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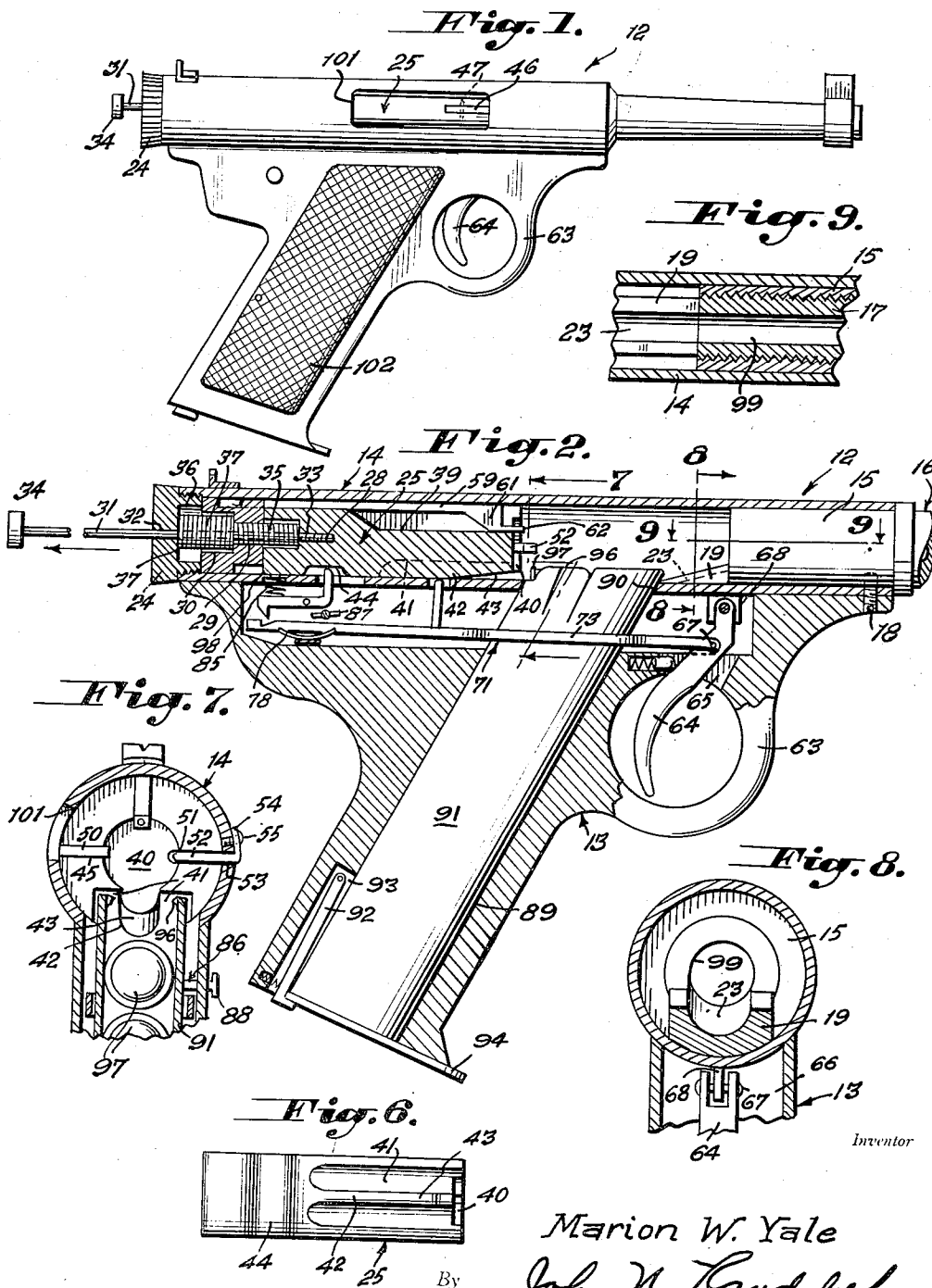
M. W. YALE

