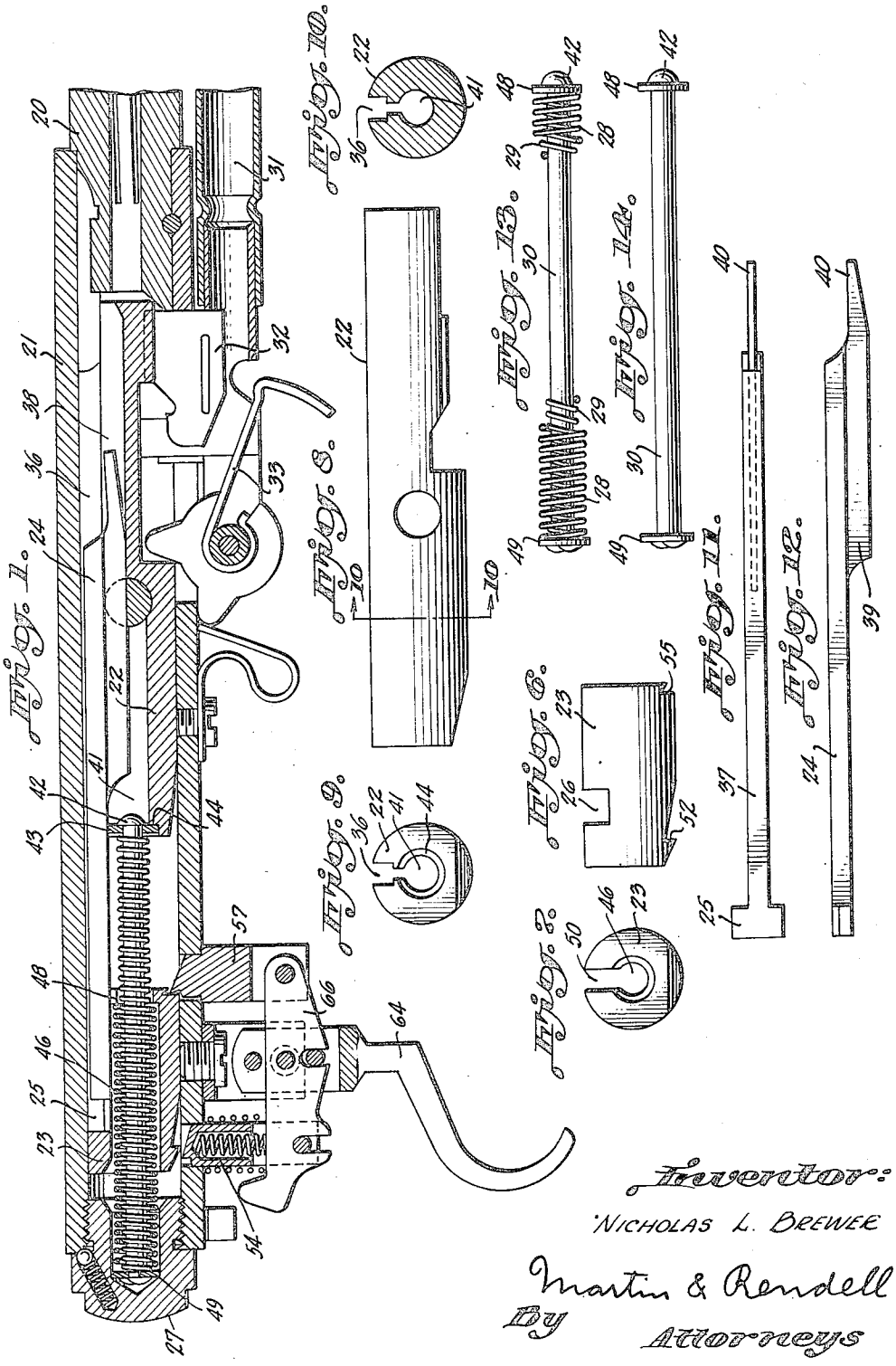
Sept. 22, 1942. N. L. BREWER 2,296,242

FIREARM

Filed Feb. 1, 1940 2 Sheets-Sheet 1

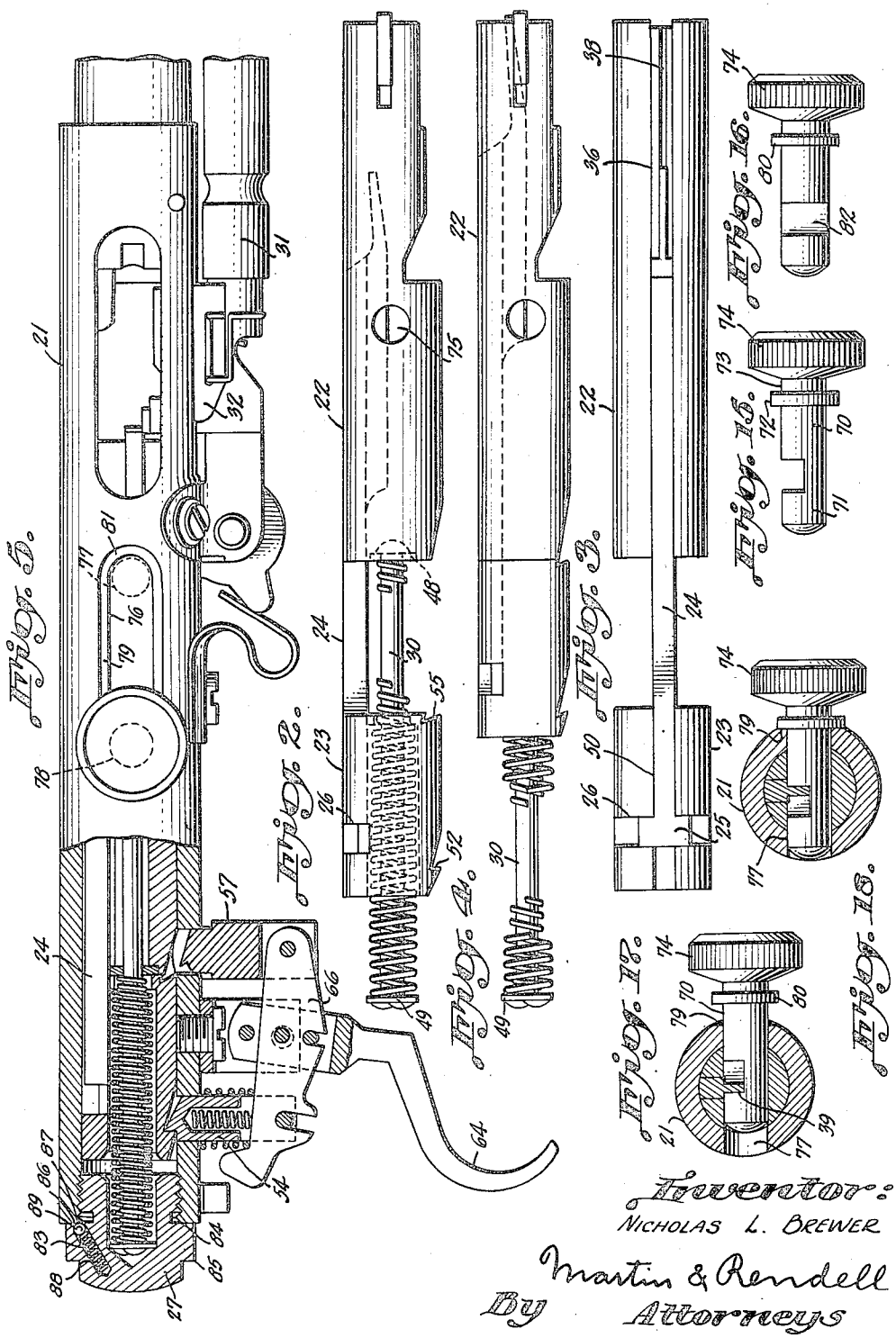


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FIREARM

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UNITED STATES PATENT OFFICE

2,296,242

FIREARM

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Application February 1, 1940, Serial No. 316,752

7 Claims. (Cl. 42—3)

This invention relates to repeating guns.

