AUTOMATIC FIREARM WITH BREECH BLOCK OPERATED DISCONNECTOR


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3 Claims. (Cl. 89—145)

This invention relates to automatic arms, particularly of the type having a movable breech utilizing recoil to reload after each discharge, and to novel trigger and safety devices in the firing mechanism of the arm.

One object of the invention is to provide an improved trigger and associated trigger bar.

A further object is to provide a trigger and safety mechanism in which the trigger is disconnected from the firing mechanism during firing, recocking and when in safety condition.

A still further object is to provide a novel safety mechanism which prevents accidental discharge of the arm by jarring its firing pin, by pulling its trigger, by impact of its hammer or by partial or full cocking and releasing of the hammer.

In a broad aspect the invention relates to a firearm of the type automatically recocked after firing and comprises a firing mechanism including a hammer, a sear member releasably engaging the hammer so as to hold and release it from its cocked position, a spring urging the sear into hammer engaging position, a trigger, a trigger bar for connecting the trigger with the sear member, the bar being pivotally supported at one end by the trigger so as to swing between an inoperative position and a position operative to engage the sear member, the sear member having an abutment holding the bar in inoperative position after the trigger is pulled to engage the sear and release the hammer and after the hammer is recocked, so that the sear member may re-engage the hammer and prevent repeated firing of the arm while the trigger remains pulled. Preferably the aforesaid trigger bar is moved from operative to inoperative position by the provision of means on the hammer for engaging the trigger bar when the hammer is released.

In a further aspect involving a firearm with a frame and a breech member slidingly mounted on the frame, the firing mechanism is provided with a disconnecter mounted on the frame and having at one end a cam nose in the path of the breech and adapted to move the breech and its forward return to firing position. In a related aspect of the invention the frame which carries the above described firing mechanism and the breech are provided with a safety device including a rotatable member mounted on the breech member for adjustment between safe and off position, and means on the frame for engaging the trigger bar and moving the bar to inoperative position when the member is rotated to safe position. Preferably the safety device is used in conjunction with a sliding firing pin carried in the breech member and having a forwardly facing shoulder near its forward end, and the rotatable member comprises a bolt having an opening axially therethrough for receiving the after end of the pin and said shoulder, and means on the bolt rotatable with the bolt into engagement with said shoulder thereby to block forward movement of the pin. Preferably the safety bolt is also provided with an abutment movable between the aforesaid pin end and the hammer when the bolt is rotated to safe position, thereby to obstruct the path of the hammer and prevent its striking the after end of the firing pin.

In other aspects the invention comprises an improved trigger and bar assembly, an improved sight, and a cooperative safety bolt and extractor structure.

For the purpose of illustrating typical embodiments of the invention are shown in the accompanying drawings, in which

Fig. 1 is a side elevation of a double action automatic pistol;
Fig. 2 is a plan view of the pistol on a larger scale;
Fig. 3 is a section on line 3—3 of Fig. 2;
Fig. 4 is a section on line 4—4 of Fig. 3;
Figs. 5 and 6 are sections on line 5—5 of Fig. 3, showing two positions of the safety device;
Figs. 7, 8 and 9 are sections on line 7—9 of Fig. 2, showing three positions of the firing mechanism;
Fig. 10 is a section on line 10—10 of Fig. 2, parts being broken away;
Fig. 11 is a section on line 11—11 of Fig. 2;
Fig. 12 is a plan view of a trigger bar on an enlarged scale;
Fig. 13 is a side elevation of the trigger bar on an enlarged scale;
Fig. 14 is a plan view of the disconnecter;
Fig. 15 is a side elevation of the disconnecter;
Fig. 16 is a rear end view of the safety device;
Figs. 17 to 19 are sections on lines 17—17, 18—18 and 19—19 respectively of Fig. 16;
Fig. 20 is a side elevation of a trigger;
Fig. 21 is a front end elevation of the trigger;
Fig. 22 is a bottom view of the breech slide;
Fig. 23 is a side elevation of the pistol barrel;
Fig. 24 is a rear end view of the barrel;
Fig. 25 is a plan view of the pistol frame;
Fig. 26 is a schematic elevation showing the relationship of parts of the barrel and frame;
Fig. 27 is a side elevation of the sear;
Fig. 28 is a rear end elevation of the sear;
Fig. 29 is a section like Fig. 3 showing a modified trigger and trigger bar in a single action automatic pistol;
Fig. 30 is a section on line 30—30 of Fig. 29;
Fig. 31 is a plan view of the single action trigger and trigger bar assembly;
Figs. 32 and 33 are sections of the single action pistol like Fig. 29;
Figs. 34 to 36 respectively are a front elevation, side elevation, and bottom view of the single action sear; and
Fig. 37 is a side elevation of the single action disconnecter; and
Fig. 38 is a side elevation of the single action hammer, shown partly in section.

