

Sept. 19, 1967

A. SEIDERMAN
BOLT ACTION FOR FIREARMS HAVING A RIGHT OR LEFT HAND
OPERATING HANDLE

3,341,963

Filed Aug. 9, 1966

5 Sheets-Sheet 1

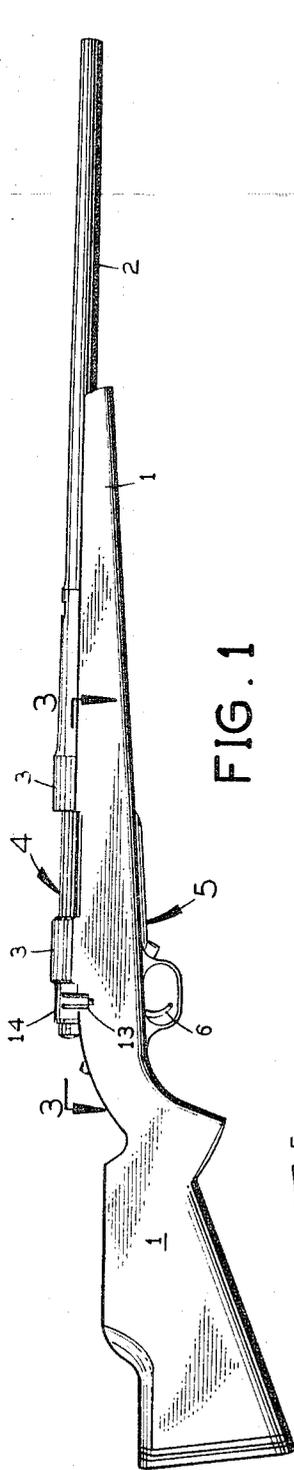


FIG. 1

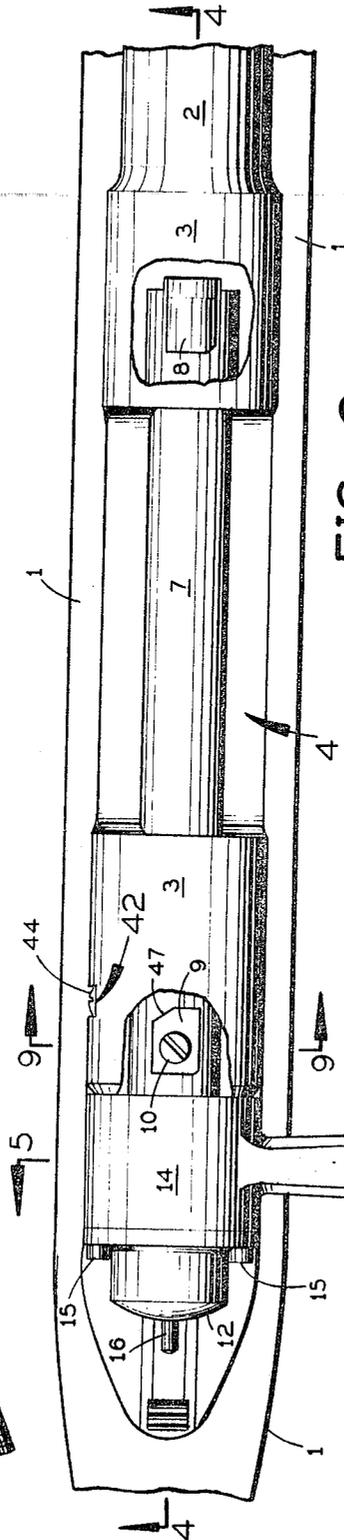


FIG. 2

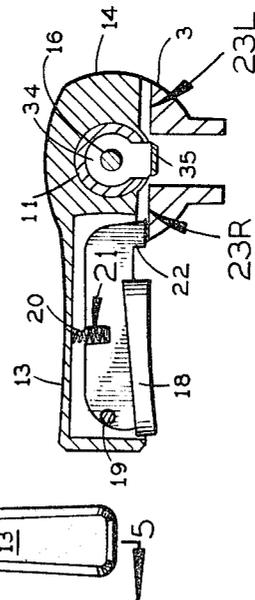


FIG. 5

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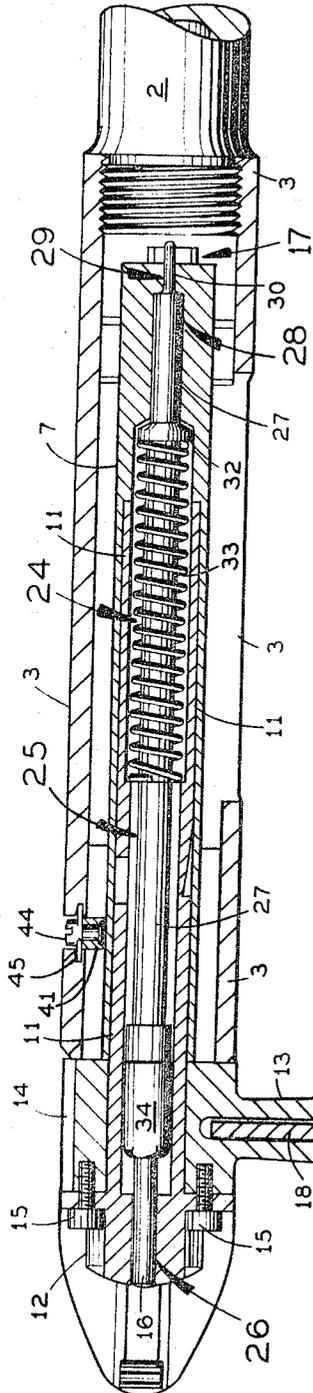


