures that the sensing lever and, in particular, its lug 23 is maintained in the first or operative position, as shown in Fig. 1, wherein the breech bolt 13 and the action slide 11 are in the firing position as shown in Fig. 1.

Note further that it is possible to change the position of the sensing lever manually. Manual movement of the lever is accomplished by depression of the operating arm 23 in the manner shown in Fig. 3.

A particular feature to note at this point is that when the sensing lever is rotated while the hammer is in the latched position, the sear is kept free of the trigger finger piece.

Thus, the tooth 36 of the sear is rotated away from the cooperating notches 37 and 38 so that the trigger finger piece is rendered inoperative and will not be effective to release the hammer. If the weapon is held in such a manner that the lever 21 is in the free position shown in Figs. 2 and 3.

This feature is obtained by virtue of the fact that the sear is mounted upon the lever.
The only time the trigger is effective to release the hammer—is when the lever 21 is in the first or operative position shown in Fig. 1 and this occurrence can take place only when the breech bolt and action slide 11 is fully "home" or in the fully closed position.

The reason for the formation of a pair of notches 37 and 38 is to insure in semi-automatic weapons that the finger piece and sear engage one another after each occurrence of firing even though the trigger finger piece is still retained in the fired position (dotted line position in Fig. 3) by the shooter. Thus, if the trigger is in the fired position, the tooth 36 will bear up first in the notch 38 while upon release of the trigger in preparation to fire the weapon again, the tooth slips down into the notch 37 without releasing the hammer. Thereafter upon actuation of the finger piece to the firing position the sear is cammed in a counterclockwise direction to release the hammer.

It is to be especially noted that the sensing element or lever 21 need not be arranged in the manner illustrated, so long as the sensing element is movable to at least two positions, the first position being one in which the lever is operative to permit firing because the lever senses that the weapon's breech bolt means is fully closed and/or locked, while the second position is one in which the lever is free and the weapon may not be fired because the lever senses that the breech bolt means is not in condition for firing.

Obviously, the element or lever 21 need not sense the above two conditions of the breech bolt directly but may do so through intermediate elements or piece parts.

What is claimed is:

1. A trigger mechanism for a firearm including: a breech bolt means, said mechanism comprising a main frame, a firing means movably mounted in the frame and normally disposed in a latched position, a sensing element cooperating with the breech bolt means for sensing the open or closed condition thereof, said element being movably mounted in the frame and movably from an operative position denoting a closed bolt means to a free position denoting an open bolt means, a sear mounted upon the sensing element and movable relative thereto, said sear being operable to engage and latch the firing means, and a trigger finger piece pivotally mounted in the frame, said finger piece being operable to engage and move the sear to unlatch the firing means only when the sensing element is in the operative position.

2. A trigger mechanism for a firearm including: a breech bolt means, said mechanism comprising a main frame, a firing means pivotally mounted in the frame and normally disposed in a latched position, spring means for urging the firing means away from said latched position, a sensing lever cooperating with the bolt means for sensing the open or closed position thereof, said lever being pivotally mounted in the frame and movable from an operative position denoting a closed bolt means to a free position denoting an open bolt means, a sear mounted upon the lever and movable relative thereto, said sear being operable to engage and latch the firing means, and a trigger finger piece pivotally mounted in the frame, said finger piece being operable to engage and move the sear to unlatch the firing means only when the sensing lever is in the operative position.

3. The device of claim 2 wherein the firing means is a hammer provided with a spring effective while the hammer is in the latched position, by virtue of the connection of the hammer with the sear, to urge the sensing lever to its operative position.

4. The device of claim 2 wherein the firing means is a hammer provided with a spring tending to pivot the hammer away from its normal position and effective while the hammer is in the normal position to urge the sensing lever to its operative position, the sear making a driving connection with said lever and being provided with a power spring of less potential than the hammer spring, said sear spring tending to oppose the hammer spring, said sear spring being effective to maintain the sensing lever in the free position whenever the hammer is unlatched.

5. The device of claim 2 wherein the lever is provided with a manually engageable arm operable to move the lever from the operative position to the free position without unlatching the firing means and in opposition to the potential of the spring means.

No references cited.