As shown in Figs. 1 to 3, the pistol comprises a frame 1 on which is mounted a sliding breech member 2 and a barrel 3. The forward end of the barrel 3 is supported by a collar 4 which makes a bayonet fit in the forward end of the breech slide 2. A slight clearance between the forward end of the barrel and the internal bore of the collar 4 permits a small angular depression of the barrel. Integral with and extending downwardly from the collar 4 is a plate 41 which serves as an abutment for one end of the breech slide return spring 50 which is carried on a guide rod 51, the rod extending through an opening 42 in the collar extension 41. At the rear end of the guide rod 51 is a circular plate 52 which engages a shoulder 23 on the frame 2 and holds the spring 50 compressed. As
shown in Fig. 4, tongues 21 on the slide 2 and grooves 22 on the frame 1 guide the breech slide 2 on the frame and permit it to move rearwardly by the well-known recoil reaction when the pistol is fired. The spring 50 and guide block 24 pass through a sliding groove from the slide 2. Rearward movement of the slide 2 on the frame 1 is limited by a shoulder 11 in the path of the block 24. Forward movement of the slide is limited by a locking pin 53, which as shown in Figs. 3 and 4 extends through the frame 1 into the path of a lug 31 depending from the barrel 3. The locking pin 53 is held in place by a spring urged detent 54 carried in the rear end of the guide rod 51. Exteriorly of the frame the pin 53 carries a manually releasable detent arm 53a adapted to engage in a notch 53b on the slide 2 when the slide is manually retracted or when the slide recoils after the magazine clip 110 is emptied. Inasmuch as this arrangement is conventional, no further description is given.

As shown in Fig. 23, the lug 31 on the barrel 3 is provided with forwardly and rearwardly facing cam surfaces 33 and 32. The rear cam surface 32 is slightly spaced from a parallel cam surface 12 on the frame 1 (Figs. 3 and 26). A downwardly facing surface 34 intersects the cam surface 32 at the top of the locking pin 53 thereby holding the barrel in the elevated position relative to the breech slide 2 illustrated in Fig. 3.

When the barrel 3 is in elevated position a rib 36 on the barrel is locked in a groove 26 on the breech slide. On recoil the barrel is carried rearwardly with the breech slide owing to this interlock until the cam surface 32 strikes the cam surface 12. Thereupon the barrel pivoting in the collar 4 is cammed downwardly at its rear end and disengaging the rib 36 from the groove 26 until downwardly facing surfaces 35 on the barrel strike a flange 13 along the upper side of the frame 1 (Fig. 4). Thereafter the breech slide travels rearwardly and performs recocking and shell extracting functions to be described hereinafter.

After the recoil portion of the recocking cycle the breech slide is returned toward forward position by the spring 50 which has been compressed against the collar flange 41 secured at the forward end of the breech slide. When the trigger block 27 strikes the rear end of the barrel 3 urging the barrel forwardly, the forward barrel cam surface 33 is urged against the locking pin 53 (Fig. 26) thereby lifting the rear end of the barrel over the pin 53 and re-engaging the barrel rib 36 with the breech slide groove 26.

The firing mechanism for the pistol comprises a trigger 5, a trigger bar 6, a sear 7, a hammer 8, and a firing pin 9. The trigger 5 is secured to the frame 1 by a pivot pin 59 passing through the frame. As shown in Figs. 3 and 9 a spring urged detent 55 recessed in the trigger 5 engages a notch in the pivot pin thereby securing it to the trigger which in turn is located between the frame walls 13 (Fig. 25).