The purpose of the present invention is to provide certain improvement in what may be roughly considered the rear end of the action of a repeating gun, and particularly to provide new and improved mechanism including in some of the combinations the rearward part of the breech bolt, the hammer slidingly mounted in the receiver to the rear of the breech bolt, and the assembly with said hammer of a hammer spring and a breech bolt spring concentrically mounted about a guide rod.

A further purpose is to provide a new and improved form of hammer and hammer spring and breech bolt spring mounted longitudinally through the center of said hammer and in turn guided by a guide rod, with means on said guide rod for holding both said springs in place, both when mounted in the gun and also when the hammer and assemblage of springs and guide rod are removed from the receiver of the gun.

A further purpose is to provide an improved combination of firing pin, hammer and breech bolt, and in further combinations also including the hammer spring and the breech bolt spring, and further to have said firing pin operate as the means for connecting and aligning the hammer and breech bolt when these parts are within the gun.

A further purpose is to provide a new and improved and simplified form of transversely extending bolt or handle for the breech bolt adapted to operate and especially to retract the breech bolt manually when that is required, and to have said transverse handle bolt further adapted to function as a means for locking the breech bolt in forward position or in rearward position.

Further purposes are to provide new and improved constructions of the several parts above named, and improved ways of connecting and combining the said parts for economy in manufacture, convenience in assembling and efficiency in operation.

A further purpose is to provide a new and improved construction wherein the breech bolt, hammer, firing pin, hammer spring and breech bolt spring and guide rod for said two springs are readily removed by the removal of a screw-threaded recoil plug at the rear end of the receiver, with said springs and spring guide still assembled when so removed.

A further purpose is to provide a new and improved and very convenient manner of constructing and assembling the action of a semi-automatic gun so that the action may be easily taken out and cleaned and as readily replaced or assembled without the use of tools.

Further purposes and advantages will be apparent from the specification and claims hereinafter set forth.

Fig. 1 is a view mostly in longitudinal central section of the material portion of the action of a rifle of the semi-automatic type embodying this invention, the rifle being seen from the right hand side and the parts being in the position they occupy when the rifle is cocked.

Fig. 2 is a side elevation as seen from the right hand side, of the breech bolt, hammer, firing pin, hammer spring, breech bolt spring and guide rod for said springs in the relative position they occupy in Fig. 1.

Fig. 3 is a top or plan view of the breech bolt, firing pin and hammer as seen when in the position they occupy in Figs. 1 and 2.

Fig. 4 is a view in right hand side elevation of the parts seen in Fig. 2 but after the rifle has been fired and with the hammer and firing pin in extreme forward position but before the firing of the cartridge has driven the breech bolt, hammer and firing pin from their forward position.

Fig. 5 is a view similar to Fig. 1 but showing the forward half of the receiver and adjacent parts in side elevation and showing the parts of the action in the position they occupy after the firing has driven the hammer, breech-bolt and firing pin to extreme rearward position and after these parts have gone forward a very short distance until the hammer and firing pin are temporarily arrested by the detent plunger of the release mechanism but before the breech bolt has gone any further forward.

Fig. 6 is a side elevation of the hammer as seen from the right hand side and Fig. 7 is a rear end view thereof.

Fig. 8 is a right side elevational view of the breech bolt.

Fig. 9 is a rear end view of said breech bolt and Fig. 10 is a cross-sectional view thereof on line 10—10 of Fig. 8.

Figs. 11 and 12 are respectively a top or plan view and a right side elevation of the firing pin 24.

Fig. 13 is a side view of the end portions of the breech-bolt spring and of the hammer spring mounted upon the spring guide rod 30, but minus the hammer and with the middle portion of the outer, that is, the hammer spring still further removed in order to clearly show the breech-bolt spring.

Fig. 14 is a side view of the guide rod 30.