2,659,994

SELF-LOADING SEMIAUTOMATIC PISTOL

Filed Feb. 3, 1950

2 Sheets-Sheet 1



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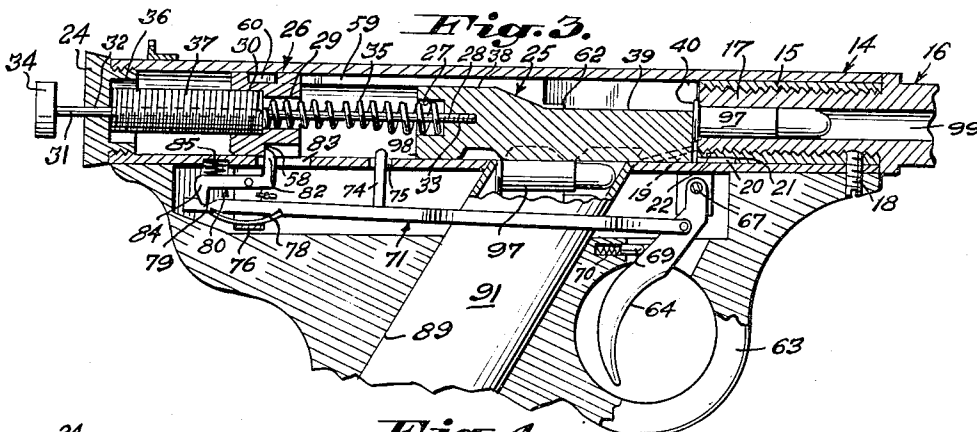
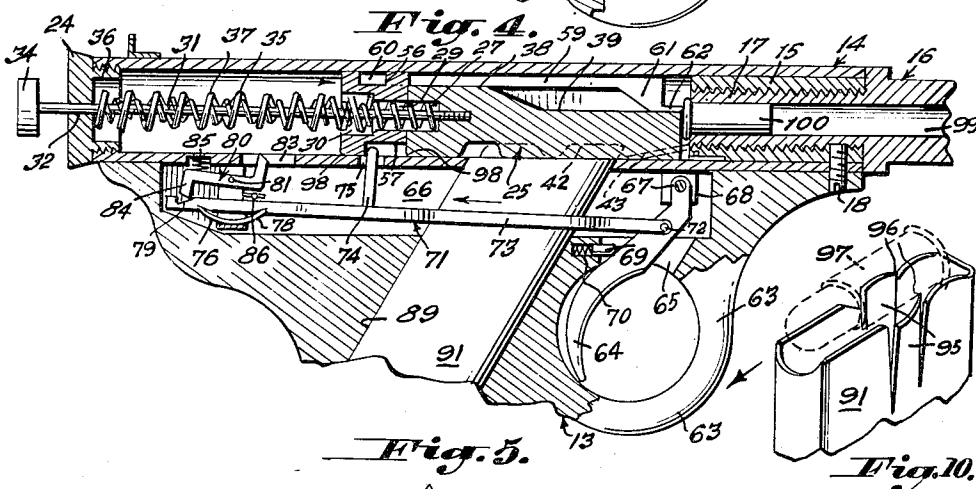
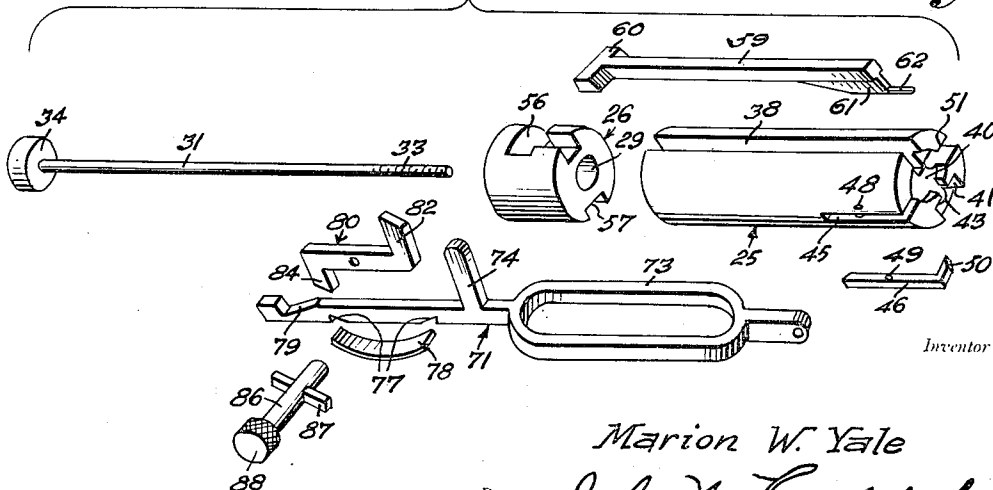
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SELF-LOADING SEMIAUTOMATIC PISTOL