The trigger 5 and trigger bar 6 are shown in detail in Figs. 12, 13, 20 and 21. Extending upwardly from the trigger are extensions 56 which straddle a neck 61 on the trigger bar 6. Forwardly of the trigger bar neck 61 is a head 62 having a rearwardly facing surface 63 adapted to be engaged by curved surfaces 57 on the forward side of the trigger extension 56. As shown in Fig. 9, as the trigger is pulled the point of engagement between the trigger bar surface 63 and the curved edges 57 move outwardly from the pivot point of the trigger so that a relatively short lever arm is provided for easy starting of the trigger lever arm 64 when the trigger bar has started to move. Below the head 62 is a hook 64 adapted to engage the trigger pivot pin 59. Forwardly of the hook 64 is a recess 65 adapted to receive a spring urged pin 58 carried in the frame 1. The hook 64 is transmitted through the surface 63 of the head to the curved surfaces 57 above the pivot 54 of the trigger thereby yieldingly urging the trigger to normal position shown in Fig. 3. Furthermore, because the point of engagement between the plunger 58 and trigger bar recess 65 is slightly below the point of engagement between the pin 58 and the pivot 54, a small counterclockwise moment is applied to the trigger bar when the trigger and bar are in normal position as shown in Fig. 3 with the hook engaging the pivot pin 54. However, after the trigger is pulled moving the hook 64 past the pivot pin 54, the pivot point of the trigger bar relative to the trigger is transferred to the point of contact between the curved trigger surfaces 57 and the trigger bar surface 63 so that the counterclockwise moment applied by the spring urged plunger 58 is substantially greater. Thus the clockwise moment applied to the bar is small before the trigger is pulled and relatively greater after it is pulled. With the above described interlocking relation between the trigger and trigger bar, the desired operating relation between the bar and trigger is maintained without any fixed pivotal interconnection between the bar and trigger so that the draw bar may be said to float with relation to the trigger.

Extending rearwardly from the neck 61 of the trigger bar are two spaced arms 66 connected at the rear by a cross piece 69 which is adapted to engage in notches 81 on the hammer 8 and swing the hammer about its pivot 82 when the trigger is pulled.

The mainspring 83 for the hammer is confined in a recess 84 in a grip attachment 80 on the frame 1. The mainspring 83 acts on the hammer 8 through a plunger 85 and a toggle link 86, the link 86 being pivotally connected to the hammer at 87. The lower end of the link 86 pivots in a depression at the upper end of the plunger 85. A lock pin 88 passing through the frame attachment 80 confines the plunger and spring in the recess 84 so that the frame attachment 80 may be retracted with the spring held in place under slight compression, by removing a pin 89 which in cooperation with an abutment 90 adjacent the upper end of the frame attachment 80 secures the attachment 80 to the frame 1.

The firing pin 9 which is struck by the hammer 8 is enclosed in the breech block 27 at the rear of the breech 2. As shown particularly in Figs. 3, 5 and 6, the firing pin 9 and the spring 91 which urges it rearwardly are confined in a chamber 28 within the block 27, which chamber has an opening at its rear end and which opening at the end of the pin 9 to strike a cartridge in the barrel 3. Spaced slightly forward of the rear end of the pin 9 is an annular rib 92 which normally abuts a safety bolt 10 extending transversely through the breech block 27. The spring 91 urges the rear end of the hammer 8 shown in Figs. 5 and 7. The impact imposed by the hammer gives the firing pin sufficient momentum to carry forward against the force of the spring 91 so that the forward end of the pin 9 is projected through the forward opening in the breech block.

The sear 7 which holds the hammer 8 in the half-cock position of Fig. 7 or the full-cock position of Fig. 8 is pivoted to the frame by a pin 71. The sear, shown separately in Figs. 27 and 28, has at its upper end a nose 72 for engaging in the half-cock notch 73 or the full-cock notch 74 of the hammer 8 (Figs. 8 and 9). At the lower end of the sear 7 a spring urged plunger 77 is carried in a recess in the sear so as to abut the inner wall of the frame attachment 80 and urge the sear counterclockwise toward engagement with the hammer notches 73 and 74. Below the sear as illustrated as shown in Fig. 28, is a rearwardly facing shoulder 75 adapted to be engaged by the trigger bar hook 68a when the trigger is pulled, thereby swinging the sear counterclockwise and disengaging it from the hammer.