FIG. 3

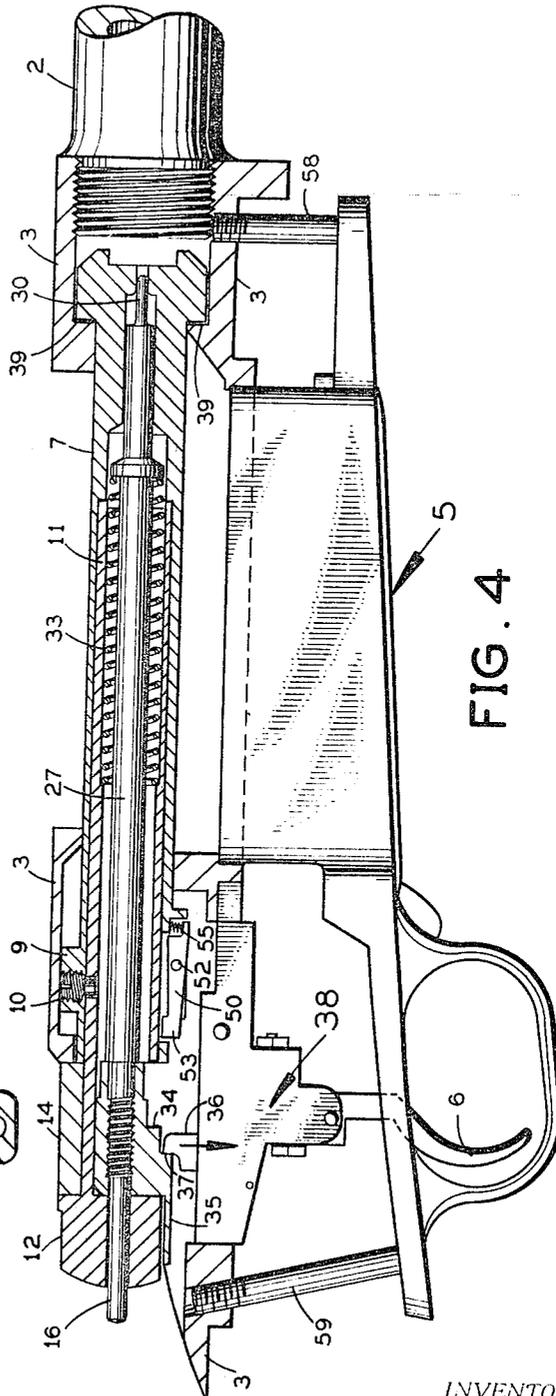


FIG. 4

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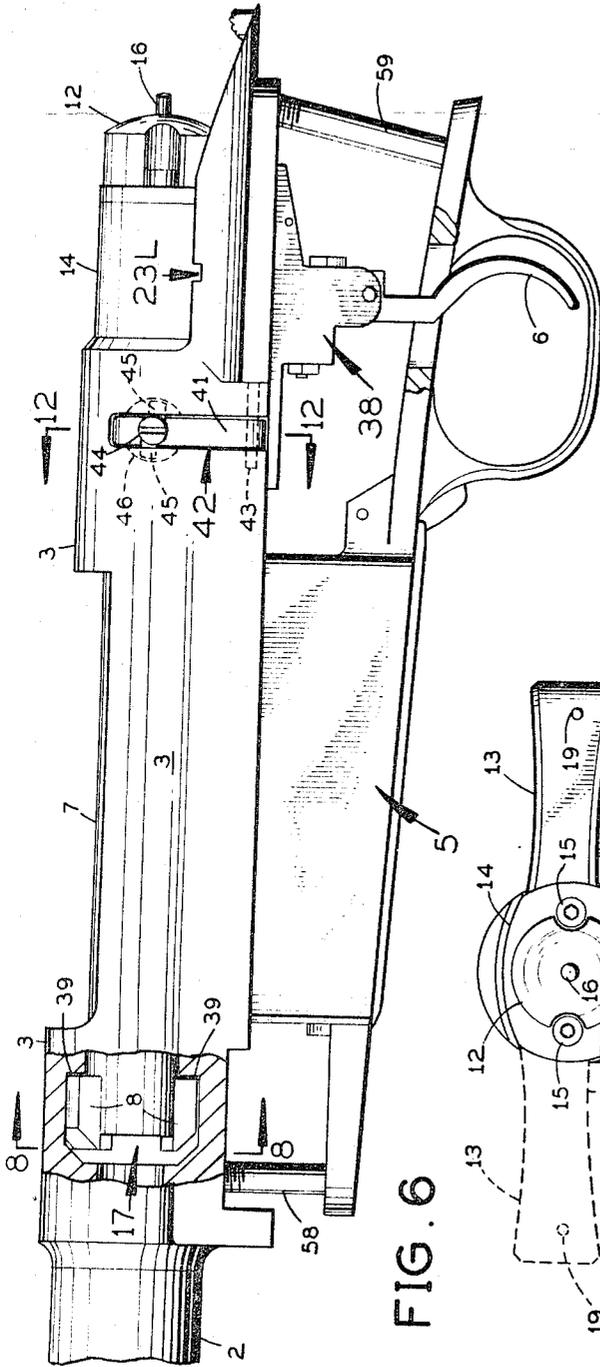