Fig. 15 is a rear elevation of the combined operating handle and locking bolt which extends transversely of the breech bolt and receiver.

Fig. 16 is a top or plan view of said handle and locking bolt.

Fig. 17 is a rear side elevation of said handle and locking bolt and a sectional view on the center of said handle bolt through the breech bolt, receiver and firing pin, on the line of either locking position of the breech bolt, with the said handle in outward position so that the breech bolt can be operated thereby or by the firing of the gun.

Fig. 18 is a view similar to Fig. 17 but with the said handle in inward or locking position.

Referring to the drawings in a more particular description it will be seen that the invention is illustrated in connection with a semi-automatic rifle of the blow-back type and that said rifle includes a barrel **20** of the usual type to the rear end of which is securely fastened a rearwardly extending hollow receiver **21** in the chamber of which is slidingly mounted the breech-bolt **22** and to the rear of said bolt the hammer **23** with a firing pin **24** having its forward end slidingly mounted in a longitudinal groove in said breech bolt and with the rear end of said firing pin fixed to travel with said hammer as by laterally extending fingers **25** near the rear end of said firing pin projecting into pockets **26** provided in the upper side of said hammer.

The rearward end of said receiver is closed by a recoil plug **27** screw-threaded into the rear end of the chamber of said receiver. This plug is bored out at its forward side to form a pocket into which projects the rearward end of the hammer spring **28** and also the rear end of the breech bolt spring **29**, said springs being of the helical form and concentrically arranged about the guide rod **30**.

It will be understood that the rifle is equipped with some proper form of magazine for the cartridges such as a tubular magazine **31** mounted below the barrel and with a proper cartridge feeding device such as illustrated in the drawings by the magazine box **32**, the swinging lifter **33** and other parts cooperating therewith as by parts upon the lower side of the forward half of the breech bolt operating as the breech bolt is carried backward by the firing of the gun to extract the shell of the fired cartridge from the bore of the barrel and to eject the said shell from the receiver and to raise a cartridge that has come back from the cartridge magazine up into the receiver more or less into line with the bore of the barrel so that upon the forward movement of the breech bolt the cartridge is pushed into the bore of said barrel and the breech bolt brought into closed position at the rear of said barrel and directly behind said cartridge. No further detailed description of these parts or of these operations is deemed necessary as neither the form of the magazine nor the form or operation of the feeding mechanism nor the form of the part of the breech bolt cooperating with said feed mechanism constitute any part of my present invention and my invention is capable of being used with various forms of magazines and with various forms of feed mechanisms and various forms of construction of the breech bolt in its cooperation with the feed mechanism including thereunder the extraction and ejection of the fired shell and the return of the breech bolt to closed position having meanwhile pushed the new cartridge into its position in the bore of the barrel.

It will be seen that the breech bolt has at its upper side a wide slot **36** extending for the whole length of said breech block for the sliding mounting therein of the main substantially rectangular portion **37** of the firing pin. Projecting still further from the bottom of the wide slot **36** is a narrower slot **38** for the lengthwise travel therein of the fin or key portion **39** depending from the forward half of the said firing pin as best seen in Fig. 12. The forward part of this fin or key upon the firing pin extends forwardly beyond the rectangular portion thereof and its front end constitutes the firing point **40** of said firing pin. Extending centrally of the breech bolt from its rearward end there is provided a bore **41** through which may travel as required the guide rod **30** and particularly its enlarged head **42** at its forward end, the rearwardly facing projecting shoulder of which head acts as a means for retaining upon the said guide rod the forward washer **43**. Adjacent the rear end of the breech bolt said bore is enlarged for a short distance forming a rearwardly facing shoulder **44** adapted to hold said forward washer **43** at the rear end of the breech bolt while allowing the head of the said spring guide rod **30** to slide through said washer and as far as needed into the bore of the breech bolt.