Below the surface 75 is a downwardly facing surface or abutment 76, which as shown in Fig. 9 swings over the hook 68a of the trigger bar when the hammer returns.
to full-cock after firing and while the trigger remains pulled. During the firing movement of the hammer a projection 78 adjacent the full-cock notch 74 strikes the rear trigger bar claw 68 knocking the rear end of the trigger bar downwardly to the position shown in Fig. 9 wherein the forward trigger bar claw 68 is below the shoulder 72 thereby permitting the ear nose to swing to the position shown in Fig. 9 so that it may drop into the hammer notches 73 or 74 when the hammer is returned to cocked position by recoil of the breech slide. If the trigger is thereafter released the floating trigger bar claw 68 is forced to ride under the influence of the spring-urged plunger 58 at its forward end to the position shown in Fig. 8, or to a position slightly higher with the hook 69 opposite to rear surface 75.

The double action pistol shown in Figs. 1 to 28 may be cocked and fired merely by pulling the trigger, or may be cocked by hand for hair trigger action. As previously mentioned, the hammer may be trigger cocked from the normal position shown in Fig. 3 or the half-cocked position shown in Fig. 7 by pulling the trigger so as to engage the trigger bar hooks 68 and 69 in the corresponding notches of the hammer and thereby rotate the hammer to full cocked position whereafter the claw 68 slips from its notch releasing the trigger and permitting the claw 68 to fall underneath the surface 76 as described above. As the hammer is manually moved toward full cock position shown in Fig. 7 the friction surface of a notch 79 on the hammer engages the rear end of the trigger bar 6 and urges the trigger bar downwardly from the position shown in Fig. 7 to the position shown in Fig. 8 wherein the trigger bar 68 is below the rear face 75. Owing to the need for swinging the hammer slightly beyond full cock in order to insure that the ear nose 72 engages the hammer notch there is a possibility that the claw 68 might accidentally engage the surface 75 of the ear. However, a frictional engagement of the notch 79 on the end of the trigger bar 6 serves to depress the trigger bar 6 sufficiently to avoid such accidental engagement of the claw 68 with the ear 7. The frictional engagement between the notch recess 79 and the trigger bar is easy overcome when the trigger 5 is pulled raising the rear end of the trigger bar 6 until the trigger bar 68 is opposite to rear surface 75 whereafter further pull of the trigger brings the claw 68 into engagement with the ear and releases the hammer. The notch 79 is widened to permit the trigger bar to swing from inoperative to operative position when the trigger is pulled, and also to permit the bar to swing from operative to inoperative position under-due action of the magazine lever when the magazine is removed.

The breech slide 27 until the breech block 27 is to the rear of the clip 110 and the barrel has dropped to the position shown in broken lines in Fig. 26. Subsequent forward movement of the breech block 27 urges the topmost cartridge in the clip 110 forwardly until the nose of the cartridge enters a groove 31 in the barrel 31 which guides the cartridge into the barrel (see Figs. 23 and 24). When the cartridge has been fired and the breech slide recoils, the empty cartridge is engaged by a hook 111 at the forward end of an extractor 112 to be described more fully hereinafter.

During recoil of the breech slide the firing mechanism is held disabled by operation of a disconnecter 120 shown separately in Figs. 14 and 15. The disconnecter 120 is held at the rear of the frame 1 in a tubular passage 14 formed in a portion 14 which connects both sides of the frame 1. A both sides of the passage 14 slots 151 and 152 are cut in the frame. An opening 176 and the slots 151 and 152 intersect between the passage 14 and the slots 151 and 141 (Fig. 8). The disconnecter 120 has a cylindrical upper portion 121 which slides in the passage 14. A pin 122 fixed to the cylindrical portion 121 extends through the opening 176 into the slots 151 and 141. At the bottom of the disconnecter 120 is a foot 123 adapted to extend through the upper bifurcated portion of the rear and rest on the trigger bar crosspiece 69. At the upper end of the disconnecter is a beveled nose 124 which is normally urged upwardly into a recess 28 in the breech block 27 by the trigger bar. When the breech block recoils after firing the disconnecter nose is cammed downwardly by the end of the recess 28 forcing the trigger bar to and rest in position in which it is inoperative to engage the ear 7, the trigger slide being held in inoperative position during the recoil and return movement of the breech block.