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2 Sheets-Sheet 2



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SELF-LOADING SEMIAUTOMATIC PISTOL

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2 Claims. (Cl. 42—69)

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This invention relates to a novel construction of self-loading semiautomatic pistol having an enclosed action and no outside moving parts except an operating rod for rendering the piston action dirt-proof.

Still a further object of the invention is to provide a pistol of extremely simple construction which may be very readily dismantled for cleaning, repair or replacement of parts and which is capable of being quickly and easily reassembled.

Still a further object of the invention is to provide a pistol which may be readily constructed to provide a well balanced weapon to afford the maximum degree of accuracy in firing.

Various other objects and advantages of the invention will hereinafter become more fully apparent from the following description of the drawings, illustrating a presently preferred embodiment thereof, and wherein:

Figure 1 is a side elevational view looking toward the right-hand side of the pistol;

Figure 2 is an enlarged longitudinal central sectional view, partly in side elevation thereof and showing the bolt and hammer in retracted positions;

Figure 3 is a fragmentary longitudinal sectional view showing the bolt in a forward position preparatory to firing and with the hammer in a retracted, cocked position;

Figure 4 is a view similar to Figure 3 but showing the hammer in a forward position and illustrating the parts in their positions as the cartridge is fired;

Figure 5 is an exploded perspective view of certain of the operating parts of the pistol;

Figure 6 is a bottom plan view of the bolt;

Figure 7 is an enlarged cross sectional view taken substantially along a plane as indicated by the line 7—7 of Figure 2;

Figure 8 is an enlarged cross sectional view taken substantially along a plane as indicated by the line 8—8 of Figure 2;

Figure 9 is a horizontal sectional view taken substantially along a plane as indicated by the line 9—9 of Figure 2, and

Figure 10 is a fragmentary perspective view of the upper end of a cartridge clip especially designed for use with the pistol.

Referring more specifically to the drawings, the semiautomatic self-loading pistol in its entirety is designated generally 12 and includes a frame, designated generally 13 to the upper end of which is secured a receiver, designated generally 14. A barrel bushing 15 is press fit into the forward end of the receiver 14 and a barrel 16 has a restricted threaded rear end 17 which is threaded into the

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threaded bore of the bushing 15. The barrel and bushing are connected together and to the receiver by a screw fastening 18 which also forms a part of the connection between the receiver 14 and frame 13. A cartridge ramp 19 is disposed in the receiver 14 directly behind the barrel and bushing and is secured to the bushing 15 by an extension 20 of said ramp 19 which fits a recess 21 in the bottom of the rear end of the bushing 15 and which is secured thereto by a fastening 22. The ramp 19 is relatively short and has a concave, longitudinally extending upper surface 23, as best illustrated in Figure 3. The opposite, rear end of the receiver 14 is internally threaded and normally closed by a removable, externally threaded plug 24.

