

March 2, 1965

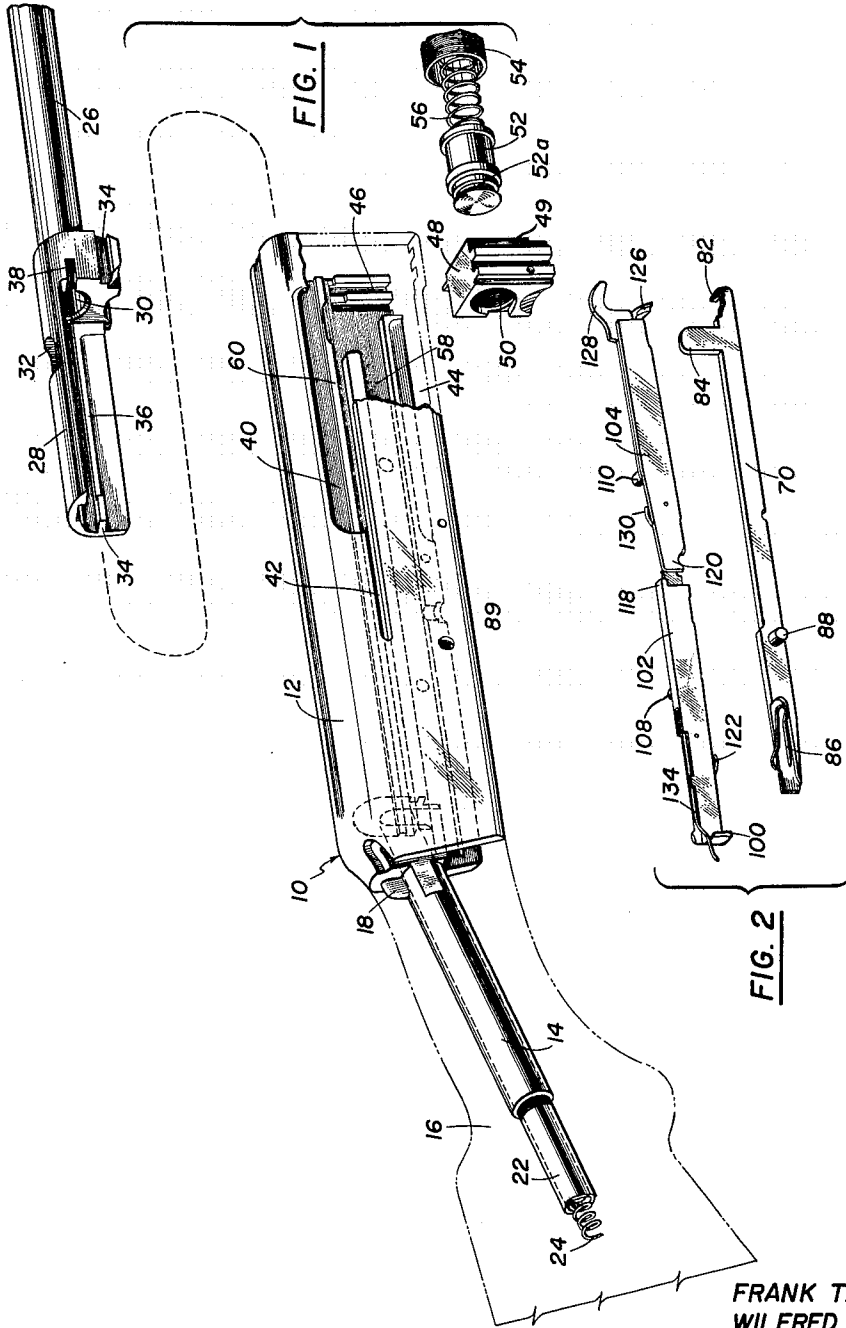
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3,171,225