Associated with the disconnecter is a safety arrangement including the safety arm 130, and a magazine actuated lever 130, and a bell crank 140. The lever and bell crank are pivoted on the hammer pivot pin 82. The bell crank 140 and the lever 130 each have upper horizontal arms 141 and 131 respectively, which lie in the slots 142 and 132 in the upper rear end of the frame 1. The breech slide has corresponding slots 132 and 142 into which the lever 130 and bell crank 140 respectively may extend. Just forwardly of the bolt 10 there is located in the breech block a plunger 133. At its lower end the plunger 133 has a nose 134 which extends into the lever receiving slot 132. The top of the breech block 27 has a circular recess 135 having overlying shoulders 136 and 137 which provide a bayonet type socket for a sight member 150. The sight member comprises a generally cylindrical portion 151 which carries the sight proper 152. At the front and back ends of the sight member are actuated flanges 153 which make a bayonet fit under the shoulders 136. Extending forwardly from the cylindrical sight portion 151 is an arm 154 having a curved forward end adapted to snap into a curved recess 155 on the top of the breech block 27 thereby locking the sight member in position. The plunger 134 lies in a passage between the bayonet socket 135 and the slot 132 into which the lever 130 extends. The plunger is urged downwardly by compression of a spring between the cylindrical sight member 151 so that the plunger nose 134 abuts the lever arm 131, urging the lever downwardly from the position shown in Figs. 3 and 7 to 9. In the downward position (not shown) the arm 131 is urged against the disconnecter cross pin 122 thereby pushing the disconnecter foot 123 against the trigger bar portion 69, disconnecting the trigger bar from the rear 7, and holding the bar in its inoperative down position. When the magazine 110 is inserted in the pistol it engages the lever arm 131 forcing it into inoperative position thereby permitting the trigger bar to lift the disconnecter to normal position. If the magazine is removed the lever arm 131 automatically drops, rendering the trigger inoperative.

The safety bolt 10 shown in Figs. 1 and 16 to 19 comprises the usual finger lever 101 and a bolt 102 which extends through the breech block 27 (Figs. 5 and 6). The end of the bolt remote from the finger lever 101 is provided with two similar flats 103 opposite the rear end of the extractor 112. The extractor 112 has a hook 113 which fits in a recess in the breech block 27. The safety bolt 102 abuts the rear end of the extractor assisting in holding it in place with the hook in the breech recess. Re-cessed in the extractor 112 is a spring-urged plunger 114 adapted to engage either one of the flats 103 accordingly as the finger lever 101 is in the up or off position as shown in Figs. 1 and 5, or in the down position as shown in Fig. 6. As can be seen in Figs. 7 to 10, the bolt passes through the slots 132 and 142 in the breech block 27 in which the lower 136 and bell crank 140 extend. On the section shown in Fig. 19 the bolt 101 is slotted at 104 to clear the lever arm 131 when the bolt is in either off or safe position. At the section shown in Fig. 17 the bolt is slotted at 105 so that in the off position of Figs. 16 to 19 clearance is provided for the upper arm 141 of the bell.
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crank 140. However in the down or safe position of the safety the bolt engages the upper arm 141 of the belt crank 140 thereby swinging it clockwise as viewed from the right-hand side of the pistol. When so rotated the upper end of the belt crank 140 engages the pin 122 extending through the disconnector 120 and forces the disconnector downwardly until its foot 123 engages the cross piece 69 of the trigger bar 6 and moves the trigger bar to the operative position shown in Fig. 10. The belt crank 140 also has a lower arm 143 with a cam nose 144 (Fig. 10) opposite the lower arm 72 which engages the hammer notches. When the belt crank 140 is rotated clockwise by turning the safety to downward position the nose 144 pushes the lower nose 72 out of the hammer notch thereby releasing the hammer. The hammer would then strike the firing pin 9 except for a further safety feature described below. However, the cam arm 143 may be omitted if desired.

Approximately on the center line of the pistol and on the center line of the firing pin 9 a passage 107 is formed and shown in Fig. 18. As shown in Figs. 3, 5 and 6, the rear end of the firing pin normally extends through the passage 107 into a cutaway portion 108 adapted to receive the hammer. However, when the safety bolt is rotated to the position shown in Fig. 6, the cutaway portion 108 is replaced by the periphery of the bolt 10 which moves the passage 107 into the path of the hammer 8 and blocks it from striking the pin 9 (see Figs. 6 and 29). In addition a pair of overlying shoulders 109 forming a dove-tailed notch in the bolt 10 are swung around an annular rib 92 on the firing pin 9 thereby gripping the firing pin and holding it against forward or rearward movement. When so gripped the firing pin cannot be moved either by impact of the hammer or by jarring of the gun. The slot 105 is angularly related to the dovetail such that the pin is gripped prior to actuation of the beltcrank 140 extending in the slot 105.

