DOUBLE ACTION TRIGGER MECHANISM FOR SEMI-AUTOMATIC PISTOL

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ABSTRACT
A firearm of the double action type including a frame having a trigger pivotally supported therefrom including a lower finger engageable portion below the trigger pivot and an upper portion above the trigger pivot. A generally horizontal front to rear extending drawbar is provided and the forward end of the drawbar is pivotally anchored to the upper portion of the trigger. Also, a hammer is pivotally supported from the frame for movement between cocked and firing positions and includes upper and lower portions above and below the hammer pivot with the rear end portion of the drawbar being vertically swingable below the hammer lower portion and the hammer lower portion and drawbar rear end including first coacting engageable portions for moving the hammer portion forward to a predetermined forward position with the hammer in the cocked position in response to forward shifting of the drawbar and subsequently releasing the hammer for movement to the firing position thereof in response to further forward movement of the drawbar. A spring is provided which yieldingly urges the hammer toward its firing position and additional spring structure is connected between the trigger and the drawbar yieldingly urging inverse pivotal movement of the trigger and the drawbar to swing the lower portion of the trigger forward and the rear end of the drawbar upwardly.
DOUBLE ACTION TRIGGER MECHANISM FOR SEMI-AUTOMATIC PISTOL

The pistol of the instant invention has been specifically designed to provide a hand gun with a minimum of components thereof requiring precise machining operations. A maximum number of components of the pistol may be readily cast and need not be machine finished to any great degree. Also, the pistol has been constructed in a manner whereby the internal components thereof may be readily assembled and disassembled with a minimum of effort and a minimum of tools. Still further, the trigger mechanism of the pistol is of the closed double acting type and constructed in a manner such that the pistol may not be discharged other than by exerting a rearward pull on the trigger and a safety slide is provided to effectively disengage and maintain the drawbar disengaged from the hammer of the pistol.

The main object of this invention is to provide a semi-automatic pistol having a double action trigger mechanism and which may not be fired except by a rearward pull on the trigger of the pistol.

Another object of this invention, in accordance with the immediately preceding object, is to provide a pistol including a manually actuated safety for rendering a rearward pull on the trigger ineffective to cock the hammer of the pistol.

Still another object of this invention is to provide a pistol including a minimum of working parts.

A further important object of this invention is to provide a pistol designed in a manner such that a minimum number of machined parts are required and enabling a majority of the working parts of the pistol to be cast in a substantially finished condition.

Another object of this invention is to provide a pistol constructed in a manner whereby its working components may be readily assembled and disassembled with a minimum of effort and through the utilization of a minimum number of simple tools.

A final object of this invention to be specifically enumerated herein is to provide a semi-automatic pistol including a double action trigger mechanism and which will conform to conventional forms of manufacture, be of simple construction and dependable in operation so as to provide a device that will be economically feasible, long lasting and trouble free.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part thereof, wherein like numerals refer to like parts throughout, and in which:

FIG. 1 is a side elevational view of a pistol constructed in accordance with the present invention with portions of the frame, slide and other components being broken away and illustrated in longitudinal vertical section, the trigger mechanism including the trigger, hammer and drawbar being illustrated in a position preparatory to the application of a rearward pull on the trigger to cock the hammer;

FIG. 2 is a fragmentary, longitudinal, vertical, sectional view of the rear portion of the trigger with the trigger mechanism in a partially cocked position;

FIG. 3 is a fragmentary, vertical, sectional view similar to FIG. 2 with the trigger mechanism illustrated in the fully cocked position;

FIG. 4 is a fragmentary, vertical, sectional view similar to FIGS. 2 and 3 with the trigger mechanism in the fired position;

FIG. 5 is a fragmentary, vertical, sectional view similar to FIGS. 2, 3 and 4 but with the trigger forwardly displaced to a position just rearward of its forwardmost position preparatory to the rear end of the drawbar again being engaged with the lower portion of the hammer;

FIG. 6 is a fragmentary, transverse, vertical, sectional view taken substantially upon the plane indicated by the section line 6–6 of FIG. 1; and

FIG. 7 is a fragmentary side elevational view with the rear handgrip of the pistol removed and illustrating the pivotal mounting of the clip retaining latch lever and the coacting portions of the slide and latch therefore for locking the slide in forward, rearward and intermediate position thereof.

Referring now more specifically to the drawings, the numeral 10 generally designates a pistol constructed in accordance with the present invention. The pistol 10 includes a frame 12 and a barrel supporting slide 14 mounted on the upper portion of the frame 12 for rectilinear reciprocation in a fore and aft direction.