FIG. 6

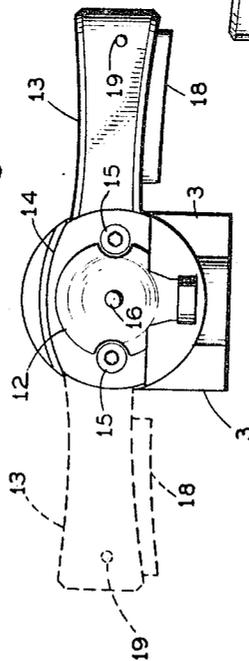


FIG. 7

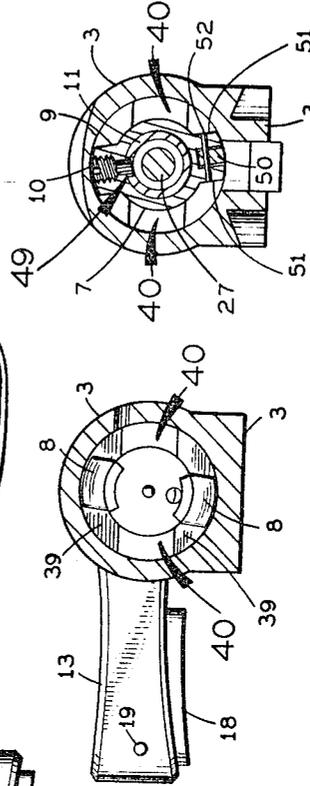


FIG. 8

FIG. 9

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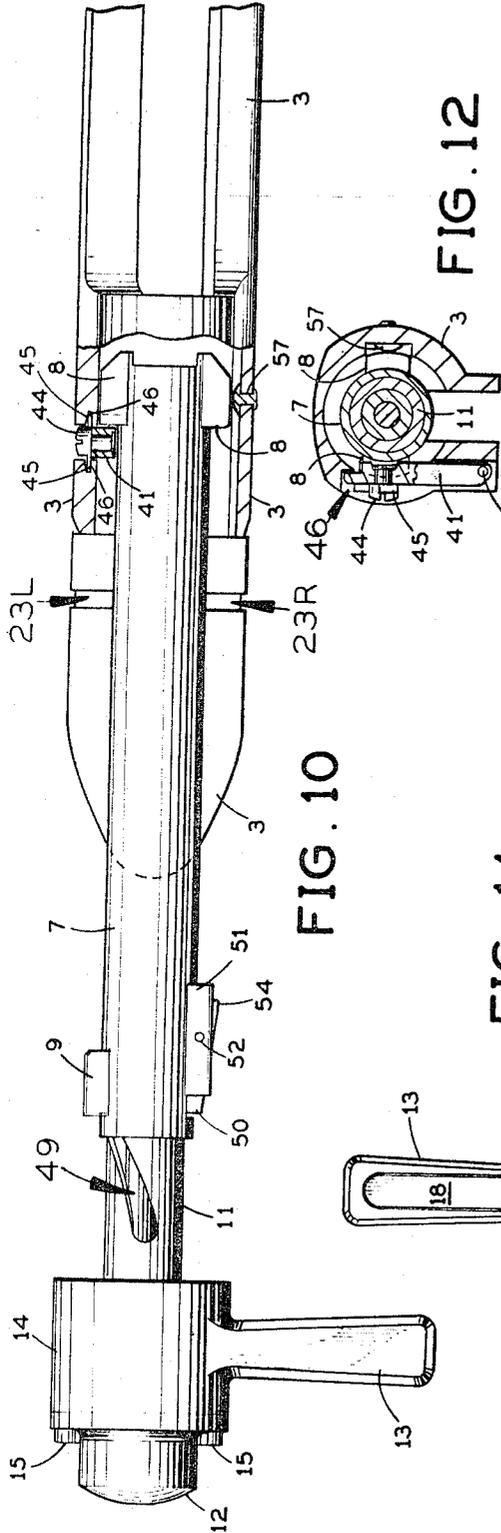