In summary, the cooperative safety features operate as follows:

The disconnector 120 may be urged downwardly disconnecting the trigger from the sear either by removal of the magazine 110, by recoil of the breech slide, or by actuation of the safety 10. The trigger bar 6 is urged to its downward, inoperative position either by the disconnector 120 or by the hammer 8 during the firing movement of the hammer. If the safety 10 is rotated to safety position, only is the disconnector urged downwardly disconnecting the trigger bar and trigger, but in addition the bolt moves into the path of the hammer 8 obstructing it so that it cannot strike the firing pin 9 and the firing pin is firmly gripped so that it cannot be moved by any accidental force.

Figs. 29 to 37 illustrate how the novel features shown in the double action pistol of Figs. 1 to 28 are applied to a single action pistol which must be hand cocked initially. Since the breech slide, barrel and safety assembly of the single and double action models are interchangeable, only the firing mechanism of the single action model need be described. A modified trigger 50 is pivoted on a pin 59a at its upper end. Extending downwardly through the trigger is a passage 161 in which slides a plunger 58 urged downwardly by a spring 162. The lower end of the passage 161 connects with a slot 163 which receives the neck 61a of a modified trigger bar 6. A pin 164 fixed transversely in the trigger bridges the slot 161 and a notch 164 in the trigger bar neck 61a fits over the pin 164 thereby pivotally connecting the bar to the trigger. At the upper, open end of the trigger passage 161, a lug 166 struck in to the passage forms a bayonet socket for a block 167 having a shoulder 168 adapted to be rotated under the lug 166 after the block is inserted in the passage 161. The spring 162 will be compressed between the block 167 and the top of the trigger bar neck 61a yieldingly holding the bar and trigger as if assembled with the end of the neck 61a abutting the wall of the passage 164 as shown in Fig. 29.

When the trigger is pulled the trigger bar will be swung upwardly until its cross piece 69a abuts the lower surface or abutment 171 of a modified sear 7a. Thereafter the bar will be held at its end by a recess formed in the arm 166 of the sear 7a which will be pressed rearwardly until the cross piece 69a strikes the forwardly facing surface of a shoulder 72 at the bottom of the sear, thereby disengaging the sear from the hammer 8a.

As shown in Figs. 34 to 36 the sear 7a has the usual hammer engaging slot 72 at its upper end and a transverse opening for its pivot pin 71 (see Figs. 29, 32 and 33). A slot 70a admitting the disconnector of Fig. 37 opens on the front and rear sides of the sear. The sear is urged clockwise by a spring plunger confined in a block 80a integral with a frame attachment 80 like attachment 80 of Figs. 1 to 28.

As shown in Fig. 37 the modified disconnector 120a has a rearwardly extending arm 126 as well as a cross pin 122a and a foot 123a similar to that of Figs. 14 and 15. When assembled in the single action firing mechanism the sear pivot 71 passes through an elongated slot 120a of the disconnector allowing the disconnector to slide lengthwise with its nose 124 in the breech recess 29 (Fig. 33) or with its foot 123a depressing the trigger bar 6a (Fig. 32). The passage 164 extends through the forward opening of the sear slot 70a in the hammer 8a of Fig. 38. A surface 8a at the top of the slot swings against the arm 126 as the hammer strikes thereby depressing the disconnector as the pistol is fired and swinging the trigger bar 6a to inoperative position.

After the hammer has fired the pistol and the breech 2 recedes the modified disconnector 120a is held down by the breech block as previously described with reference to the double action model. The foot 123a of the disconnector continues to engage the bar cross piece 69a holding the bar 6a out of the operative position shown in Fig. 3 and in the inoperative position shown in Fig. 32, wherein the sear 7a is released to engage the hammer. Thereafter the breech slide relocks the hammer swinging the hammer surface 8c out of engagement with the disconnector arm 126 and permitting the disconnector to rise as soon as the slide returns to forward position. However, if the trigger remains pulled at the end of the cocking cycle the trigger bar will be held down after the disconnector is engaged by the shoulder 72a on the sear 7a (Fig. 33). As in the double action pistol, the trigger must be released before the bar can be returned to operative position.