The frame 12 defines a downwardly opening passage 16 upwardly into which a conventional clip 18 is telescoped and secured in position by means of a clip retaining latch lever 20 oscillatably mounted by pin 22 within a downwardly opening cavity 24 defined in the frame 12 immediately rearward of the passage 16. When the clip 18 is secured within the passage 16 by means of the lever 20, the upper end of the clip 18 is disposed immediately beneath the slide 14 rearward of the rear end of the barrel 26.

The lever 20 has a forwardly opening recess 28 formed therein above the pivot 32 and a compression spring 30 has one end seated in the recess 28 and the other end abutted against a partition portion 32 of the frame 12 separating the passage 16 from the cavity 24. In this manner, the lever 20 is urged toward a position with its exposed lower terminal end 34 displaced forwardly beneath the rear lower portion of the clip 18.

A trigger element 36 is pivotally supported in the frame 12 by means of a pivot pin 38 and the trigger element 36 includes a lower finger engaging portion 40 below the pivot pin 38 and an upper portion 42 above the pivot pin 38.

The rear end of the slide 14 includes a downwardly opening cavity 44 which forms an upward extension of the cavity 24 and a horizontal bore 46 formed in that portion of the slide 14 forward of the cavity 44 opens rearwardly into the latter. The forward end of the bore 46 includes a diametrically reduced portion 48 which opens into the rear end of the barrel 26.

A firing pin 50 including a diametrically enlarged rear end portion 52 and a diametrically enlarged intermediate portion 54 is snugly, slidably received in the bore 46. A pivotally supported extractor lever is provided and includes an inwardly projecting abutment portion 56 which projects laterally into the bore 46 between the diametrically enlarged portions 52 and 54 and thus limits forward and rearward shifting of the firing pin 50.

A compression spring 58 is disposed about the forward end portion of the firing pin 50 between the diametrically enlarged portion 54 and the shoulder defined at the rearward extremity of the diametrically re-
duced portion 48 of the bore 46. The forward end of the pin 50 projects into the diametrically reduced portion 48 and thus may be axially shifted into the rear end of the barrel 26.

A hammer 60 is pivotally supported by pin 62 within the upper portion of the cavity 24 of the frame 12 and includes an upper firing pin engaging portion 64 disposed within the cavity 44 and a lower portion 68 disposed below the pivot pin 62. The lower portion 68 is bifurcated so as to define a rearwardly and downwardly opening slot 70, see FIG. 6, and the upper end of an upwardly extending push rod 72 is pivotally anchored within the slot 70 by means of a pivot pin 74. The rod 72 includes a diametrically enlarged head 75 disposed immediately below the lower end of the hammer 60 and the lower end of the rod 72 is loosely telescopically disposed in an upwardly opening blind bore 76 formed in the upper end of the lever 20. The bore 76 includes an upper end counterbore 78 and a compression spring 80 is disposed about the rod 72 and has its upper end abutted against the underside of the head 75 and its lower end seated in the counterbore 78. Accordingly, it may be seen that the spring 80 yieldingly biases the hammer 60 in a clockwise direction as viewed in FIG. 1 of the drawings with the forward face of the hammer 60 abutted against the upwardly rearwardly facing coplanar abutment faces 82 and 84 of the slide 14 and frame 12.

A forked drawbar 88 has its forward end pivotally secured to the upper portion of the trigger element 36 as at 90 and the rear ends of the arms 92 of the drawbar curve inwardly behind the clip 18 which is embraced by the arms 92 and underlie the rear bifurcated lower end portion of the hammer 60. As can best be seen from FIGS. 4 and 5 of the drawings, the fucrations are provided with aligned downwardly and rearwardly opening notches 94 and the rear end portions of the arms 92 are notched as at 96, see FIGS. 3 and 4. Further, the rear terminal ends of the arms 92 embracingly receive the head or diametrically enlarged portion 75 of the rod 72 therebetween.

A butterfly spring 100 is encircled about the pivot pin 38 and its opposite ends are engaged with the lower portion 40 of the trigger element 36 and the arn 92 of the drawbar 88 a spaced distance rearwardly of the pivot 90. Thus, the butterfly spring 100 yieldingly biases the lower end of the trigger element 36 forwardly and the rear end of the drawbar 88 upwardly toward a position with the notches 96 engaged with the notches 94, see FIG. 1.