The hammer **23** is annular in form and slidingly mounted in the chamber of the receiver **21** to the rear of the breech bolt. This hammer has a longitudinally extending bore **46** of large enough diameter to freely receive therein as much as needed of the hammer spring **28**. Extending into this bore adjacent the forward end of the hammer, the hammer is provided with a small annular inwardly extending flange **47** the rear face of which forms a shoulder **48** to engage the forward end of the hammer spring and so in an obvious manner place said hammer spring under compression as the hammer is moved back either by the regular firing of the gun or by the rearward manual moving of the breech bolt. The annular flange **47**, however, has its aperture large enough to allow the free passage therethrough of the breech bolt spring **29** and of its within located guide rod **30**. The forward washer **43** is larger than the opening in the said flange **47** at the front of the hammer so that neither the said forward washer **43** nor the head **42** of the spring guide rod **30** can pass to the rear of the front face of the said hammer. The rear end of the two springs upon said guide rod **30** are retained upon said guide rod by a rear washer **49** which in turn is held against the rear end of said rod as by the rear extremity of said rod being made smaller in diameter than the regular diameter of the said rod so as to form a shoulder against which the washer bears while the smaller diametered extremity of the rod projects through the hole in the washer, and then the extreme end of the rod is riveted over against the rear face of the washer. In the upper side of the hammer there is provided a longitudinally extending slot **50** corresponding with and in alignment with the slot **36** in the breech bolt for receiving the main nearly rectangular portion **37** of the firing pin **24** and from this slot **50** there project laterally the two pockets **26** to receive the two laterally extending fingers **25** already mentioned as being provided upon the firing pin near its rear end.

It will now be seen that the firing pin **24** is mounted to travel with said hammer simply by the rear part of said firing pin being set down

into the slot 50 of the hammer with the fingers of the said firing pin likewise resting down into the pockets 26 of the hammer. It will be seen also that these two parts will be secured in relative position as long as they are in place in the chamber of the receiver, but that they can be readily separated when these two parts are withdrawn from the rear of the receiver after the recoil plug 27 has been removed. Similarly it will be seen that the forward end of the firing pin can slide back and forth relative to the breech bolt and that when the hammer is advanced to its forward position relative to the breech bolt the front end or firing point 40 of said firing pin will project the required slight distance into the head space of the breech bolt and so into firing position assuming that the breech bolt is in its forward position.

The trigger 64 and its associated release mechanism shown in Figs. 1 and 5 of the drawings herein are the subject of a separate patent application filed by me March 10, 1939, as Serial No. 261,021, and are shown here only for the purpose of illustrating an operative gun. The details of said release mechanism will not need therefore to be described herein further than to say that the trigger 64 through its release lever 66 controls the release plunger 57 and the detent plunger 54 relative to the contact faces 52 and 55 on the lower portion of the hammer 23, being respectively contact face 55 at the forward end of the hammer and face 52 near the rearward part thereof, so as to obtain a temporary holding of the hammer in a position slightly back of its cocked position by detent plunger 54 engaging face 52 and thereafter, and after the shooter's finger has been released from the finger piece of the trigger to allow the hammer to advance slightly to cocked position where it is held by the release plunger 57 engaging said contact face 55.

In Figs. 15 to 18 inclusive there are shown several views of the combined operating handle and locking bolt 70, which bolt and handle consists of a shank portion 71, preferably circular in cross section, and of uniform size throughout its length except for the notch hereinafter mentioned, an annular collar 72 at the right hand end of said shank as the parts are seen in Figs. 15 to 18, and further to the right a short neck portion 73 and at its extreme right hand end an enlargement or knob 74, the peripheral portion of which is knurled for convenient and positive engagement by the hand or fingers and thumb of the shooter. The shank portion 70 of this combined locking bolt and handle is slidingly mounted in a hole 75 extending transversely through the breech bolt 22 about midway its length, said hole being of a size and shape to have said shank portion snugly but slidingly move therein. Preferably the hole 75 in the breech bolt will be arranged in such a way as to have said handle and locking bolt substantially horizontal when the gun is held in normal firing position.