As in the double action model of Figs. 1 to 28, the single spring-urged plunger 58a serves to hold the trigger bar in floating relation to the trigger, to elevate the bar when the trigger is pulled, and to urge the trigger and bar to normal position when the trigger is released. Also the modified disconnector 120a is provided with the previously described cross pin 122, so that the single action embodiment of Figs. 29 may be provided with the safety lever 130 and bell crank 140 of the double action model if desired.

In both the single and double action models the hammer when released moves the trigger bar to inoperative position. In the double action-the friction surface of the notch 79 engages the bar directly whereas in the single action the hammer surface 8e engages the arm 126 of the modified disconnector 120a which in turn depresses the trigger bar.

The safety mechanism of the single and double action models is particularly advantageous if it is desired to load the barrel by hand or if jammed cartridges are anticipated. In either case the safety may be placed in safe position regardless of the position of the breech slide or the hammer. Thus if the slide 2 has been manually retracted and a cartridge inserted in the barrel, the
safety may be moved to safe position before releasing detent arm 53 which holds the breech slide retracted. The firing pin will be gripped and guarded by the safety bolt so that it cannot fire the inserted cartridge, and the hammer will be dropped safely when the breech slide returns to position. Or if the breech slide has been returned to closed position the hammer may be safely dropped by using the safety, rather than by pulling the trigger and attempting to drop the hammer by hand. Similarly, if the breech slide is jammed open or closed the safety can be thrown on before attempting to unjam the gun. In any case accidental closing of the slide or dropping of the hammer is completely without hazard if the safety is on.

The firing mechanism parts, comprising the trigger, trigger bar, sear, disconnector, and hammer, are of both the single and double action models are designed so that they are symmetrical on a vertical plane extending through the center of the pistols. Thus, where a part such as the sear or bar straddles a part such as the hammer or disconnector, the straddling portions are duplicated so that the pistol is balanced on its center line.

I claim:

1. In a firearm of the type automatically recolled on recoil, a frame, a breech member slidingly mounted on the frame, a firing mechanism comprising a hammer, a sear releasably engaging the trigger, a spring yieldingly urging the sear toward hammer engaging position, a trigger, a trigger bar for connecting the trigger and sear, said sear being pivotally supported at one end by the trigger to swing between an inoperative position and a position operative to engage the sear, said sear having an abutment holding said bar in inoperative position after said trigger is pulled to release the hammer and after said hammer is recolled by recoil, so that said sear may re-engage the hammer and prevent repeated firing if the trigger remains pulled, and a disconnector mounted on the frame and having at one end a cam nose in the path of the breech member and opposed to said bar to move said bar to inoperative position when said cam nose is engaged by said breech member on recoil, thereby to disconnect the trigger and bar from the sear during recoil, a lever pivoted on the frame in engagement with said disconnector, and a safety bolt rotatably mounted in said breech member and having a cam section for moving said lever when the safety bolt is rotated to safe position thereby to move said lever and disconnector and disconnect said trigger bar from said sear.

2. In a firearm of the type automatically recolled on recoil, a frame, a breech member slidingly mounted on the frame, a firing mechanism comprising a hammer, a sear releasably engaging the hammer, a spring yieldingly urging the sear toward hammer engaging position, a trigger, a trigger bar for connecting the trigger and sear, said sear being pivotally supported at one end by the trigger to swing between an inoperative position and a position operative to engage the sear, said sear having an abutment holding said bar in inoperative position after said trigger is pulled to release the hammer and after said hammer is recolled by recoil, so that said sear may re-engage the hammer and prevent repeated firing if the trigger remains pulled, and a disconnector mounted on the frame and having at one end a cam nose in the path of the breech member and opposed to said bar to move said bar to inoperative position when said cam nose is engaged by said breech member on recoil, thereby to disconnect the trigger and bar from the sear during recoil, a lever pivoted on the frame in engagement with said disconnector, and a safety bolt rotatably mounted in said breech member and having a cam section for moving said lever when the safety bolt is rotated to safe position, thereby to move said lever and disconnector and disconnect said trigger bar from said sear, said firing pin having a forwardly facing rib near its after end, and said safety bolt having an opening therethrough receiving said pin end and shoulder and means on the bolt forming a shoulder rotatable with the bolt into engagement with said pin rib thereby to block forward movement of the pin when said bolt is in safe position.

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