March 9, 1965 E. S. VARTANIAN 3,172,222

SELF-LOCKING CARRIER

Filed Jan. 7, 1964 2 Sheets-Sheet 1

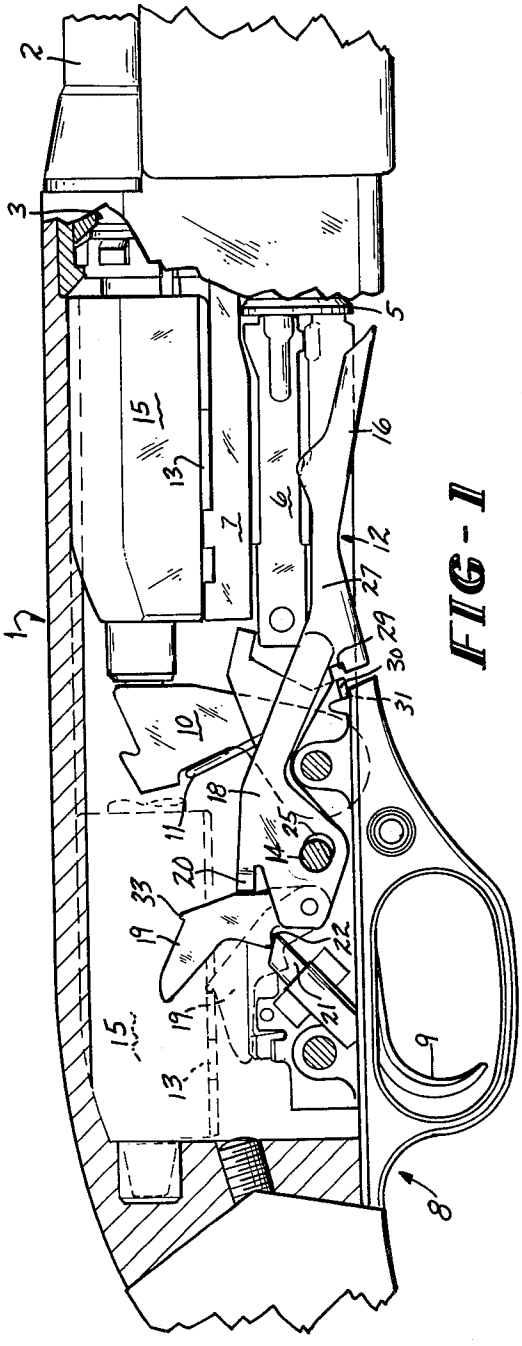


FIG-1

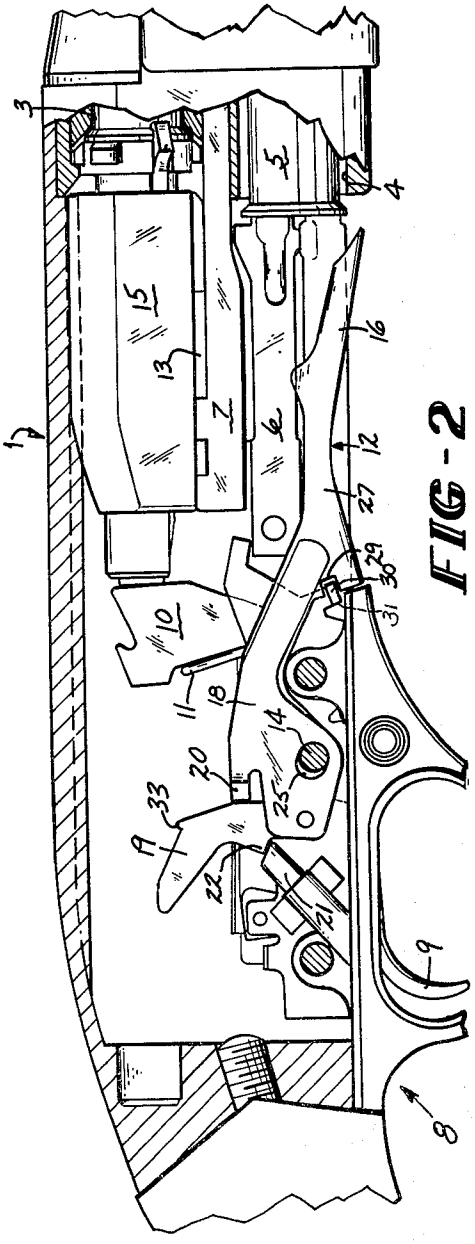


FIG-2

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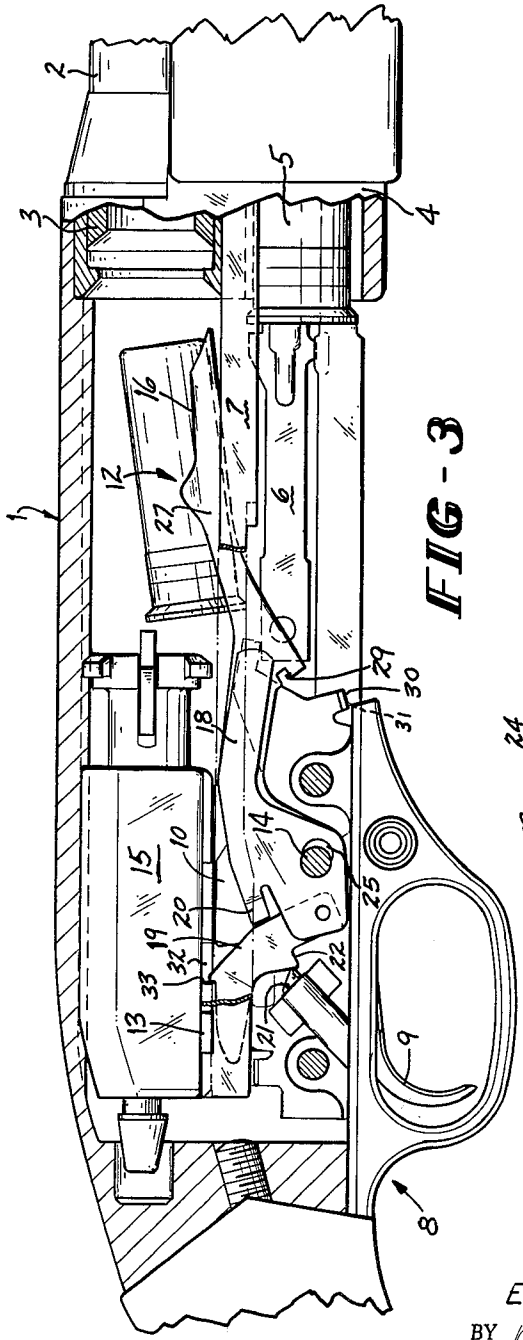


FIG - 3

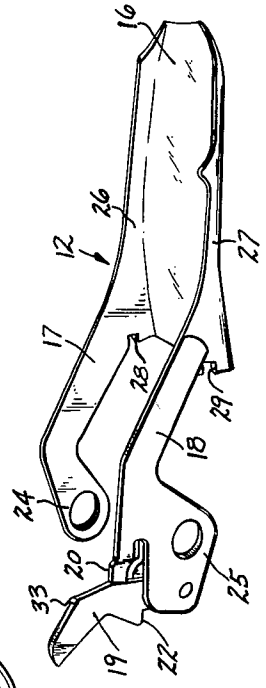


FIG - 4

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SELF-LOCKING CARRIER

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8 Claims. (Cl. 42—21)

This invention relates to new and useful improvements in firearms.

This invention more specifically relates to improvements in the shell carrier mechanism of firearms particularly of the automatic or semi-automatic type.

In automatic shotguns, after the gun is fired, the bolt is unlocked and is moved rearwardly by gas pressure directed against a piston mounted in the tubular magazine of the firearm. The piston is operatively connected to the bolt by one or more slide arms or the like. During its rearward movement, the bolt extracts the casing of the exploded shell from the chamber and ejecting means ejects the spent casing through an opening provided in the receiver of the gun. The rearwardly moving bolt also actuates means for feeding a cartridge from the magazine onto a carrier which is disposed beneath and just to the rear of the chamber. The carrier is normally disposed in an opening formed in the bottom of the receiver through which access may be had to the magazine for loading shells therein when the carrier is raised. After the bolt reaches the extent of its rearward travel, it starts its forward travel under the impetus of a closing spring which is normally positioned in the magazine tube and functions through the mechanism for opening the bolt to also close the bolt. During its forward travel, the bolt functions through an operative connection to the carrier to flip the carrier upwardly whereby a new shell positioned on the carrier is elevated into the path of the bolt. During its continued forward movement, the bolt carries the shell forwardly into the chamber in readiness for the next shot.