AUTOMATIC SHOTGUN

Filed May 10, 1963

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

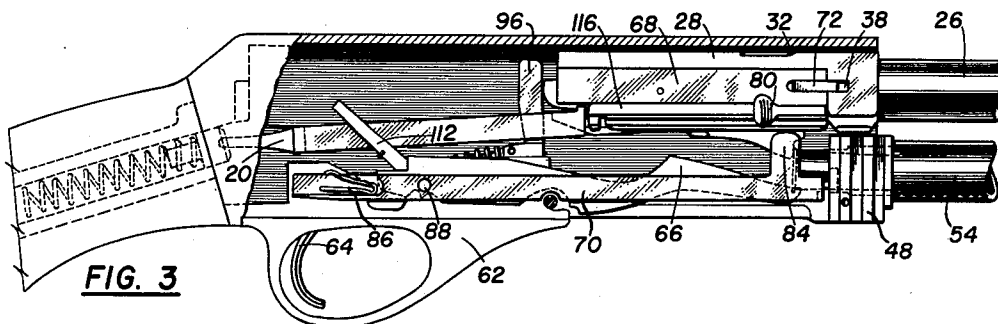


FIG. 3

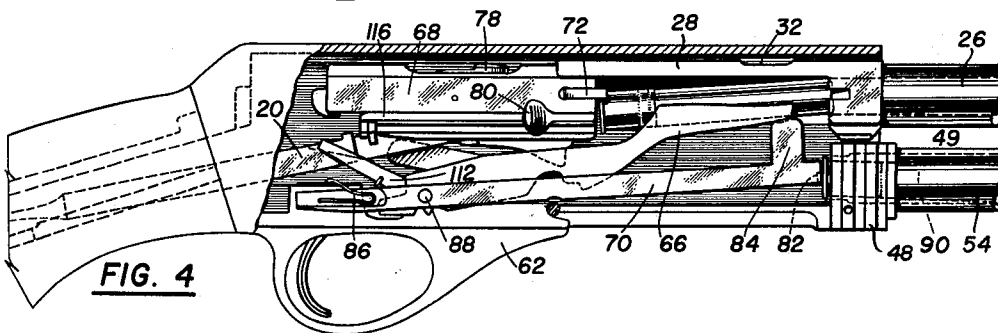


FIG. 4

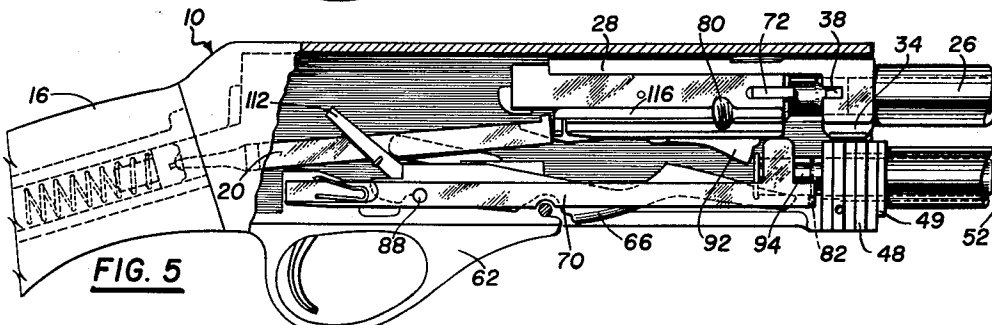


FIG. 5

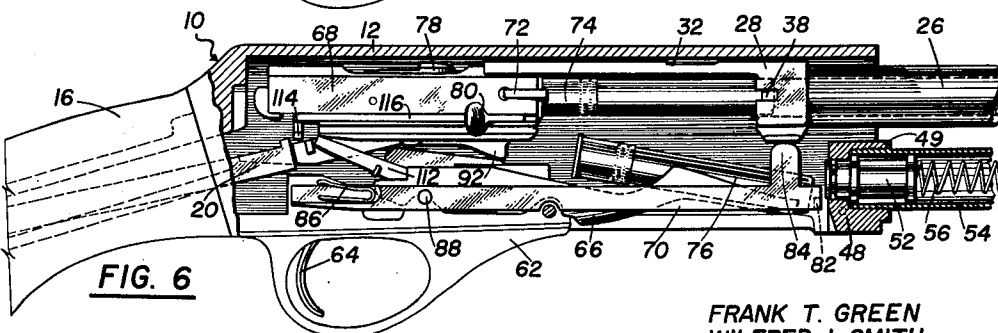


FIG. 6

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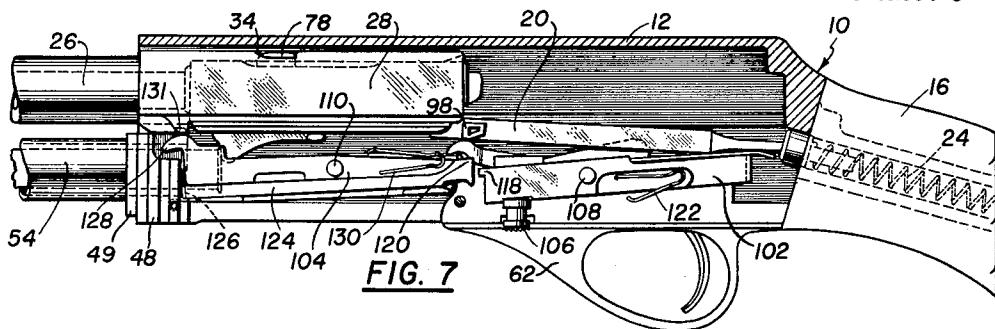