A safety lever 102 is pivoted on the pin 62 on the outside of the left side of the frame 12 and includes a forwardly projecting thumb engageable member 104 for manually depressing the forward end of the lever 102. The forward end portion of the lever 102 includes an inwardly projecting safety arm 108 which projects through and is slidable in an upwardly slot (not shown) provided therefor in the corresponding side of the frame 12. The safety lever 102 may have its forward end downwardly displaced so as to swing the arm 108 down into engagement with the upper marginal edge portions of the rear end portions of the arms 92 so as to downwardly displace the rear end of the drawbar 88 to a position with the notches 96 out of engagement with the notches 94 and thus effectively disengaging the rear end of the drawbar 88 from the lower portion 68 of the hammer 60. Further, the rear end of the lever is pivotally connected to a slide latch 110 as at 112, the slide latch being slidingly disposed in a vertically grooved 114 in the frame 12 (see FIG. 7). When the forward end of the lever 102 is depressed, the slide latch 110 has its upper end projected upwardly into one of the three notches 116, 118 and 120 formed in the slide 14 and registerable with the groove 114 when the slide 14 is in forward firing position; the intermediate disassembly position and the rear cartridge eject position, respectively.

The lever 20 is assembled with the frame 12 after the mounting of the hammer 60, rod 72 and spring 80 and the spring 30 has been seated in the recess 28. The lever 20 is upwardly inserted in cavity 24 until the rod 72 is received in the bore 76 and the spring 80 is seated in the counterbore 78. At this point the pin 22 which is carried by the lever 20 is disposed in the upper end of the opposite side slots 122 formed in the frame 12 and a final upward and forward thrust is applied to the lower end of the lever 20 to seat the pin 22 in the notches 124 formed in the opposite sides of the frame 12.

In operation, and assuming the various components of the trigger mechanism are positioned as illustrated in FIG. 1, the lower portion of the trigger element 36 is pulled rearwardly against the biasing action of the butterfly spring 100 so as to exert a forward pull on the drawbar 88 whereby the lower end or portion 68 of the hammer 60 will be swung forwardly and the rod 72 will be displaced downwardly so as to compress the spring 80. As the lower end portion 40 of the trigger element 36 is swung rearwardly to the position thereof illustrated in FIG. 2 of the drawings, the hammer 60 is moved toward the cocked position and away from the abutment surfaces 82 and 84 so that the rear diametrically enlarged portion 52 of the pin 50 may be displaced outwardly of the rear end of the bore 46 under the biasing action of the spring 58 to the extent limited by the abutment 56. Thereafter, as the lower portion 40 of the trigger element 36 is moved further rearwardly, the hammer 60 is pivoted to the fully cocked position thereof illustrated in FIG. 3 and those portions of the bifurcated lower end of the hammer 60 are rearwardly engaged with the notches 94 swing downwardly and engage the upper edges of the arms 92 so as to cam the rear end of the drawbar 88 downwardly out of engagement with those portions of the bifurcated lower portion 68 of the hammer 60 disposed immediately forwardly of the notches 94. At this point, the hammer 60 is released from engagement with the drawbar 88 and is free to be rapidly swung in a counterclockwise direction as viewed in FIG. 4 of the drawings under the biasing action of the spring 80 so as to contact the diametrically enlarged portion 52 and drive the firing pin 50 forwardly against the biasing action of the spring 58 by inertia so that the forward terminal end of the pin 50 may contact with the primer of the cartridge 110 within the rear end of the barrel 26. As the pistol 10 is fired, the slide, which is spring urged forwardly, recoils rearwardly and the abutment surface 82 engages the upper portion 64 of the hammer 60 to swing the hammer in a counterclockwise direction. Then, as rearward movement of the slide is terminated and the slide is spring biased forwardly, the uppermost cartridge in the clip 18 is stripped therefrom and driven forward into the rear end of the barrel 26, the shell casing of the spent cartridge having been previously ejected through an opening provided for the purpose in the side of the slide 14.
Although the slide 14 may be returned to its forward limit position before the rear end of the trigger element 36 is swung forward to its forwardmost limit position, as the trigger element is released and the drawbar 88 returns rearwardly, the lower end portion 68 of the hammer 60 cams the rear end of the drawbar 88 downwardly so that the notched portion 96 of the arms 92 may again pass rearwardly beneath the lower end of the hammer and again be seated in the notches 94.

In FIG. 5 of the drawings it may be seen that the safety slide 104 has been downwardly displaced so that its upper portion 108 bears downward on the rear end of the drawbar 88 to downwardly displace the latter out of engagement with the lower end of the hammer 60.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as new is as follows:

