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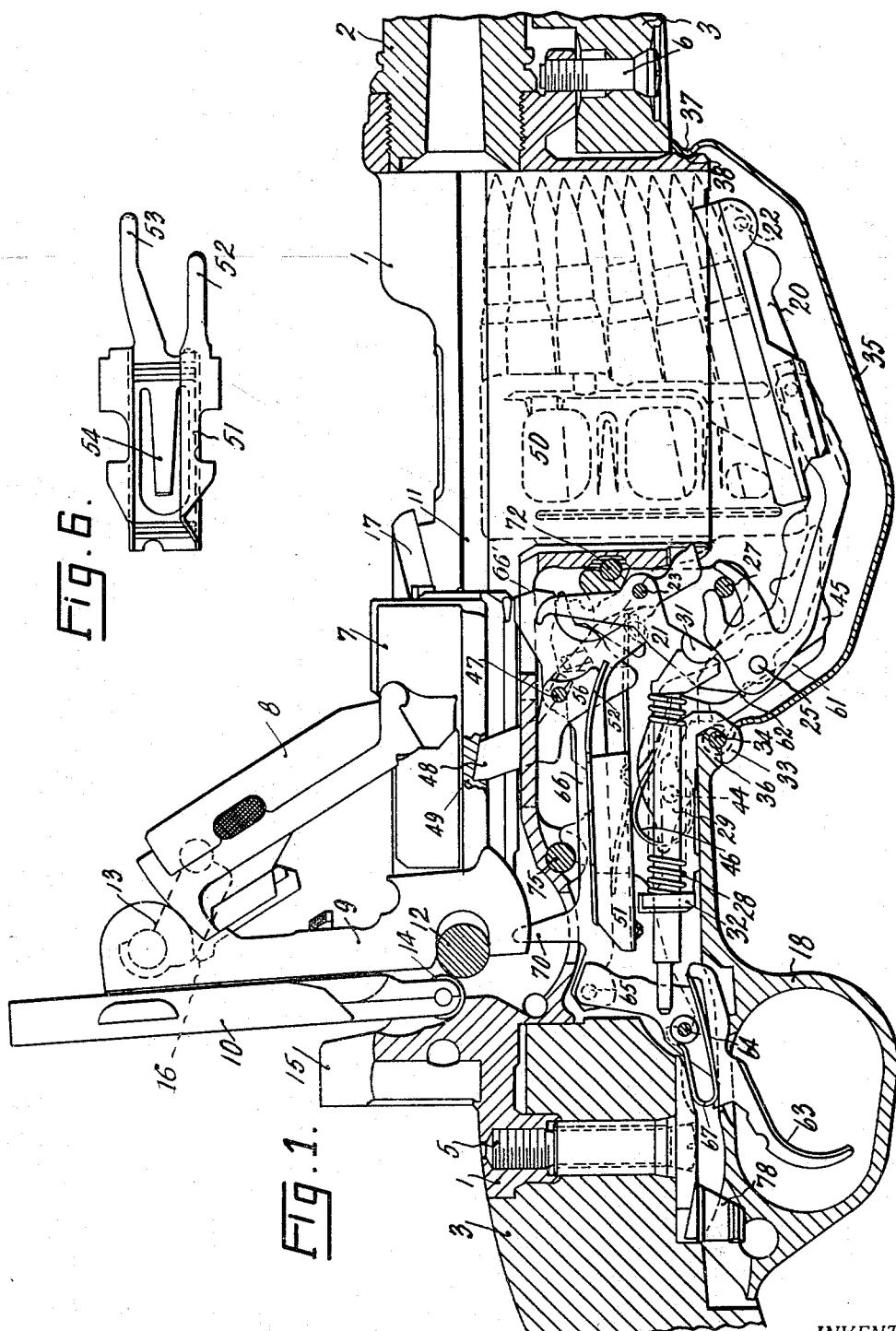
J. D. PEDERSEN

1,866,722

RIFLE

Filed Nov 29, 1930

5 Sheets-Sheet 1



INVENTOR.