FIG. 7

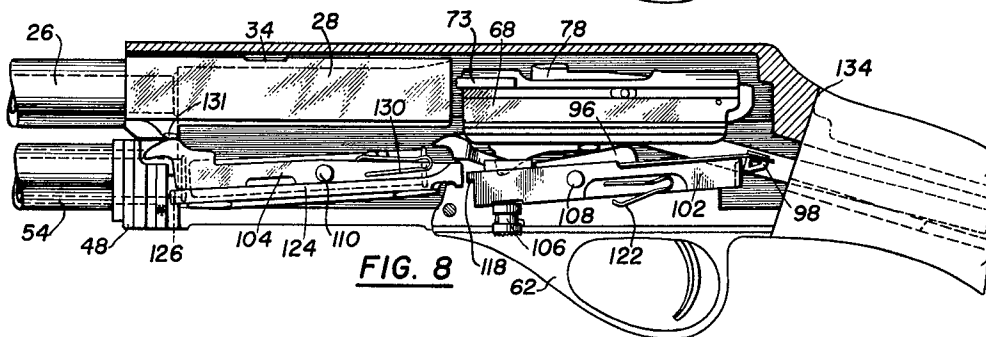


FIG. 8

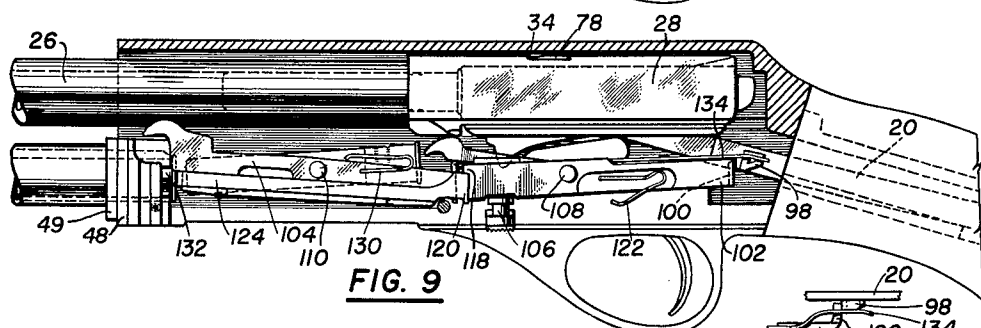


FIG. 9

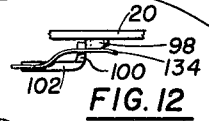


FIG. 12

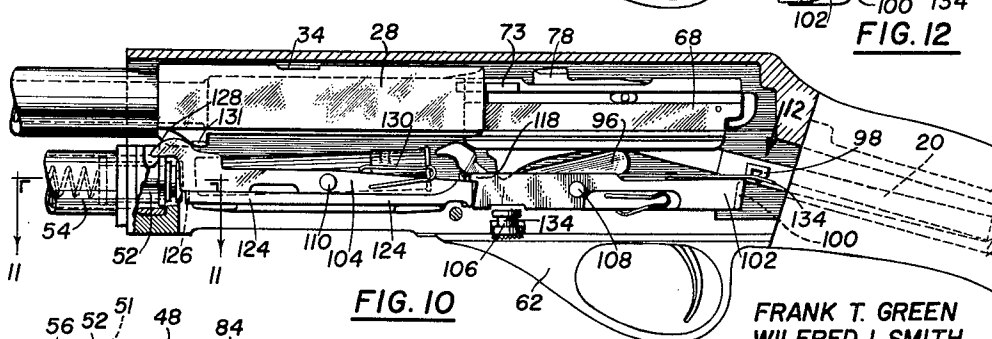


FIG. 10

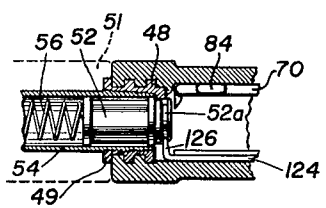


FIG. 11

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**AUTOMATIC SHOTGUN**

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Filed May 10, 1963, Ser. No. 279,391

8 Claims. (Cl. 42—17)

This invention relates to new and improved loading and firing mechanisms for automatic shotguns of the recoil type, and the general purpose of the invention is to provide new and improved loading and firing mechanisms providing for more efficient, faster action and for greater safety in the operation of the firearm as well as provision for positively preventing malfunctions, particularly during the loading operation, and also in new and improved linkages providing for holding the bolt open upon the firing and ejection of the final cartridge.