In certain firearms of this general type, it has been found necessary to provide a carrier lock mounted in the receiver and resiliently urge toward a position engaging the carrier to prevent premature upward movement of the carrier. The carrier lock usually incorporates a number of piece parts which are operatively connected between the carrier and the receiver. The carrier lock is normally disposed adjacent the carrier in such a position that it is moved to an inoperative position as soon as a shell is fed from the magazine tube onto the carrier. Another function of the carrier lock may be to lock the carrier in its downward position after the last shell in the magazine has been fired and thereby prevent the bolt from returning to its forward position. This function, however, may be accomplished by some other means such as by the magazine follower operatively locking and engaging the carrier after the last shell in the magazine tube has been expended.

As noted above, the usual type of carrier lock which has heretofore been known in the prior art is comprised of a plurality of piece parts, all of which add to the complexity and to the increased cost of the firearm. According to this invention; however, I provided a carrier which is automatically locked in position to prevent the carrier from rising prematurely before a cartridge has been properly positioned on the carrier without requiring additional piece parts or separate lock means.

It is a principal object of this invention, therefore, to provide a carrier locking arrangement which requires no additional piece parts other than the normal carrier structure itself.

Another object of this invention is to provide a carrier structure which is moved to a locked position by inertia forces while a cartridge is fed onto the carrier and which is automatically released from its locked position as the bolt moves forward toward the chamber.

It is a further object of this invention to provide a self-locking carrier in an automatic shotgun which is simple in structure, economical to manufacture and requires no additional piece parts other than the carrier structure itself.

It is a further object of this invention to provide an inerita operated locking carrier for a firearm.

These and other objects and advantages of my invention will become more readily apparent from the following detailed description and drawings in which:

FIGURE 1 is a sectional side view of a firearm showing the improved carrier structure according to this invention in its unlatched position just as the gun is fired.

FIGURE 2 is a view similar to FIGURE 1 showing the improved carrier structure according to this invention in its locked position immediately after recoil has occurred.

FIGURE 3 is a view similar to FIGURE 1 showing the improved carrier structure according to this invention after the forward movement of the bolt has released the carrier from its locked position and move it to its elevated position.

FIGURE 4 is a perspective view of my improved cartridge carrier.

Referring now to the drawings and particularly FIGURE 1, I provide a firearm having a receiver generally indicated 1. The bottom of receiver 1 is open to provide access to the interior of the receiver. Secured to the forward portion of receiver 1 is a barrel 2. Barrel 2 is provided with a chamber 3 which opens into the interior of the receiver. Mounted below the barrel 2 is a tubular magazine 4. The tubular magazine 4 is provided with a conventional magazine spring and spring follower (not shown) operative to urge cartridges in the magazine rearwardly toward the receiver. Magazine 4 accommodates a plurality of cartridges 5, only one of which is shown in the drawing. The cartridges 5 are selectively fed into the receiver 1 by a pair of cutoffs 6 only one of which is shown in the drawing. The cutoffs 6 are operated to selectively feed cartridges into the receiver by a pair of slide arms 7 only one of which is shown in the drawings. The rearward portion of the opening in the bottom of receiver 1 is closed by a trigger assembly generally indicated 8. The trigger assembly 8 includes a trigger 9, hammer 10, sear means (not shown), a hammer spring 11, and other well-known and essential components of a trigger assembly which forms no part of this invention but which are disclosed to provide sufficient background for my invention. The forward portion of the magazine opening is closed by means of a cartridge carrier 12, the details and construction of which will be described in detail below. Mounted above the trigger assembly and shell carrier is a bolt assembly 15 which includes a firing pin and extractor means. Bolt assembly 15 is mounted for reciprocal sliding movement in the receiver and is actuated by slide arms 7 connected to the bolt assembly through a bolt carrier plate 13. Slide arms 7 are actuated by means of a gas piston (not shown) mounted in the forward portion of the magazine 4.

The mechanism described thus far forms no part of the invention and has been referred to only to provide sufficient structural background for my invention which will now be described in detail. Pivotally mounted in the trigger assembly 8 by means of a pivot pin 14 is my improved carrier structure 12. Carrier 12 includes a tray 16 and a pair of bifurcated support arms 17 and 18. Pivotally attached to support arm 18 is a pawl 19. The pawl 19 is normally urged toward a projection 20 (note FIGURE 4) on support arm 18 which limits the forward