FIG. 10

FIG. 12

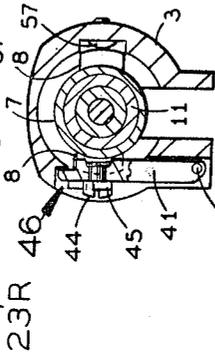


FIG. 11

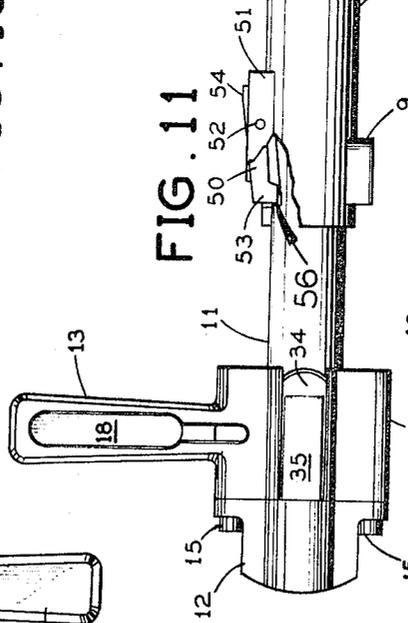


FIG. 13

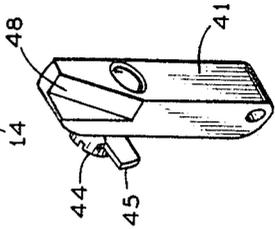
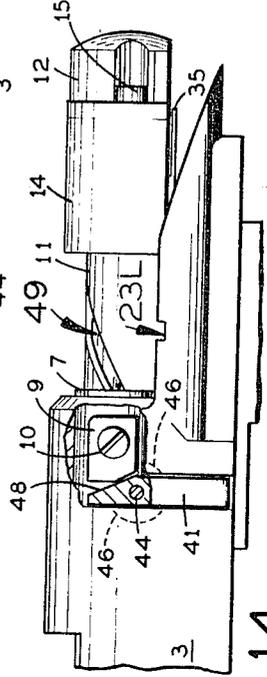


FIG. 14



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BOLT ACTION FOR FIREARMS HAVING A RIGHT OR LEFT HAND OPERATING HANDLE

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 Filed Aug. 9, 1966, Ser. No. 571,307
 6 Claims. (Cl. 42-16)

This invention relates in general to bolt action firearms and more particularly to a bolt action requiring reciprocation only and which may be readily converted for either right or left hand operation.

Prior firearms for left hand operation are generally "special" and because of relatively small production are necessarily considerably more expensive than standard right hand models.

Bolt actions requiring reciprocation only rather than both rotation and reciprocation were excessively complicated and unreliable and in many cases unsafe because of insecure locking mechanisms.

The present invention overcomes the above objections and disadvantages by the provision of a firearm of relatively low cost manufacture which provides a rotary bolt action by reciprocating movement only, by the operator, including a demountable bolt handle which may be easily transferred from a right to a left position on the firearm for either operation, which construction is a principal feature of the invention.

Another object of the invention is the provision of a dual bolt assembly which automatically provides rotation for securely locking the main bolt when an operating handle is moved in a straight path from a load to a fire position.

Another object of the invention is the provision of a reciprocating dual bolt action which prevents the firing of the cartridge until the main bolt is locked in firing position and the bolt handle also locked for added security by an auxiliary locking means.

A further object of the invention is the provision of a firing pin adapted to extend coaxially through the rear of the bolt assembly as a convenient signal for indicating the cocked condition of the firearm.

These and other objects and advantages in one embodiment of the invention are described and shown in the following specification and drawings, in which:

FIG. 1 is a side elevation of the firearm in reduced scale.

FIG. 2 is a fragmentary top plan view of the bolt action shown in FIG. 1 in normal scale.

FIG. 3 is a cross sectional plan view taken through section line 3-3, FIG. 1.

FIG. 4 is a cross sectional elevation taken through section line 4-4, FIG. 2.

FIG. 5 is a cross sectional end view taken through section line 5-5, FIG. 2.

FIG. 6 is a fragmentary left side elevation of the bolt action shown in FIG. 1 with stock removed.

FIG. 7 is a fragmentary rear elevation of elements shown in FIGS. 1 and 6 with the bolt handle in right hand position, in full lines.

FIG. 8 is a cross sectional view taken through section line 8-8, FIG. 6.

FIG. 9 is a cross sectional rear elevation taken through section line 9-9, FIG. 2.

FIG. 10 is a fragmentary top plan view of the bolt action shown in FIG. 3 in withdrawn position.

FIG. 11 is a bottom plan view of the bolt action shown in FIG. 3 in withdrawn position.

FIG. 12 is a cross sectional end elevation taken through section line 12-12, FIG. 6.

FIG. 13 is a perspective view of an element shown in FIG. 12.

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FIG. 14 is a fragmentary illustration of bolt elements in primary extract position.

FIG. 15 is a top plan elevation of the bolt assembly.

FIG. 16 is a cross sectional view taken through section line 16-16, FIG. 15.