In alignment with this hole 75 in the breech bolt there is provided an elongated slot 76 on the right hand side of the receiver extending entirely through the wall of said right hand side of the receiver and extending far enough forward to allow the breech bolt to go to its extreme forward position without the projecting portion of said locking bolt striking the forward end of said slot 76 and extending far enough to the rear to allow the breech bolt to go to its extreme rearward position without the outwardly projecting portion of said locking handle striking the rear end of said slot 76. In line with the shank 71 of said locking bolt and handle when said breech bolt is at its extreme forward position there is provided a hole through the left hand wall of the receiver of a size to readily but snugly receive the left hand end of the said shank when said locking bolt and handle is moved from its ordinary non-locking position as shown in Fig. 17 to its locking position as shown in Fig. 18. When the locking bolt is thus moved to the left to the position shown in Fig. 18 it will be obvious that the left hand end of the shank 71 by closely fitting the hole 77 in the receiver 21 operates to lock the breech bolt in forward position, which locked position may be utilized under several circumstances and particularly will be used when it is desired to have the gun function as a single shot hand-operated gun instead of a semi-automatic gun adapted to extract and eject the shell of the fired cartridge and bring a new cartridge into line with the barrel, all on the rearward movement of the breech bolt automatically when the gun is functioning as a semi-automatic gun.

By withdrawing the locking bolt to the right from its locking position as shown in Fig. 18 to its unlocking or normal operating position as shown in Fig. 17 it will be obvious that the shank portion 71 of the locking bolt no longer engages the left hand wall of the receiver 21 adjacent the forward hole 77, and therefore the breech bolt is free to be moved either by hand operation of the knob 74 of the locking bolt and handle or by the power from the explosion of the cartridge in the barrel.

In alignment with the shank of said locking bolt when the breech bolt is in extreme rearward position there is provided in the left hand wall of the receiver a rearward locking hole 78 into which the left hand end of the said locking bolt may be shoved by the hand of the shooter. It will be understood of course that in this automatic gun or in any gun having a spring for returning the breech bolt to forward position the breech bolt will have to be held in rearward position by the shooter against the power of said breech bolt spring tending to move the breech bolt forwardly from such rearward position. Of course when the gun is functioning as a semi-automatic gun the rearward movement of the breech bolt takes place with such lightning-like rapidity and is followed immediately with a very quick forward motion of the breech bolt so that the shooter cannot in practice intercept the breech bolt at its rearward position by manipulating the knob of the locking handle. Ordinarily the putting of the breech bolt into locked condition at its rear position is accomplished by manually retracting the breech bolt by manipulating said knob and then while the breech bolt is forcibly held in retracted position, pushing the knob 74 to the left until the left-hand end of the locking bolt engages the left-hand wall of the receiver adjacent the said rearward locking hole 78 therein. Preferably the edge formed by cutting the elongated slot 76 through the cylindrical wall of the receiver will be trimmed down to form a face 79 engaging the flat inner face 80 of the collar 72, and this face 79 will be continued around the two semi-circular ends of the slot by cutting away the material of the receiver at the semi-circular zones 81 so as to allow ample clearance for the extreme forward and rearward movement of said locking bolt.

As already described the firing pin **24** has its lower portion in the form of a fin or key portion **39** which is thinner than the main portion of the hammer and projects down into the narrower slot **38** provided in the breech bolt below the wide slot **36** in the breech bolt. This fin or key portion extends down into the transverse notch or cut **82** provided about midway of the clear portion of the shank **70** of the combined handle and locking bolt. The notch or cut **82** is purposely made wide enough, that is extends longitudinally of the shank far enough and is so placed on the shank of the said locking bolt as to allow the locking bolt to be moved from non-locking position as shown in Fig. 17 to locking position as shown in Fig. 18. This key portion **39** therefore serves as a means for retaining the said locking bolt in the gun against accidental displacement as long as the hammer is in its telescoping position relative to the breech bolt and both are within the receiver.