This firearm includes a magazine tube provided below the barrel with access to the magazine tube through a receiver loading port in which a lifter or carrier device is positioned for transferring cartridges from the rear end of the magazine tube upwardly into position to be engaged by the bolt and loaded into the breach of the barrel. This firearm has a recoiling barrel and barrel extension which recoil upon the firing of the cartridge in the breech, retracting the bolt and spent cartridge, and novel means to temporarily hold the bolt open during ejection and reloading of the next cartridge, and then, the bolt holding means being inactivated by the action of the barrel extension, the bolt is returned to breech closed position and locked.

One of the objects of the present invention resides in the provision of a new and improved means for providing against unwanted rearward motion of cartridges in the magazine under influence of the magazine spring while the loading action is taking place, and until the spent cartridge is ejected.

A further object of the invention resides in the provision of a new and improved vertically acting linkage which feels the presence or absence of a cartridge in the magazine and having means associated therewith for causing the bolt to remain in fully open position on the last cartridge being fired and ejected, ready for succeeding loading operations.

Other objects of the invention reside in certain details and combinations of parts such as for instance a new and improved magazine and magazine mount which is applied in a certain novel manner to the forward portion of the receiver.

The invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly set forth in the appended claims.

Reference is to be had to the accompanying drawings, in which

FIG. 1 is a perspective exploded view illustrating the respective association of the barrel, barrel extension, magazine tube and magazine tube mounting block;

FIG. 2 is a composite view illustrating the right and left-hand cutoff assemblies in their approximate relationship;

FIG. 3 is a view in side elevation showing the right-hand side of the receiver and associated parts, parts being broken away and in section and showing the firearm fully loaded;

FIG. 4 is a view similar to FIG. 3 illustrating the loading operation, particularly with respect to the bolt and the lifter mechanism;

FIG. 5 is a similar view showing the cartridge substantially moved to the breech position and the bolt not quite closed;

FIG. 6 is a similar view illustrating the position of a fired cartridge about to be ejected and a new cartridge in position to be lifted after the ejection;

FIG. 7 is a view in side elevation of the receiver showing the left-hand side thereof and illustrating the left-hand cutoff members in a position corresponding to that of FIG. 3 at the right-hand side;

FIG. 8 is a view similar to FIG. 7 showing the coaction of the same parts with the bolt fully retracted and locked in position;

FIG. 9 is a view similar to FIG. 8 illustrating the interaction of the left-hand cutoff linkage with the bolt fully retracted but in the act of lifting a subsequent cartridge to be loaded into the breech;

FIG. 10 is a view similar to FIG. 9 but showing the left-hand cutoff linkage in a position to release the bolt to allow it to be closed;

FIG. 11 is a horizontal section on line 11—11 of FIG. 10 illustrating the cutoff slide in position with the magazine empty, and

FIG. 12 is a detail view of the bolt locking means, looking in the direction of arrow 12 in FIG. 10.

Referring now to FIG. 1 there is here shown the general parts of the firearm including the frame 10, this frame including the receiver 12 and a fixed tubular member thereon at 14 for receiving the action rod, this being received in the stock 16. The tube 14 has an upwardly extending extension at 18 which is received in a notch in the stock in order to prevent any twisting or rotary motion of the stock relative to the receiver or frame. The action rod itself is indicated at 20 (FIGS. 3 to 6), and it is adapted to be received in a tube 22 secured to the sleeve 14. This action rod has an action rod spring 24 tending to move it forwardly at all times but yielding to allow the action rod to be retracted when the bolt is retracted when the gun is fired.