FIG. 17 is a fragmentary top plan view of the bolt assembly shown in FIG. 15 with a portion thereof broken away.

Referring to FIG. 1, this particular embodiment of the invention is shown as a rifle for right hand use with the left hand conversion to be described. The main parts of the rifle comprise a stock 1, a barrel 2 having a firing chamber therein, a frame 3, a dual bolt assembly 4, a cartridge magazine receiver assembly 5 and a trigger 6.

Referring to the top view shown in FIG. 2, the bolt assembly 4 is shown in firing position with the main bolt 7 positioned for holding the cartridge in the firing chamber. One of two oppositely positioned conventional locking lugs 8 is shown in locked position behind a locking abutment, not shown.

A primary extraction lug 9 is integral with the rear portion of the main bolt 7, as shown, and has a shoulder screw 10 threaded through lug 9 and provided with a cylindrical inner end to be hereinafter described.

The main bolt 7 has a coaxial bore therein for slidably retaining a secondary cylindrical bolt 11, shown in FIGS. 3, 4, and 5, which terminates at its rear end in an integral head member 12. An operating handle 13 has a body portion 14 with the latter bored to slidably engage a portion of the periphery of the secondary bolt and retained in operating position on the bolt by screws 15-15 in parallel spaced relation through the head member 12.

The outer end of the main bolt 7 is provided with a conventional casing extraction device 17, not shown in detail, for automatically gripping the rim of the cartridge and extracting and ejecting same from the firing chamber when the bolt is withdrawn.

Referring to FIG. 5, the under side of handle 13 is hollow, and a finger lock 18 therein is pivoted about a transverse pin 19 and urged in a downward direction by spring 20, positioned in a cavity 21 in the latch, as shown. The inner end of the lock is formed into an abutment dog 22 for engaging a transverse slot 23 in the frame 3, better shown in FIG. 10. It is to be noted that the dog 22 will engage the slot 23 and lock the secondary bolt and handle only when the bolt assembly is in its extreme forward firing position, as shown in FIG. 2.

Referring to FIG. 3, the secondary bolt 11 has a coaxial open bore 24 in the forward end thereof and a connecting intermediate bore 25 of smaller diameter forming a shoulder. A further connecting coaxial bore 26 of smaller diameter connecting bore 25 extends through the head member 12 of the bolt, as shown. A firing pin 27, shown in fired position in FIG. 3, is slidably positioned at its forward end portion in a pair of bores 28 and 29 through the end of the main bolt 7. A percussion pin 30 integral with the firing pin 27 is slidably positioned in bore 29 for projection therefrom for firing the cartridge. The firing pin has an integral collar 32 for abutting one end of a high energy compression spring 33, and as a forward stop in bore 24 for limiting the projection of the percussion pin 30 from the end of the bolt. The rear end of the spring rests against the shoulder at the junctions of bores 24 and 25.

The rear end portion 16 of the firing pin projects outward from the coaxial bore in member 12 as a visual signal when the firearm is cocked, as is shown in FIGS. 2 and 3, and is withdrawn when fired. An offset firing pin cocking piece 34 is threaded on the rear portion of the firing pin 27 against a shoulder thereon, as shown in FIG. 4 in its cocked position. The lower portion of the cocking piece terminates in a flat projection 35 parallel

The firing pin for normally holding the shear 36 depressed against its spring, not shown, in the direction shown by arrow. The shear latch surface 37 of the piece 34 is provided to engage shear 36 when the bolt assembly 4 is moved forward from its rear extraction position to its firing position, which will permit the shear 36 to hold the cocking piece 34 until the latter and the firing pin are moved to cocked position against the restraining action of spring 33 when the bolt assembly is moved a short final distance into firing position.

A trigger assembly 38 of conventional construction is secured in the frame 3 by well known means and when the trigger 6 thereof is pressed the shear 36 will be withdrawn from the piece 34 and permit the energy stored in the firing pin spring 33 to drive the firing pin with high force and velocity into its forward firing position, as shown in FIG. 3.

It is to be noted that the collar 32 of the pin 27 abuts the forward internal bolt shoulder when the percussion pin is in its fired position, as shown slightly spaced for illustrative purposes in FIG. 3.

FIG. 6 illustrates the bolt in firing position with the locking lugs 8 engaged behind a pair of conventional lock shoulders 39—39 in frame 3, also shown in FIG. 8. A pair of straight longitudinal channels 40—40 in the bore of the frame are for permitting the bolt assembly to be withdrawn rearward when the lugs 8 are rotated approximately ninety degrees out of locking engagement with shoulders 39 in well known manner.