A bolt 25 which is generally circular, externally in cross section, is mounted for longitudinal sliding movement in the receiver 14 behind the bushing 15 and for movement toward and away from the rear end of the bushing 15 and barrel 16. A hammer 26, which is likewise of substantially circular external cross section, is also reciprocally mounted for longitudinal movement in the receiver 14 between the bolt 25 and plug 24. The bolt 25 at its rear end is provided with a rearwardly opening recess 27 and a restricted threaded recess 28 which extends forwardly from the bed of the recess 27. The hammer 26 has a bore 29 extending longitudinally and centrally therethrough and which is provided with an enlarged rearwardly opening rear end portion 30. An action rod 31 extends reciprocally through a central bore 32 in the plug 24, through the bore 29 and recess 27 and has a threaded forward end 33 which threadedly engages the threaded recess 28. The action rod 31 has a knob or head 34 at its rear end which is disposed rearwardly of the plug 24, in the forwardmost position of said action rod, as illustrated in Figure 1. A long action spring 35 of relatively small diameter is mounted on the action rod 31 within the receiver 14 and has one end thereof seated in a forwardly opening recess 36 of the plug 24 and extends forwardly therefrom through the hammer bore 29 into the bolt recess 27 and has its opposite end bearing against the bed of the recess 27. A shorter main spring 37 of larger diameter is disposed around the rear portion of the action spring 35 and has its rear end seated in the recess 36 and its forward end seated in the hammer recess or bore enlargement 30 so that the spring 35 urges the bolt 25 toward its forward position of Figures 3 and 4 and the main spring 37 urges the hammer 26 toward its forward position of Figure 4.

As best seen in Figures 2, 3, 4 and 5, the bolt 25

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is provided in its upper portion with a groove 38 which extends from end-to-end thereof and which has a deep cut forward portion 39. The forward end of the bolt 25 is provided with a recess or depression 40 for receiving the rim or rear end of a cartridge case. As seen in Figure 6, the underside of the bolt 25 is provided with spaced longitudinally extending grooves 41 which extend from intermediate of its ends to its forward end and which combine to form a longitudinally extending rib 42 therebetween which has a beveled forward end 43 terminating at the bed of the pocket or depression 40. The pocket or depression 40 opens downwardly into the grooves 41 at the forward end of the rib 42. The underside of the bolt 25 is also provided with a transversely extending depression or groove 44 which is disposed rearwardly of the longitudinal grooves 41 and which is provided with rounded forward and rear ends, as best seen in Figures 2, 3 and 4. As seen in Figure 5, the right-hand side of the bolt 25 is provided with a longitudinally extending groove 45 which extends to its forward end and laterally thereof into the recess 40 for receiving an extractor 46 which is pivotally mounted therein, intermediate of its ends on a pin 47 which extends vertically through an opening 48 of the bolt 25 and through an opening 49 of the extractor 46. The extractor 46 is provided with a laterally extending hook 50 at its forward end which extends radially inwardly of the forward end of the bolt 25 and into the depression 40. The opposite, left-hand side of the bolt 25 is provided with a longitudinally extending relatively deep groove or channel 51 for slidably receiving an ejector 52 which extends laterally inwardly through an opening 53 in the left side of the receiver 14, as seen in Figure 7, and which has an upturned flange 54 at its outer end which engages a portion of the outer side of the receiver 14 and which is secured thereto by a fastening 55. The groove 51 extends from the forward end of the bolt 25 and is of a depth so that its bed portion opens into the depression 40 and the ejector 52 is of a length to extend to adjacent the bed of the groove 51 so as to move into the depression 40 as the bolt 25 approaches its retracted position of Figure 2.

The hammer 26 is provided with a substantially T-shaped forwardly opening recess 56 in its upper part and a groove 57 in the bottom part thereof which opens outwardly of the forward end of the hammer 26 and which terminates intermediate of the ends of said hammer to form a forwardly facing shoulder 58. A firing pin 59 is provided with a T-shaped head 60 at its rear end which fits into the hammer recess 56 and said firing pin extends forwardly therefrom in the groove 38 and has a depending flange 61 at its forward end which is reciprocally disposed in the deep cut groove portion 39 of the bolt 25. The flange 61 terminates at its forward end and bottom edge in a forwardly extending pin portion 62 which projects into the depression 40, in its forwardmost position of Figure 4. It will be readily apparent that the hammer is nonrotatably connected to the bolt 25 by the firing pin 59 and the bolt 25 is prevented from turning in the receiver 14 by engagement of the ejector 52 with the bolt groove 51.