The barrel is shown at 26 and this barrel has at its rear portion thereof an extension assembly 28. As indicated, this extension assembly is adapted to be guidably slidable within the receiver, the receiver having a forward open end. The interior of the receiver is provided with certain grooves and ribs for guidably sliding the extension assembly 28. The breech is indicated by the reference numeral 30. There is a recess in the top wall of the extension assembly 28 as at 32 and this receives and locks the bolt when closed, i.e., when the breech is loaded and the gun is ready to fire. Also the assembly is provided with various guides and grooves at 34, and a seat at 36 for cooperative relative sliding arrangement with respect to the bolt and a portion of the receiver. The barrel extension assembly also has a recess 38 to receive the extractor on the bolt when the bolt is fully forward and in loaded condition of the firearm as will be explained hereinafter.

The reference numeral 40 indicates the receiver ejection port and this has an extension at 42 to accommodate the manual button or fingerpiece of the bolt by which the bolt can be worked manually. Also the lower portion of the receiver is open as at 44, this being the loading port, and at the forward end of the receiver it is provided with a series of vertical grooves and slots 46 to slidably receive the magazine mounting block 48. This block is provided with the opening 50 to receive magazine follower 52 and of course also the cartridges which are loaded through port 44 through the opening 50 and into the magazine tube 54. The magazine follower spring is indicated at 56 and it will be apparent how these parts are assembled. The barrel and magazine tube can be assembled in any way desired (not shown) and the cartridge lifter assembly, the right and left-hand cutoffs, the trigger assembly, etc. all to be hereinafter described are also as-

sociated in and operatively arranged with the receiver and particularly with longitudinal slots and grooves which are indicated in general in FIG. 1 by the reference numeral 58, there being such grooves and lands as are required in order to carry out the proper functioning of the fire-arm. The numeral 60 is a fixed rib slidably receiving the slot 34.

Referring now more particularly to FIGS. 3 to 6 inclusive, these figures illustrate the operation of the parts of the gun including the lifter and the right-hand cutoff assembly. The trigger plate is shown at 62 and the trigger at 64 but the trigger, sear, hammer, etc. are not novel except in their interrelationship with the other parts in the case, and not shown in great detail. The lifter is shown at 66, the bolt at 68 and the right-hand cutoff member at 70. The bolt is provided with a pivoted extractor 72 shown holding the rim of cartridge 74 in FIG. 6 and in this figure this cartridge 74 is about to be ejected by the usual ejector, whereas cartridge 76 is just about to be lifted by the lifter 66 into the position of FIG. 4 to be moved into the breech by the bolt in its closing motion. The bolt is provided with a locking bolt 78 which is slightly movable relative to the bolt. This locking bolt locks with respect to the edges of the aperture 32 in the barrel extension assembly 28 when the gun is ready to fire as in FIG. 3. The bolt is also provided with a finger operating member 80 by which it can be manually manipulated.

The right-hand cutoff 70 is provided with a lateral extension or spur 82 and an upwardly extending projection 84. It also has a spring adjacent the rear end thereof at 86 so positioned as to normally tend to cause the same to rise at its forward end, about its pivot pin 88. However, when the bolt is forward as shown in FIG. 5, it bears down on projection 84 and depresses the cutoff 70, and takes the stop 82 out of the path of the magazine follower or cartridges being forced to the rear by the magazine follower spring, in which position it is located when the bolt is to the rear as in FIG. 4, in which case spring 86 causes the cutoff 70 to move in a counterclockwise direction (see FIG. 4), bringing the stop 82 into the path of the magazine follower or cartridge in the magazine tube. Thus as shown in FIG. 4 the right-hand cut-off 70 stops a succeeding cartridge which is indicated in FIG. 4 at 90, from proceeding any further than as shown in FIG. 4 under influence of the magazine follower spring, so that ejection can take place and the lifter and corresponding parts may operate to reload as for instance with cartridge 76 in FIG. 6 without interference. However when the bolt has been returned to its loaded position in FIG. 3, the extension at 84 being engaged by the bolt, causes the right-hand cutoff to descend to the FIG. 5 position, wherein the stop 82 clears the path of the next cartridge. At the same time a cartridge stop 92 on the bolt engages cartridge 94 as seen in FIG. 5, and prevents the same from moving any farther backwards but allowing it to be quickly moved to the position of cartridge 76 in FIG. 6 to be lifted to loading position upon the bolt retracting once again.