It is well known that when a cartridge is fired in the chamber, the casing expands and resists the initial extraction, and to assist this extraction a primary extraction lever 41 is pivotally secured in a vertical channel 42 through the frame 3 pivoted at the lower end thereof on a pin 43. The construction of the lever 41 is shown in FIG. 13 with a rotary locking member 44 having a pair of lateral projections 45 secured in lever 41 for rotation normal to the axis of the bolt, as shown in FIG. 6. A pair of arcuate grooves 46 are cut in the frame 3 in opposite side walls of channel 42 for receiving projections 45 when member 44 is rotated, better shown in FIGS. 10 and 12. When the lever 41 is locked in the position shown, it serves as an outward stop for the bolt assembly when withdrawn by engagement with the left lugs 8, as shown in FIG. 10. However, the most important operation of the lever 41 resides in providing primary extraction of the cartridge by the camming engagement of the surface 47 on lug 9, as illustrated in FIG. 14, which will cam against the angular surface 48 of lever 41 and forcefully move the bolt rearward a short distance with high mechanical advantage and accomplish the primary extraction of the cartridge by means of the extraction device 17 as the bolt assembly is rotated into its unlocked position.

Referring to FIGS. 6, 10, and 12, when it is desired to remove the entire bolt from the firearm, the locking member is rotated approximately ninety degrees by means of the screw driver slot therein which will permit the lever 41 to be manually tilted outward from the channel 42 and permit the passage of the left lug 8 which would normally be stopped against the lever.

The channels 40 for guiding the lugs 8—8 run the entire length of the frame and thus prevent the bolt 7 from rotating when unlocked and withdrawn to ejection-load position with one of the lugs 8 against the lever 41.

The rotation of bolt 7 about its axis through an angle of approximately ninety degrees is required for locking same in the frame with the lugs 8—8 behind shoulders 39 in the frame, as previously described. This rotation is obtained by the action of the secondary bolt 11 which is adapted to reciprocate in the bore of the main bolt under the guidance of the cylindrical portion of screw 10 in engagement with a coaxial left hand helical groove 49 cut in the periphery of the bolt with radial walls through a predetermined first withdrawal distance, as shown in

FIGS. 10 and 17. The groove terminates at its forward end in a straight axial portion having a length D for reasons to be hereinafter described.

Referring to FIGS. 10, 16, and 17, the cylindrical end of screw 10 in the groove 49 is an effective follower member for rotating bolt 7 in opposite directions when bolt 11 is reciprocated in the bore of bolt 7.

A latch 50 for locking the secondary bolt in retracted position with respect to the main bolt is pivoted within a clevis 51 integral with bolt 7 by a pin 52. The rear end of the latch 50 terminates in a projection 53 and the opposite end terminates in a cam surface 54. A compression spring 55 is biased between the bolt 7 and the inner side of the cam surface 54 for urging the projection 53 against the surface of the secondary bolt 11 through an appropriate aperture. When the bolt 11 is withdrawn from the bolt 7, as shown in FIG. 17, the follower screw 10 will move along the axial portion D of groove 49 and permit the projection 53 of the latch 50 to engage a transverse notch 56 cut across the bolt 11. Thus the bolt 11 is locked in an outward position with respect to bolt 7 following the rotation of the bolt 11 through a radial angle of approximately ninety degrees, which is the condition of the elements shown in FIGS. 10 and 11. When the bolt assembly, as shown in FIG. 10, is moved in a forward direction for loading the cartridge into fire position, the cam surface 54 of latch 50 will cause cam against abutment 57 on the inner wall of frame 3, and release the bolt 7 for subsequent rotation by virtue of the helical groove 49.

At the time of the release of latch 50, the lower sides of head member 12 and the body member 14 of the handle 13 will have engaged the flat surfaces of the frame 3.

It is now apparent that no rotation is imparted to handle 13 and bolt 11 when reciprocated from load to firing position and vice versa.

FIGS. 1 and 6 illustrate a conventional receiver 5 for receiving a multiple cartridge magazine, which receiver also provides the trigger guard. This assembly is secured to frame 3 by screw means 58 and 59.

In operation and under the assumption that the bolt assembly is in fired position and the cartridge has been fired, then the handle 13 is gripped and the finger lock depressed, as shown in FIG. 5. The movement of the latter will disengage dog 22 from the right hand slot 23R and thus unlock the auxiliary lock and permit the handle to be pulled rearward. Since the lugs 8 are holding bolt 7 in locked position, the latter must be rotated approximately ninety degrees before the bolt can be withdrawn. Therefore, the first movement of the handle 31 rearward will withdraw the bolt 11 and by the action of the helical groove and follower screw 19 the bolt 7 will be rotated. At the time the main bolt 7 has been rotated approximately ninety degrees, it will be unlocked from the frame and the pin 10 will have entered the straight portion D of groove 49 and the projection 53 of latch 50 will engage the notch 56 and lock the secondary bolt to the main bolt.