movement of the pawl 19. A spring biased plunger 21, which is mounted in the trigger assembly 8, engages an abutment 22 on the pawl 19 to normally urge the pawl 19 toward its forward position in engagement with projection 20. In order to pivotally mount the carrier 12 on pivot pin 14, I provide a pair of aligned, oval-shaped elongated openings 24 and 25 in the support arms 17 and 18, respectively. The elongated openings 24 and 25 are inclined somewhere between an angle of 0 and 45° to allow a slight upward movement of the carrier as it moves rearwardly. The elongated slots, inclined in the manner indicated, allow the carrier to move back and forth on pivot pin 14 so as to provide a lost motion connection between the carrier 12 and the mounting pivot pin 14. The tray portion 16 of the carrier is provided with a pair of vertical wall portions 26 and 27 which merge into the support arms 17 and 18. Slots 28 and 29 are formed in the vertical wall portions 26 and 27 which are engaged by projections 30 and 31 extending forwardly from the trigger housing. When the projections 30 and 31 are interlocked in slots 28 and 29, the carrier 12 is locked in the position illustrated in FIGURE 2 and can not move upwardly. When the carrier 12 is moved slightly forward, due to the lost motion connection, projections 30 and 31 are released from slot 28 and 29 and the carrier is free to rise in the manner illustrated in FIGURE 3.

In operation, my improved cartridge carrier functions as follows: Referring now to FIGURE 1 of the drawings, I show the cartridge carrier 12 mounted in the receiver 1 of a firearm. In FIGURE 1, the firearm mechanism is shown in a just-fired position wherein the trigger 9 has been pulled to release the hammer 10, the hammer 10 has struck the firing pin and exploded the cartridge positioned in chamber 3. The cartridge carrier 12 is in an unlatched condition since the projections 30 and 31 formed on the trigger housing are not engaging slots 28 and 29 formed in the cartridge carrier.

FIGURE 2 shows the firearm of FIGURE 1 and the relationship of the parts immediately after firing and after recoil has occurred. Note in FIGURE 2 that the inertia forces of recoil have caused the cartridge carrier 12 to move rearwardly relative to the trigger assembly 8 so that the projections 30 and 31 on the trigger assembly are now engaged in slots 28 and 29 of the carrier. The elongated openings 24 and 25 in cartridge carrier 12 permit relative movement of the carrier on mounting pivot pin 14 to the locked position. In this position, the cartridge carrier is completely locked and the bolt assembly 15 has begun its rearward movement toward the rear wall of the receiver 1. Bolt assembly 15 moves rearwardly from the position shown in FIGURE 2 to the dotted line position shown in FIGURE 1. In its movement to the dotted line position shown in FIGURE 1, bolt assembly 15 functions to extract the fired cartridge, move the hammer 10 to the cocked position shown in dotted lines in FIGURE 1, and engages the pawl 19 on the carrier 12 to move the pawl rearwardly against the action of plunger 21 as is also shown in dotted lines in FIGURE 1. During this rearward movement of the bolt assembly, the slide arms 7 actuate cutoffs 6 to feed another cartridge onto the tray 16 of the cartridge carrier while the carrier is in its locked condition.

After the bolt assembly 15 has reached the rearward extent of its travel, it begins its forward movement toward the position illustrated in FIGURE 3. As the bolt assembly moves forward as shown in FIGURE 3, a projection 33 on the pawl 19 of the cartridge carrier 12 is engaged in an opening 32 formed in the bolt carrier plate 13. The engagement of projection 33 on pawl 19 with the opening 32 in the forward moving bolt carrier plate 13 produces a force in the forward direction which is exerted against the cartridge carrier 12. This force is sufficient to produce relative movement in the forward direction between the carrier and pivot pin 14 sufficient

to move the slots 28 and 29 on the cartridge carrier out of engagement with the projections 30 and 31 on the trigger housing, and unlock the cartridge carrier. Further forward movement of the bolt causes the cartridge carrier to be flipped upwardly to the cartridge feeding position shown in FIGURE 3. During continued forward movement of the bolt, the cartridge positioned on cartridge carrier 12 is engaged by the forward portion of the bolt assembly and moved into chamber 3. The projection 22 on pawl 19 of the cartridge carrier is released from engagement with opening 32 formed in the bolt carrier plate and the cartridge carrier is again returned to the unlatched position shown in FIGURE 1. The gun is now ready to be fired again merely by pulling the trigger.