As the barrel and bolt move rearwardly together, the locking bolt 78 becomes unlocked from the aperture 32 and the bolt folds the hammer backwardly, the hammer being shown in FIG. 8 at 96. This hammer of course is mounted on the usual hammer pivot-pin and operates in more or less the usual manner, the trigger having a sear, etc., which is familiar to those skilled in the art and will not be further described herein. The unlocking of the bolt 78 is accomplished by the action rod 20 which as it retracts with the bolt, changes its angle, compare FIGS. 3 and 6, and by linkage (not shown), retracts the bolt 78 sufficiently to allow the barrel to move forward under the action of the usual recoil spring.

The bolt 68 moves the action rod 20 against its spring 24 down and to the rear. If the gun is not loaded, the bolt 68 is held in its retracted position by a lug 98 on

the action bar 20 bearing against a turned-in foot 100 on a link 102 forming a part of the left-hand cutoff assembly which also includes a pivoted link 104. The bolt will be held in its retracted position by this means until released by the manual button 106 which extends downwardly out of the receiver on the left-hand side and engages the link 102 so that when it is pushed upward it moves the same (see for instance FIG. 8), releasing the foot 100 from the lug 98. The link 102 is pivoted on a pin 103 mounted on the receiver and the link 104 is pivotally mounted on a similar stud 110 also mounted in the receiver. Links 102 and 104 are vertically arranged and their pivot pins are horizontal.

The reference numeral 112 indicates the lifter pawl which is engaged by a member 114 on the operating bar 116. Incidentally, the bolt operating element 80 is mounted on this operating bar 116 but the operating bar 116 in general moves with the bolt and moves the bolt. The member 114 in moving forwardly with the bolt engages the rear end of the lifter pawl 112 as seen in FIG. 6, and this causes the lifter to lift the shell as described. As the bolt continues forward, pushing the cartridge into the breech, the pawl 112 is spring-pressed in such a way as to allow member 114 to rise over it to the rear without effecting it.

The forward end of the lever 102 is provided with a projection 118 which is engaged by the rear end portion 120 of the link 104 (see FIG. 9). This tends to hold the lever 102 in a clockwise tilted position against the action of a spring 122 so as to disengage the lug 98 with respect to the member 100. The bolt is thus temporarily locked in retracted position long enough for the barrel and extension to return to forward position and allow time for the ejection and reloading steps. This occurs as long as there is a cartridge in the magazine. On the other hand, however, if the engagement of the rear end of lever 104 with the projection 118 at 120 does not occur as indicated in FIG. 7, then this spring 122 causes the rear portion of lever 102 to be projected upwardly into the locking position with respect to the lug 98 (see FIG. 8), and this is permanent until the gun is reloaded and pin 106 pressed. The bolt is held open in this condition after the last shot because of the fact that there is no cartridge in the magazine.

This action is occasioned by reason of a cutoff slide 124 which has an inwardly directed foot 126 (see FIG. 11). The slide 124 is mounted on lever 104, but slides on it. The lever 104 has a forward nosepiece 128. Also, a spring 130 tends to hold the lever 104 as shown in FIG. 9, but the lever is moved down against the action of the spring 130 by the barrel extension which has a cam at 131 at its forward end for this purpose. When the barrel extension moves to the rear, cam 128 is released so that the lever 104 tends to turn in a counterclockwise direction under influence of its spring, but when the barrel returns to normal forward position, the cam at 131 moves the lever down at its forward portion, and thus also moves the cutoff slide 124 downwardly. The foot 126 thus is moved out of the range of the next cartridge, for instance indicated at 132 in FIG. 9. The magazine follower 52 has a reduced portion or groove in it at 52a, and if no cartridge is in the magazine at all, then the foot 126 enters this groove. In other words, the turned-in foot 126 gauges the outside diameter of a cartridge 132 if it is present, maintaining the lever 104 in position so that it engages the projection 118, actuating link 102 to release the lug 98 on the action bar; but if there is no cartridge present, the inturned finger 126 is allowed to drop into the groove at 52a, then it causes a disengagement of the parts as seen in FIG. 8 which allows the spring 122 to raise the rear end of link 102 to be engaged by lug 98 and fail to be disengaged.

When lever 102 pivots so that the rear end thereof is lowered by the action of the rear end of lever 104 rising, this action causes a small spring at 134 to slip under the

lug 98 and provide for a positive release of these parts as otherwise there might be a malfunction involved by the lug sticking on occasion, see particularly FIG. 12.

Now assuming the parts are as in FIG. 3, the gun is fully loaded and cocked. Upon pulling the trigger, the barrel, barrel extension assembly and bolt as well as the spent cartridge shell all move to the rear as a unit, perhaps as best seen in FIG. 6. The next cartridge 94 (FIG. 5) is released from stop 92 and starts to move to the rear.