The frame 13 is provided in its forward portion with an opening defining a trigger guard 63 in which the lower portion of a trigger 64 is swingably disposed. The trigger 64 extends upwardly from the trigger guard 63 through an opening 65

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of the frame 13 into a longitudinally extending recess 66 formed in the upper portion of the frame 13 and which opens upwardly of its upper edge. The upper end of the trigger 64 is pivotally mounted at 67 on a block 68 of the frame 13 and which extends into the forward portion of the recess 66. A spring pressed plunger 69 which is mounted in a recess 70 of the frame 13 and which extends into the opening 65 bears against the trigger 64 and urges it to spring forwardly within the trigger guard 63, as illustrated in Figures 3 and 4. A sear bar, designated generally 71, is disposed longitudinally in the recess 66 and is pivotally connected at its forward end at 72 to the trigger 64, beneath and adjacent its pivot 67. The sear bar 71 is provided near its forward end with an elongated clip receiving opening 73 and behind and adjacent thereto has an upstanding, rigid disconnecter pin 74 which extends upwardly through an opening 75 in the bottom portion of the receiver 14. The frame 13 is provided with a hanger 76 which extends downwardly into the recess 66, near the rear end thereof and through which the rear end portion of the sear bar 71 loosely extends. Said sear bar 71 is provided in its underside with longitudinally spaced notches 77 for receiving the ends of an arcuate, leaf-type spring 78, the intermediate portion of which is bowed downwardly to rest upon the bottom portion of the hanger 76 for urging the rear end of the sear bar 71 upwardly. The sear bar 71 near its rear end is provided with a notch in its upper side forming a ramp surface 79. A sear 80 is pivotally mounted intermediate of its ends by a pin 81 on the hanger 76 above the sear bar 71 and has an upwardly extending forward end 82 which extends upwardly into or through an opening 83 in the bottom of the receiver 14. The opposite end of the sear 80 terminates in a downturned portion 84 which normally engages the ramp surface 79. A spring 85 which seats against the bottom of the receiver 14 and bears on the upper rear end portion of the sear 80 urges said sear to rock in a counterclockwise direction on its pivot 81 for urging the rear end portion 84 downwardly against the ramp surface 79 and the forward sear end 82 upwardly into the receiver 14.

A safety 86 extends transversely through the recess 66, beneath the forward end of the sear 80 and has a cross bar 87 located beneath the sear 80 and a knurled head 88 located on the outer left-hand side of the frame 13. By rotating the catch 86 the cross bar 87 thereof will urge the forward end of the sear 80 upwardly and the sear bar 71 downwardly for locking the sear in a position for engagement with the hammer so as to prevent firing of the piston 12 when the safety catch cross bar 87 is in an upright position rather than in a horizontal position, as illustrated in Figures 3 and 4.

The grip portion of the frame 13 has a bore 89 of oblong cross section extending from the bottom thereof diagonally upwardly and forwardly and opening into the recess 66 and which aligns with an opening 90 in the bottom of the receiver 14. The bore 89 is adapted to receive a cartridge clip 91 which is inserted therein from the lower end of said bore and which extends upwardly through the bore 89 through the recess 66 and opening 90 into the lower part of the receiver 14. The clip 91 has a portion extending loosely through the clip opening 73 of the sear bar 71, which opening 73 is of sufficient length to allow the clip bar 71 to reciprocate longitudinally in the recess 66 and relatively to the clip 91. A spring

projected latch 92 which is pivotally mounted in a recess 93 of the frame 13 and which has a hook portion disposed beyond the lower end of the frame 13, is normally held in a position with its hook portion engaging the lower end of the clip 91 for retaining the clip in an applied position, as illustrated in Figure 2. By manually swinging the clip latch 92 clockwise or to the left as seen in Figure 2, the clip flange 94 can be engaged for removing the clip 91 for reloading the pistol 12. The clip 91 differs from a conventional clip in that the sides thereof are slit longitudinally from its upper, open end to provide strips 95 the rear edge portions of which are bent inwardly to provide lips 96, for a purpose which will hereinafter become apparent.