During the latter portion of the rotation of the main bolt 7, the extraction lug 9 will cam against surface 48 of lever 41 and apply a force with high mechanical advantage to the bolt a relatively short distance whereby the extractor mechanism in the outer end of the bolt in engagement with the rim of the casing of the cartridge will apply primary extraction. Further rearward movement of the handle will complete the extraction of the spent casing, or live cartridge, and the bolt assembly will come to rest when the left lug 8 abuts lever 41, as shown in FIG. 10. Just prior to this point, the spent casing, or the live cartridge, will be ejected from the extraction mechanism. At this point, a subsequent cartridge will be inserted in the firing chamber by the first forward movement of the handle with both secondary bolts locked to the main bolt by latch 50. When the cam surface 54 of latch 50 engages abutment 57, then the rotary locking action of the main bolt will begin by the rotation imparted thereto by the

helical groove 49. When the rotation is complete, the lugs 8 will have engaged the shoulders 39, as shown in FIG. 4. The last forward movement of bolt 7 will engage the abutment of the cocking piece with the sear 36 and arrest the forward movement of the firing pin 27 and cock the latter for release by the trigger 6. At this point, the handle will reach its final forward position and the auxiliary abutment dog 22 of the finger lock 18 will have engaged the slot 23R. It is to be noted that the rear end of the firing pin 16 will now project from the head member 12 indicating the firearm is ready for firing.

In order to change the firearm for left hand use, as a first step, the lock member 44 is moved to release position and the lever 41 tilted outward which will permit the removal of the entire bolt assembly from the frame. As a second step, the screw 10 is removed from lug 9 and the bolt 7 removed from bolt 11. As a third step, the screws 15—15 holding the body portion 14 of the handle to the head member 12 are removed. As a fourth step, the handle is removed from bolt 11 and inverted and reinstalled on the left side of the bolt 11 and the screws 15 replaced. Then the secondary bolt is reinserted in the main bolt by depressing the cam surface of latch 50. Then the screw 10 is replaced for engagement with spiral groove 49. The bolt assembly is then reinserted in the frame 3 with the handle on the left side and the lever 41 is locked into operating position by locking member 44. It is now apparent that the finger latch in handle 13 will now engage the left side of slot 23 when the bolt assembly is in firing position, and all other operation is the same as previously described.

It is understood that certain modifications in the above construction, utilizing the features described, are intended to come within the scope of the appended claims.

Having described my invention, I claim:

1. In an interchangeable right or left hand bolt action firearm of the character described a means forming a frame,

a barrel having a cartridge firing chamber therein secured in said frame,

said frame having a bolt retaining bore coaxial with and adjacent said chamber including at least one straight guide channel in one side thereof parallel thereto,

a main bolt having at least one locking lug projecting laterally therefrom for a slidable movement in said channel,

said main bolt having a coaxial bore of predetermined length in the rear end thereof for slidably retaining a secondary bolt,

said main bolt slidably positioned in said retaining bore in said frame for reciprocating movement through a predetermined distance from a load to a firing position with the forward end thereof in close coaxial proximity with said chamber and with said lug engaged for axial reciprocal guidance of said main bolt in said guide channel,

a stop means in said frame for abutting said lug corresponding to said load position of said main bolt,

said channel terminating at the forward end in a transverse abutment in said frame for locking engagement with said lug when said main bolt is moved into its said firing position and rotated a predetermined locking angle about the axis thereof with the outer end of the main bolt positioned substantially against the outer end of a cartridge inserted in said chamber,

a secondary bolt slidably positioned in said frame for reciprocation only with the forward end portion thereof coaxially and slidably positioned in the said bore in said main bolt for axial movement from a predetermined outer to a predetermined inner firing position for rotating said main bolt from an unlocked to a locked position respectively,

cam means operatively associated with said secondary bolt and said main bolt for rotating the latter in one

direction through said angle for locking said main bolt when said secondary bolt is moved inward to its said inner position in said main bolt and to rotate said main bolt in reverse direction to unlock same when said secondary bolt is moved rearward to its said outer position,

latch means operatively associated with said main bolt and said secondary bolt for engaging and locking the latter and said main bolt together when said secondary bolt is withdrawn to its said outer position,

a fixed abutment in said frame for engaging and releasing said latch means when both said bolts are moved inward a predetermined distance corresponding to the end of the forward travel of said main bolt for permitting said secondary bolt to move to its said inner position and rotate said main bolt into its said locked position,

an operating handle secured to said secondary bolt by screw means and projecting normal therefrom in either right or left direction as desired whereby the rearward movement of said handle will first retract said secondary bolt and rotate and unlock the main bolt and engage the said latch means for further retraction of the said secondary bolt and the retraction of said main bolt to its said load position with its said lug against said stop means and whereby the forward movement of said handle will move said main bolt from its load to fire position and rotate same into its locked position when said latch means is released and permitting said secondary bolt to be moved into its said inner firing position.