When the unit of bolt, spent cartridge and barrel reach the rear position, the lock 78 releases the barrel extension and the barrel and its extension then reverse and move to the forward position under influence of the usual recoil spring. This allows the ejection to take place and the lifter to raise cartridge 76 from FIG. 6 to FIG. 4 position for loading.

As the bolt moves to the rear, the extension 84 on the right-hand cutoff assembly is released and as the cartridge stop 92 on the bolt has released the next cartridge in the magazine which is then moved to the rear over the lifter by the magazine follower spring, the third cartridge is stopped by finger 82 on lever 70 (see FIG. 4). Then when the bolt returns, the stop 92 engages the third cartridge as at 94 in FIG. 4.

The left-hand cutoff assembly has operated as is above described in order to release the bolt from its temporary lock and it moves forwardly, following the barrel. The bolt moves forwardly under action of the action bar and the action bar spring. The gun is now once more ready for firing, the parts being again as in FIG. 3, and the action is repeated until the magazine is emptied, at which time the cutoff slide 124 of the left-hand cutoff assembly associated with lever 104 therein acts to prevent engagement of projection 118 by the rear end of lever 104 in such a manner as to allow the lug 98 on the action bar 20 to positively engage at 100, i.e., the rear end of the link 102, holding the bolt open in the rearwardmost position with the gun unloaded.

The pivot pin or stud 88 for the right-hand cutoff lever 70 is permanently secured to the lever as for instance by welding, and it extends into the aperture 89 in the receiver (see FIG. 1). This aperture acts as a bearing for the pin. The pivot pins or studs 108 and 110 for the left-hand cutoff levers 102 and 104 are likewise fixed to their respective levers and are mounted in apertures in the receiver at the opposite side thereof. These parts are all conveniently retained by other parts in the receiver such as the trigger plate assembly and the magazine mount, and this construction does away with the conventional screw mounted pivots which tend to loosen due to vibration and friction-torque.

The bolt is provided at its front face with a projection 73 (see FIG. 8) which is opposite the extractor 72. This projection causes short cartridges to remain with the bolt on the retraction thereof until the rim of the cartridge strikes the ejector. A short hull (fired cartridge) as for instance a two-and-a-half inch .410 would otherwise tend to pivot out at its forward end and jam as soon as it clears the breech, but with the projection 73, in combination with the extractor, the short hull is retained long enough to eject properly. A longer hull three inch .410 is retained by the barrel until the ejector is reached and thus does not necessarily benefit from the presence of projection 73.

The magazine mounting block 48 has a rectangular forward projection 49 which extends slightly in advance of the end of the receiver and is less in width than the receiver (see FIG. 11). The usual wood or plastic fore-end (not generally shown but indicated in dotted lines in FIG. 11), is recessed to accommodate this projection and this properly positions the fore-end and prevents any interference with free action of the barrel as may happen if the fore-end should tend to twist.

Other parts of the firearm not described are more or less as is usual in this type of firearm and it will be

believed that the above description will be clear to those skilled in the art.

As above described, it will be seen that the objects of the invention have been carried out. It is to be particularly noted that both right-hand and left-hand cutoff assemblies operate in a vertical direction rather than a horizontal direction as usual and thus allow the receiver to be smaller and the parts more compactly arranged in the receiver. All of the parts accomplish their function by a minimum of motion so that the action is extremely fast but on the other hand the action of all of the parts is very positive so that malfunctions are limited to a minimum as compared with automatic firearms of this general type. By the use of the present mechanism, the parts are more easily made with fewer surfaces that have to be ground and filed, so that the mechanism provides an accurately operating, fully freely functioning firearm which is inexpensive to make as to the formation of the parts and as to assembly thereof.

Having thus described our invention and the advantages thereof, we do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what we claim is:

1. In a firearm of the recoil type comprising a receiver, a barrel, a barrel extension, a bolt retracting with the barrel and barrel extension, a cartridge lifter, a magazine, a follower, a follower spring, the follower spring urging cartridges into position for the lifter to move the same in front of the bolt for the bolt to move into the breech of the barrel, means temporarily holding the bolt in its open position for reloading as the barrel and extension return to original position, means releasing said bolt holding means comprising a left-hand cutoff assembly, a cam on the barrel extension at its forward end actuating the left-hand cutoff assembly to release the bolt upon return of the barrel and extension to original closed breech position, the left-hand cutoff assembly including a cooperating cam located at the forward portion of the receiver.