1. A firearm of the double action type, said firearm comprising a frame, a trigger pivotally supported in said frame, said trigger including a lower finger engageable portion below the trigger pivot and an upper portion above the trigger pivot, a drawbar having a forwardly pivotally anchored to said upper portion, a hammer pivotable in said frame for movement between cocked and firing positions and including upper and lower portions above and below the hammer pivot, the rear end of said drawbar being vertically swingable below said hammer lower portion, said rear end of said drawbar and the lower hammer portion including first coacting engageable portions for moving said hammer lower portion forward to a predetermined forward position with said hammer in said cocked position in response to forward shifting of said drawbar and subsequently releasing said hammer for movement to the firing position thereof in response to forward movement of said drawbar, means for urging said hammer toward said firing position, spring means connected between said trigger and drawbar urging said trigger and drawbar to swing the lower portion of the trigger forwardly and the rear end of said drawbar upwardly, and the rear end of said drawbar and the lower portion of said hammer including second coacting portions operable to cam the rear end of said drawbar downwardly beneath the lower end of the hammer when the lower end of the trigger is swung to its forwardmost position and the drawbar is shifted rearwardly, whereby the rear end and lower portions of said drawbar and hammer may again be engaged with each other for subsequent forward shifting of the drawbar and movement of the hammer toward the cocked position thereof, said frame defining a downwardly opening passage in which to upwardly telescopically receive a load clip, said drawbar comprising a rearwardly opening forked member whose opposite side arms extend along opposite sides of and embrace said passage, the rear ends of said arms, rearward of said passage, being directed toward each other and defining said rear end of said drawbar.

2. The combination of claim 1, wherein said hammer lower portion and drawbar rear end include cam and abutment portions, respectively, for camming said rear end downwardly to disengage said first coacting portions upon forward movement of said drawbar sufficient to move the hammer to the cocked position thereof.

3. The combination of claim 1, wherein said frame further defines a downwardly opening upstanding cavity rearward of said passage, an elongated upstanding clip retaining lever pivotally supported in said cavity intermediate the upper and lower ends of said lever for slight inverse front to rear swinging of the upper and lower ends of said lever, means biasing said lever to a position with its lower end forwardly displaced, said lower end including means operative to retentively engage a clip in said passage to prevent downward shifting of said clip and to disengage said clip for its downward movement from the lower end of said passage in response to rearward swinging of the lower end of said lever.

4. The combination of claim 3, wherein said means yieldingly urging said hammer toward said firing position comprises an upstanding elongated spring biased connecting member having its upper end connected to said hammer rearward of the hammer pivot and its lower end loosely guidingly supported from the upper end of said lever for longitudinal reciprocation relative thereto.

5. A firearm of the double action type, said firearm comprising a frame, a trigger pivotally supported in said frame, said trigger including a lower finger engageable portion below the trigger pivot and an upper portion above the trigger pivot, a drawbar having a forwardly pivotally anchored to said upper portion, a hammer pivotable in said frame for movement between cocked and firing positions and including upper and lower portions above and below the hammer pivot, the rear end of said drawbar being vertically swingable below said hammer lower portion, said rear end of said drawbar and the lower hammer portion including first coacting engageable portions for moving said hammer lower portion forward to a predetermined forward position with said hammer in said cocked position in response to forward shifting of said drawbar and subsequently releasing said hammer for movement to the firing position thereof in response to forward movement of said drawbar, means for urging said hammer toward said firing position, spring means connected between said trigger and drawbar yieldingly urging inverse pivotal movement of said trigger and drawbar to swing the lower portion of the trigger forwardly and the rear end of said drawbar upwardly, and the rear end of said drawbar and the lower portion of said hammer including second coacting portions operable to cam the rear end of said drawbar downwardly beneath the lower end of the hammer when the lower end of the trigger is swung to its forwardmost position and the drawbar is shifted rearwardly, whereby the rear end and lower portions of said drawbar and hammer may again be engaged with each other for subsequent forward shifting of the drawbar and movement of the hammer toward the cocked position thereof, said frame defining a downwardly opening passage in which to upwardly telescopically receive a load clip, said drawbar comprising a rearwardly opening forked member whose opposite side arms extend along opposite sides of and embrace said passage, the rear ends of said arms, rearward of said passage, being directed toward each other and defining said rear end of said drawbar.

6. The combination of claim 5, wherein said frame further defines a downwardly opening upstanding cavity rearward of said passage, an elongated upstanding clip retaining lever pivotally supported in said cavity intermediate the upper and lower ends of said lever for slight inverse front to rear swinging of the upper and lower ends of said lever, means biasing said lever to a position with its lower end forwardly displaced, said lower end including means operative to retentively engage a clip in said passage to prevent downward
shifting of said clip and to disengage said clip for its downward movement from the lower end of said pas-
sage in response to rearward swinging of the lower end of said lever.

7. The combination of claim 6, wherein said means yieldingly urging said hammer toward said firing posi-
tion comprises an upstanding elongated spring biased connecting member having its upper end connected to said hammer rearward of the hammer pivot and its lower end loosely guidingly supported from the upper end of said lever for longitudinal reciprocation relative thereto.

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