It is apparent from the description above that the cartridge carrier 12 is moved into a locked position by the inertia forces of recoil immediately after the gun is fired. The lost motion connection between the pivot pin 14 and the elongated slots 24 and 25 formed in the cartridge carrier permit relative movement between the cartridge carrier and the trigger assembly. This limited relative movement permits the carrier to move rearwardly into a latched position immediately after the gun is fired. The forward movement of the bolt assembly applies a positive forward force sufficient to unlatch the carrier and allow it to move into cartridge feeding position in the manner disclosed above. No additional piece parts are required to provide this novel locking carrier system, than what is normally required to provide a non-locking system. The utilization of the inertia forces of recoil, a pivotal connection allowing relative movement of the carrier, and interlocking slots formed in the carrier perform a function normally requiring an additional number of piece parts, and increased assembling and manufacturing expense.

While this invention has been described in detail with reference to the preferred embodiment illustrated in the drawings, various design changes and modifications are anticipated which are within the spirit and scope of the claims.

I claim:

1. In a firearm having a receiver and a cartridge carrier, means pivotally mounting said cartridge carrier in said receiver for pivotal movement between a cartridge receiving position and a cartridge feeding position, said means being operative to provide relative movement between said cartridge carrier and said receiver from a rearward position wherein the cartridge carrier is locked against pivotal movement to a forward position wherein said carrier is free to pivot, and interlocking means on said carrier and in said receiver operative to lock said carrier in said rearward position.

2. The device of claim 1 in which said interlocking means comprises at least one slot formed in said carrier and a projection mounted in said receiver operative to engage and lock said carrier against pivotal movement when the carrier is moved to its rearward position by the inertia forces of recoil after the firearm is fired.

3. The device of claim 2 in which said carrier is provided with a pawl pivotally mounted on a rearward portion of said carrier, said pawl having abutment means engageable with reciprocal bolt means mounted in the receiver and operative to unlock the cartridge carrier when said bolt means moves forward in said receiver.

4. In a firearm having a receiver, a breech bolt reciprocal therein, a barrel having a chamber opening into said receiver, a magazine, and a carrier mounted in the receiver for transferring cartridges from the magazine to the chamber: means mounting said carrier for pivotal movement from a cartridge receiving position to a cartridge feeding position, said means including a lost motion connection allowing said carrier to move forward and rearward relative to said receiver, interlocking means on said carrier engageable with corresponding interlocking

means mounted in said receiver to lock said carrier against pivotal movement when said carrier is moved rearward by the inertia forces of recoil when the firearm is fired.

5. In a firearm, a receiver, a cartridge carrier movably mounted in said receiver, said carrier being operable to pivot from a cartridge receiving position to a cartridge feeding position, a lost motion connection between the carrier and the receiver to render said carrier further operable to move from a first forward position in which the carrier is free to pivot to a second rearward position in which the carrier is locked, and lock means in said receiver cooperating with the carrier when the carrier is in the second position effective to lock the carrier against pivotal motion.

6. In a firearm having a receiver, a cartridge carrier in said receiver, pin means fixedly mounted in said receiver, said pin means extending through a pair of elongated slots in said carrier to mount said carrier for pivotal movement between a cartridge receiving position and a cartridge feeding position, said elongated slots being operative to allow limited forward and rearward movement of said cartridge carrier relative to said pin means, and interlocking means mounted in said receiver engageable with cooperating means on said carrier to lock said carrier against pivotal movement when said carrier is moved rearwardly relative to said pin means while in said cartridge receiving position.

7. The firearm of claim 6 in which said interlocking means is a projection mounted in the receiver and said cooperating means is a slot formed in said carrier which is engageable with said projection to lock said carrier while in its rearward position.

8. A firearm including a receiver having an opening formed in the bottom thereof, a trigger assembly closing a rearward portion of the bottom opening and a cartridge carrier pivotally mounted in said receiver normally closing the forward portion of said bottom opening, a barrel secured to a forward portion of said receiver having a chamber opening into said receiver, a tubular magazine mounted below said barrel having one end opening into said receiver and accessible for loading cartridges into said magazine when said cartridge carrier is pivoted upwardly in said receiver, means mounting said cartridge carrier for pivoted movement from a cartridge receiving position to a cartridge feeding position and allowing forward and rearward movement of said cartridge carrier related to said receiver, locking means in said receiver aperture to lock said cartridge carrier against pivotal movement when said carrier is moved rearward relative to said receiver, bolt means reciprocally mounted in said receiver above said carrier, and means on said cartridge carrier engageable with said bolt means to move said carrier forward relative to said receiver out of engagement with said locking means and to pivot said cartridge carrier toward its cartridge feeding position.

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