Assuming that the pistol 12 has just been loaded with a clip 91 containing cartridges 97 which are urged toward the open, upper end of said clip by a conventional spring follower, not shown, as is common in firearm clips, and further assuming that the bolt and hammer are in forward positions, as illustrated in Figure 4, the uppermost cartridge 97 will be held below the open top of the clip 91 by engagement with the bolt rib 42 which extends into the open top of the clip 91. To initially load and cock the piece 12, the knob 34 of the action rod is grasped and pulled rearwardly to its position of Figure 2. It will be readily apparent that the bolt 25 and hammer 26 will be carried rearwardly therewith. As the hammer and bolt commence their rearward movement the disconnecter pin 74 will be disposed in the hammer groove 57. As the hammer and bolt move rearwardly the rounded upper end of the disconnecter pin 74 will engage the rounded rear portion 98 of the bottom of the bolt 25 which will function as a cam for initially camming the disconnecter pin 74 and sear bar 71 downwardly. Said parts are again cammed downwardly by the forward rounded end of the bolt recess 44 and held in a depressed position by the rib 42, as illustrated in Figure 2, as the bolt and hammer reach a fully retracted position and in which position the sear end 82 is disposed in the bolt recess 44 and the sear end 84 is out of engagement with the sear bar 71. By then releasing the knob 34, the springs 35 and 37 will project the bolt 25 and hammer 26 forwardly. As the bolt 25 moves forwardly the forward end of its rib 42 will engage the rear or rim end of the uppermost cartridge 97 which has been raised by the cartridge follower into the open upper end of the clip 91 when the rib 42 was moved rearwardly and out of engagement with the clip 91. Thereafter, said upper cartridge 97 will be carried forwardly with the bolt 25 and during its initial movement will be displaced upwardly by engagement of its rim with the inwardly curved lips 96 to thereby cause the rim of the cartridge 97 to be displaced upwardly into the depression 40 of the forward end of the bolt face and as the ogive portion of the cartridge or projectile moves into engagement with the groove 23 of the ramp 19, which is disposed just forwardly of the forward, upper end of the clip 91, so that said uppermost cartridge 97 is displaced upwardly by the ramp 19 and the intumed lips 96. As the cartridge rim portion moves upwardly into the bolt face depression 40, a part of the rim will assume a position behind the hook 50 of the extractor. The ramp 19 will guide the nose of the projectile into the barrel chamber 99 so that when the bolt 25 reaches its forwardmost position, as seen in Figure 3, the cartridge 97 will be chambered and the

inclined forward surface 43 of the rib 42 will be in engagement with the groove 23 of the ramp 19.

During this forward movement of the bolt 25, as previously stated, the hammer 26 will initially be moved forwardly therewith under the biasing action of the main spring 37 but as the sear end 82 clears the rounded bolt surface 98 the sear spring 35 will rock the sear 80 counterclockwise on its pivot 81 for projecting the sear end 82 upwardly through the opening 33 into the receiver 14 and into the hammer recess 57 to engage the hammer shoulder 58 so that the hammer 26 will be held in a partially retracted position by the sear end 82. Thereafter, the forward movement of the bolt 25 is accomplished by the pressure of the action spring 35 only. As the bolt surface 98 clears the disconnecter pin 74, the spring 78 will swing the disconnecter bar 71 upwardly on its pivot 72 to its position of Figure 3. As the bolt 25 moves forwardly relatively to the hammer 26 after the hammer has been caught by the sear end 82, the firing pin 59 will slide relatively to the groove 38 in the deep portion 39 thereof so that the hammer pin flange 61 will move from its position of Figure 2 to its position of Figure 3 when the bolt has reached its projected position and the hammer 26 is held in a cocked position. Approximately .003 inch clearance exists between the bolt face and the barrel breach 17 and bushing 15 when the bolt 25 is in a forwardmost position as the bed of the recess 40 holds the cartridge rim tight against the barrel breech to provide proper head space, as seen in Figure 3. When a rearward pull is then exerted on the trigger 64, said trigger in swinging rearwardly will displace the sear bar 71 rearwardly from its position of Figure 3 to its position of Figure 4. As the sear bar 71 moves rearwardly the sear end 84 will ride up the sear bar ramp 79 to thereby cause the sear 80 to rock clockwise on its pivot 81 so that the forward sear end 82 will be drawn downwardly out of engagement with the hammer shoulder 53 thus releasing the hammer which is then projected forwardly by the main spring 37 to its position of Figure 4, in which position the disconnecter pin 74 is disposed in the hammer recess 57. The firing pin 59 likewise moves forwardly with the hammer 26 and relatively to the bolt groove 38, 39 so that as the hammer approaches its fully projected position of Figure 4 the pin portion 62 will strike and detonate the primer of the cartridge 97 for firing the piece. The recoil of the powder charge of the cartridge 97 will force the bolt and hammer rearwardly to their positions of Figure 2, as previously described heretofore in reference to the initial loading of the piece and which therefore need not be again described in detail. However, as the bolt 25 is propelled rearwardly by the recoil from the powder charge, the cartridge case 100 will be extracted from the chamber 99 by the extractor hook 50 and carried rearwardly with the bolt 25 until a portion of the rim of the cartridge case 100 strikes the stationary ejector 52 which is slidably engaged by the bolt groove 51 and which will "kick" the cartridge case 100 laterally of the receiver 14 and outwardly through the ejector opening 101 in the right-hand side of said receiver 14. As the bolt moves rearwardly it engages the disconnecter pin 74 to depress the sear bar 71, as previously described, so that the sear bar 71 is held in its position of Figure 2 until the bolt and hammer have returned to their positions of Figure 3. Accordingly, the trigger 64 must be allowed to move forwardly under the action of the spring pressed plunger 69 before the spring 78 can return