The action of the gun is taken apart by first removing the screw-threaded recoil plug **27** from the rear end of the breech bolt and then removing first the hammer and the inter-locked firing pin together with the two springs and the spring guide rod through the open rear end of the receiver and then withdrawing the locking bolt **78** from the breech bolt and then removing the breech bolt rearwardly through the open rear end of the receiver. The parts will be reassembled by inserting first the breech bolt in the receiver, then inserting the shank of the locking bolt crosswise thereof and then inserting the hammer and firing pin, taking care to have the cross arms of the firing pin in alignment with the pockets in the hammer and when these two parts are placed in the receiver to have the firing pin go through the large slot on the top of the breech bolt.

When the parts are so taken out of the receiver it will be noted that the hammer and breech bolt springs will remain mounted upon the guide rod and the hammer will also be mounted about the two springs and the guide rod. This is a definite convenience in that it avoids the common nuisance heretofore of the springs expanding and jumping away from each other and the surrounding parts as soon as they are removed from the receiver. The springs are under some tension even when removed from the action but on account of their being securely retained upon the guide rod and connected to the hammer these parts may be readily inserted in the proper order and in the proper position when the gun is to be reassembled. All of this assembling or disassembling it will be noticed can be accomplished without the use of any tools,

It will be seen that the recoil plug directly engages the rear end of the guide rod and its rearward washer and through this washer takes the strain at the rear end of the hammer spring and breech bolt spring through to the said plug. The shock or jar of this engagement is prevented from loosening the screw-threaded recoil plug through the following retaining means, namely, a circular hole **83** is provided extending in a diagonal direction from the forward face **84** of the larger diametered part or outwardly projecting knurled collar **85** of said recoil plug. The outer end of this circular hole or socket **83** faces toward the rear end **86** of the receiver, and the inner portion of this end **86** of the receiver is provided with a plurality of spaced notches **87**. In the socket **83** is placed a coiled spring **88**. Over the outer end of this spring is placed a metal ball **89**, which ball may in an obvious manner spring into one of the notches **87** as the recoil plug gets screwed up to about its ultimate place of adjustment. The ball is conveniently retained in the ball socket or circular hole **83** by staking in slightly the adjacent part of the plug so that when the plug is removed the ball and spring will still be retained in their socket.

The particular form of the feed mechanism shown in Figs. 1 and 5 of the drawings constitutes the subject matter of a separate application filed by me in the United States Patent Office the 16th day of February, 1940, as Serial No. 319,303, and is shown here only for the purpose of illustrating an operative gun.

What I claim as new and desire to secure by Letters Patent is:

1. In a firearm, the combination of a spring guide rod having at its rear end a fixed enlargement and having at its front end a head, a washer larger than said head and slidingly mounted on the front end of the guide rod, a helical breech bolt spring mounted slidingly on said rod, a helical hammer spring mounted on said rod outside said breech bolt spring and freely movable thereover, a hammer having a bore longitudinally thereof large enough for the sliding therein of said hammer spring except at the forward end of the hammer where the bore is reduced forming an inwardly extending flange stopping the forward movement therethrough of said hammer spring, but with said flange having a central opening therethrough large enough for the breech bolt spring to move therethrough, said flange on the front end of the hammer arresting rearward movement of the washer on the front end of the guide rod.

2. In a firearm the combination of a spring guide rod having a head at its front end, a washer larger than said head and slidingly mounted on the front end of the guide rod, a helical breech bolt spring slidingly mounted on said rod, a helical hammer spring mounted on said rod outside said breech bolt spring and freely movable thereover, a washer fixedly secured to the rear end of said rod and engaging the rear end of both said springs, a hammer mounted about said springs by having a longitudinal bore large enough for the sliding therein of said hammer spring, an inwardly extending flange at the front end of said hammer bore stopping the forward movement therethrough of said hammer spring but with said flange having a central opening large enough for the breech bolt spring to move therethrough, said flange arresting rearward movement therethrough of said loose washer located on the front end of the guide rod.