2. A firearm as recited in claim 1 wherein said cutoff assembly includes a vertical lever, a horizontal pivot pin therefor, and the cutoff assembly cam includes an extension at one end of the lever to be engaged by the cam on the barrel extension at the finish of the barrel motion to original position.

3. In a semi-automatic firearm of the type including a receiver, a recoiling barrel, a magazine tube associated with the barrel, trigger mechanism, a reciprocating bolt in the receiver, an action rod cooperatively associated with said bolt, a spring for said action rod, said bolt retracting the action rod and compressing the spring upon firing of a cartridge in the breech of the barrel, a rear extension on the barrel, a cam on said extension, means for temporarily holding the bolt in retractive open condition, means connecting the bolt to the rear barrel extension during the retractive action thereof, means disconnecting the bolt from the barrel extension, a recoil spring operating to return the barrel to normal position thus separating the bolt and the breech of the barrel and allowing ejection of a spent cartridge, an extractor on the bolt for extracting the spent cartridge from the breech, an ejector in the receiver,

the means for temporarily holding the bolt in open condition comprising a cutoff assembly comprising a pair of cooperating levers, said levers being mounted on horizontal pins, said levers each comprising a plate mounted in a vertical plane, one lever being in advance of the other and said levers being generally aligned with each other, means to temporarily cause said levers to interengage, said means being at the rear portion of the forward lever and correspondingly at the front portion of the rearward lever, interengaging means between the action bar and the rear lever at the rear portion of the rear lever, and means on the forward lever at the forward portion thereof

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for engagement and depression by the aforesaid cam on the barrel extension adjacent the final fully forward position of said barrel, said forward lever being otherwise free of said cam, and spring means raising said levers in a direction whereby the means on the action rod engages the means on the rear lever holding the action rod in retracted position and thereby holding the bolt in retracted position,

said cam actuating said forward lever in turn causing the rear end of the forward lever to engage the forward end of the rear lever and cause the latter to be moved in a direction to disengage the interengaging means between the action bar and the rear end of the rear lever, thus releasing the action bar and releasing the bolt, substantially at the point when the barrel has reached its normally fully forward position.

4. The firearm of claim 3 wherein the means to temporarily cause the levers to be interengaged includes a projection on one lever and a cooperating member on the other lever.

5. The firearm of claim 3 wherein the means to temporarily cause the levers to be interengaged includes a projection on one lever and a cooperating member on the other lever, and spring means adapted to be interpositioned between the interengaging means on the rear lever and on the action rod to provide for a positive release of said interengaging means.

6. A firearm as recited in claim 3 including a magazine follower, a magazine follower spring, there being a depression in said magazine follower, said magazine follower normally urging cartridges from the magazine into the receiver, and a cutoff slide associated with said forward lever, said cutoff slide having a member normally engaged with the side surface of a cartridge in the magazine if there is a cartridge in the magazine but otherwise normally engaging the depression in the magazine follower so as to have a different position from normal, said cutoff slide inhibiting the action of the forward lever from engaging with the front portion of the rear lever so as to cause the

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forward lever to fail to engage with said rear lever and thereby fail to cause the rear lever to disengage from the interengaging means on the action bar, whereby said bolt is constrained to stay retracted upon the emptying of the magazine.

7. A semi-automatic firearm of the recoil type comprising a receiver, a reciprocal bolt therein, a barrel, a barrel extension in the receiver, said extension having an engageable and disengageable locking relationship with respect to said bolt, the bolt and the barrel moving together upon the explosion of a cartridge in the breech of the barrel, a tubular magazine associated with said barrel, a wood fore-end covering the magazine, the magazine being generally parallel to the barrel, a magazine mounting block at the rear portion of the magazine, said magazine mounting block having two opposite sides, said two opposite sides being provided with parallel grooves and lands, said grooves and lands being straight, said receiver having a bottom open loading port closed at the forward portion thereof by said magazine mounting block, said receiver having substantially straight side walls having complementary grooves and lands with respect to the grooves and lands of the magazine tube mounting block, so as to receive the same in slidable condition with respect thereto for assembly and disassembly of the magazine tube and magazine block with respect to said receiver.

8. The firearm recited in claim 7 including a forwardly extending projection on the magazine mounting block, said projection extending in advance of the receiver, said wood fore-end being recessed complementary to the projection and being held against twisting thereby.

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