2. The construction recited in claim 1 including said main bolt having a coaxial firing pin bore through the forward end thereof connecting the bore therein,

said secondary bolt having a second coaxial firing pin bore therethrough,

a firing pin means having a percussion pin at one end and a bearing portion at its opposite end,

said pin means slidably positioned for reciprocation at opposite end portions thereof in each said firing pin bore in each said bolt,

a cocking piece secured on said firing pin means for reciprocation therewith and projecting downward therefrom in an open slot in the lower side of said secondary bolt for reciprocation therein for cocking and releasing said pin means,

a compression spring biased between said secondary bolt and said firing pin for urging the latter from a cocked position with the said percussion pin withdrawn into the firing pin bore in said main bolt and said bearing portion guided in the firing pin bore in said secondary bolt for movement to a fired position with the forward end of the percussion pin projecting a predetermined distance from the forward end of said main bolt,

a trigger means secured in said frame including a retractable sear positioned for latching engagement with said cocking piece when said secondary bolt is moved a predetermined distance forward into firing position for arresting the forward movement of said pin means and energizing said spring means, said operating handle having a manually releasable operable finger latch therein adapted for self engagement with a transverse groove in said frame when said secondary bolt is moved into said firing position,

a second spring means biased between said handle and said finger latch for urging the latter into said groove.

3. The construction recited in claim 2 including an extended end of said bearing portion of said firing pin whereby said end will project from the rear of the said secondary bolt for visual indication that the firing pin is cocked and the said end will be retracted into said firing pin bore of said secondary bolt when said firing pin is in fired position.

4. In a bolt action firearm a means forming a frame,
 a barrel having a cartridge firing chamber therein se-
 cured in said frame,
 said chamber adapted to receive a cartridge with a rim
 extraction casing,
 said frame having a bolt retaining bore coaxial with
 and adjacent said chamber including at least one
 straight guide channel in one side thereof parallel
 thereto,
 a bolt having at least one locking lug projecting later-
 ally therefrom for a slidable movement in said channel,
 said bolt slidably positioned in said retaining bore in
 said frame for reciprocating movement through a
 predetermined distance from a load to a firing posi-
 tion with the forward end thereof in close coaxial
 proximity with said chamber and with said lug en-
 gaged for straight axial reciprocal guidance of said
 bolt in said guide channel,
 a transverse lock abutment in said frame at the termi-
 nus of the forward end of said channel for locking
 engagement with said lug when said bolt and said
 lug is moved into said firing position and rotated a
 predetermined locking angle about the axis thereof,
 manual means for rotating said bolt in opposite direc-
 tions through said angle for locking and unlocking
 said bolt when in firing position,
 a casing extraction means operatively associated with
 the forward end portion of said bolt for engaging
 the rim of said casing when said bolt is moved into
 firing position and for extracting the casing from
 said chamber when said bolt is moved into said load
 position,
 a primary extraction camming lug integral with said
 bolt projecting from a rear portion thereof in pre-
 determined linear and radial position on said bolt,
 a primary extraction cam means secured to said frame
 with a cam surface thereon positioned in the path
 of said extraction lug when said bolt is rotated into
 its said unlocked position whereby the engagement
 of said lug means with said cam surface will apply
 an initial short rearward movement with high me-
 chanical advantage to said bolt for the initial high
 friction extraction of said casing from said chamber
 and whereby said extraction means will complete
 the extraction of said casing when said bolt is re-
 tracted to its said load position.
5. In a dual bolt firearm of the character described
 a means forming a frame,
 a barrel having a firing chamber therein secured in
 said frame,

- a main bolt adapted and constructed for reciprocation
 within a predetermined distance in said frame coaxial
 with said chamber for movement from an outer load-
 ing to an inner firing position with the inner end of
 said bolt in close proximity to said chamber,
 locking means cooperatively associated with said frame
 and said bolt for locking the latter when rotated
 about its axis through a predetermined angle for
 locking a cartridge in said chamber,
 said main bolt having a coaxial cylindrical bore enter-
 ing the rear end thereof,
 a secondary bolt having a cylindrical forward portion
 slidably retained in said bore for predetermined com-
 bined axial and radial movement therein,
 the rear portion of said secondary bolt slidably re-
 tained on said frame for axial movement only,
 a helical groove in said forward portion of said second-
 ary bolt of uniform width and predetermined pitch
 and length terminating at the forward end thereof
 in a straight axial portion of like width,
 a follower member secured in said main bolt engaged
 in said groove whereby the helical groove will drive
 said follower member in a rotary path and rotate
 and lock said main bolt in said frame when said
 secondary bolt is moved forward in a straight axial
 direction and whereby the retraction of said second-
 ary bolt said predetermined distance will rotate said
 main bolt and unlock same for movement to said
 loading position.
6. The construction recited in claim 5 including a
 latch lever on one side of said main bolt pivoted for move-
 ment about an axis normal to the axis of said main bolt
 with a release abutment projecting from one end thereof
 and a latching end thereof extending through an aperture
 in said main bolt,
 spring means biasing said lever and said bolt for urging
 said latching end through said aperture,
 a transverse groove in said cylindrical forward portion
 of said secondary bolt forming an abutment for
 engagement by said latching end when said follower
 is in said straight axial portion of said helical groove
 whereby said secondary bolt is locked to said main
 bolt for the straight movement by said secondary
 bolt of said main bolt from its firing position when
 unlocked to its outward load position.
- No references cited.
- SAMUEL FEINBERG, *Primary Examiner.*
 BENJAMIN A. BORCHELT, *Examiner.*