3. In a firearm, the combination of a receiver having a guideway, a breech bolt slidingly mounted therein and having a longitudinal bore extending into its rear end, a hammer slidingly mounted in said guideway to the rear of said breech bolt and having a bore longitudinal thereof in alignment with the said bore in the breech bolt, a helical breech bolt spring extending from the rear of the breech bolt and rearwardly through the bore of the hammer, a helical hammer spring surrounding said breech bolt spring and freely movable relative thereto, an inwardly extending flange at the front end of the hammer bore and arresting the front end of the hammer spring but allowing the breech bolt spring to move therethrough, a rod for guiding

said springs and located within said inner or breech bolt spring and having a head at its front end, a washer larger than said head and slidingly mounted on the forward part of said rod and engaging the front end of the breech bolt spring and engaging the front end of the hammer adjacent the said flange on the hammer, said sliding washer engaging the rear end of the breech bolt and allowing the front part of the guide rod to slide through the washer and into the bore of the breech bolt while the said washer by engaging the rear of the breech bolt holds the front end of the breech bolt spring.

4. In a firearm the combination of a receiver having a chamber extending to its rear end, a breech bolt and a longitudinally bored hammer both slidingly mounted in said receiver, a spring guide rod, a breech bolt spring and a hammer spring concentrically mounted about said spring guide rod and all said last mentioned three elements being permanently assembled with the hammer and partly housed within and projecting longitudinally from said bore of the hammer, and a recoil plug detachably secured to the rear end of the receiver and forming when in place a rear support for both said springs and a stop for said guide rod so that when said plug is removed from the receiver said springs, guide rod and hammer may be readily removed as a permanent assembly of said parts from the opened rear end of the receiver and as such an assembly of parts may be readily reinserted into the opened rear end of the receiver.

5. In a firearm the combination of a receiver having a chamber extending to its rear end, a breech bolt and a longitudinally bored hammer both slidingly mounted in said receiver, a spring guide rod, a breech bolt spring and a hammer spring concentrically mounted about said spring guide rod and all said last mentioned three elements being permanently assembled with the hammer and partly housed within and projecting longitudinally from said bore of the hammer, and a recoil plug detachably secured to the rear end of the receiver and forming when in place a rear support for both said springs and a stop for said guide rod so that when said plug is removed from the receiver said springs, guide rod and hammer may be readily removed as a permanent assembly of said parts from the opened rear end of the receiver and as such an assembly of parts may be readily reinserted into the opened rear end of the receiver, said breech bolt being also removable and reinsertable through said opened rear end of the receiver.

6. In a firearm the combination of a receiver having a chamber extending to its rear end, a breech bolt and a longitudinally bored hammer both slidingly mounted in said receiver, a firing pin detachably secured to the said hammer and sliding in the breech bolt, a spring guide rod, a breech bolt spring and a hammer spring concentrically mounted about said spring guide rod and all said last mentioned three elements being permanently assembled with the hammer and partly housed within and projecting longitudinally from said bore of the hammer, and a recoil plug detachably secured to the rear end of the receiver and forming when in place a rear support for both said springs and a stop for said guide rod so that when said plug is removed from the receiver said springs, guide rod and hammer may be readily removed as a permanent assembly of said parts from the opened rear end of the receiver and as such an assembly of parts may be readily reinserted into the opened rear end of the receiver, said breech bolt and firing pin being also removable and reinsertable through said opened rear end of the receiver.

7. In a firearm the combination of a receiver having a chamber extending to its rear end, a breech bolt and a longitudinally bored hammer both slidingly mounted in said receiver, a spring guide rod, a breech bolt spring and a hammer spring concentrically mounted about said spring guide rod and all said last mentioned three elements being permanently assembled with the hammer and partly housed within and projecting longitudinally from said bore of the hammer, and a recoil plug screw-threaded to the rear end of the receiver and forming when in place a rear support for both said springs and a stop for said guide rod so that when said plug is removed from the receiver said springs, guide rod and hammer may be readily removed as a permanent assembly of said parts from the opened rear end of the receiver and as such an assembly of parts may be readily reinserted into the opened rear end of the receiver, said breech bolt being also removable and reinsertable through said opened rear end of the receiver, and a device holding said recoil plug from accidentally unscrewing from the receiver.

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