the rear end of the sear bar 71 to its position of Figure 3 and from which the sear 80 can be again rocked out of engagement with the hammer shoulder 58, thus preventing the piece 12 from re-firing automatically under the action of the spring 37. As previously stated, the safety catch 86 can be revolved 90° from its position of Figures 3 and 4 to lock the sear end 82 in a raised position to prevent firing of the piece. The sides of the frame 13 are covered and closed by suitable check stocks 102 which are detachably secured to the sides of the frame 13.

By unscrewing the plug 24, the bolt, hammer, action rod, action spring and main spring may be removed as a unit for cleaning thus providing a weapon which may be readily assembled and disassembled, and by removing the receiver 14 from the frame 13 the remainder of the parts, contained within the recess 66 will be exposed. When the piece 12 is constructed for firing large caliber ammunition a suitable bolt lock, not shown, may be provided for locking the bolt in its forward-most position until after the cartridge has been fired.

Various modifications and changes are contemplated and may obviously be resorted to, without departing from the spirit or scope of the invention as hereinafter defined by the appended claims.

I claim as my invention:

1. In a clip fed semiautomatic firearm, a receiver having an open rear end, a plug detachably connected to and closing the rear end of the receiver, a bolt slidably mounted for longitudinal movement in the receiver, a hammer mounted for sliding movement in the receiver between the bolt and plug, said bolt and hammer being removable from the receiver through its open rear end when the plug is disconnected therefrom, an action rod detachably connected at its forward end to said bolt and extending rearwardly therefrom loosely through the hammer and plug and having an exposed rear end located rearwardly of the plug and adapted to be manually engaged for retracting the bolt and hammer, spring means

mounted on the action rod and disposed within the receiver including springs individual to the bolt and hammer for urging the bolt and hammer forwardly of the receiver toward the breach, and a firing pin detachably connected to the hammer and slidably engaging the bolt, said bolt, hammer, spring means and firing pin being removable as a unit with the action rod through the rear end of the receiver when the plug is disengaged therefrom.

2. In a firearm, a receiver having an open rear end, a closure detachably connected to the rear end of the receiver, a bolt slidably mounted in the receiver, a hammer slidably mounted in the receiver between the bolt and closure, an action rod extending slidably through the closure and hammer and having a forward end detachably secured in the bolt, spring means mounted on the action rod and disposed in the receiver and individual to the bolt and hammer for urging the bolt and hammer forwardly of the receiver and away from the closure, and a firing pin detachably connected to the hammer for sliding movement therewith and having a forward portion slidably engaging in and guided by the bolt, said closure, action rod, bolt, hammer, firing pin and spring means being removable from the receiver as a unit through its open rear end when the closure is detached from the receiver, said hammer being adapted to be released from a retracted cocked position by a sear for sliding movement away from the closure and toward the bolt.

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