JOHN D. PEDERSEN

BY

Chapin & Neal
ATTORNEYS.

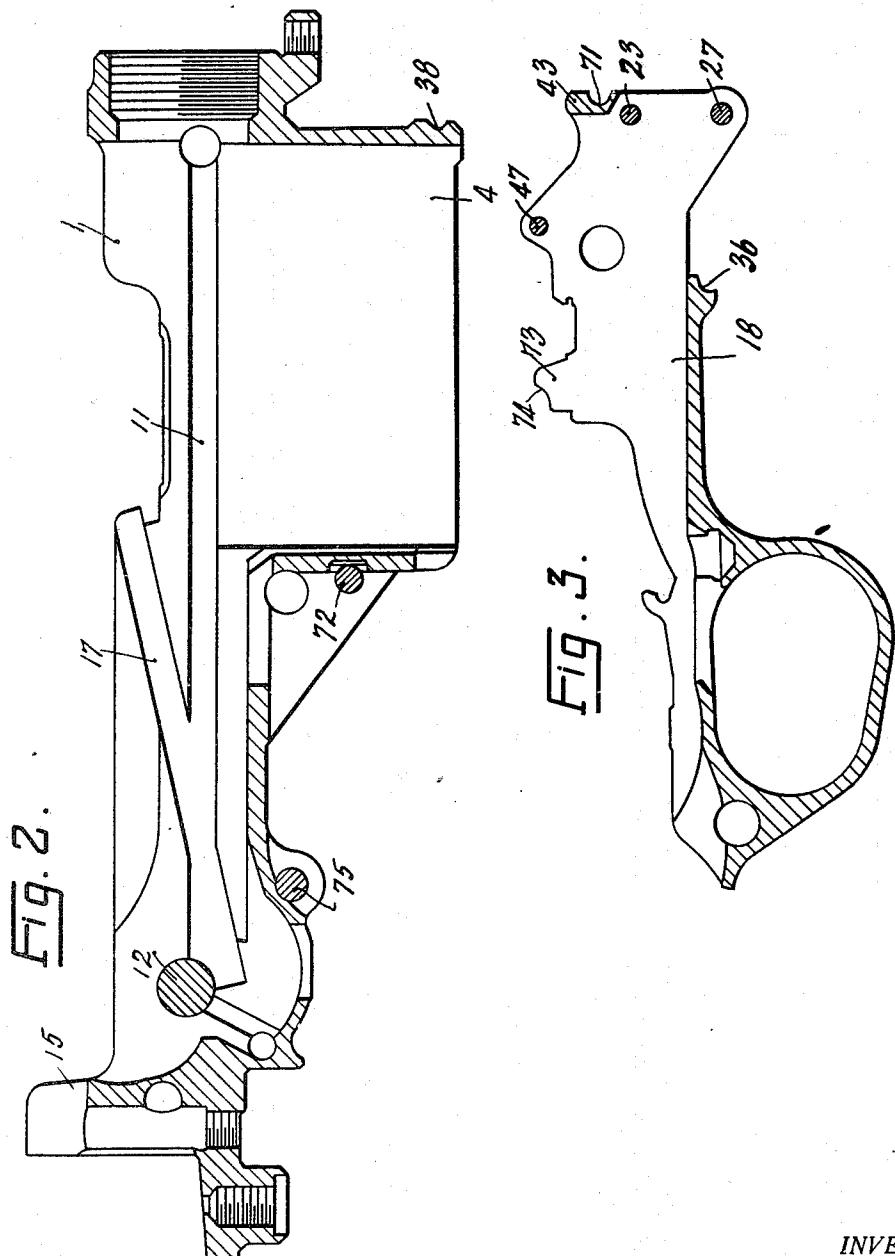
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JOHN D. PEDERSEN

BY

Chapin & Neal.
ATTORNEYS.

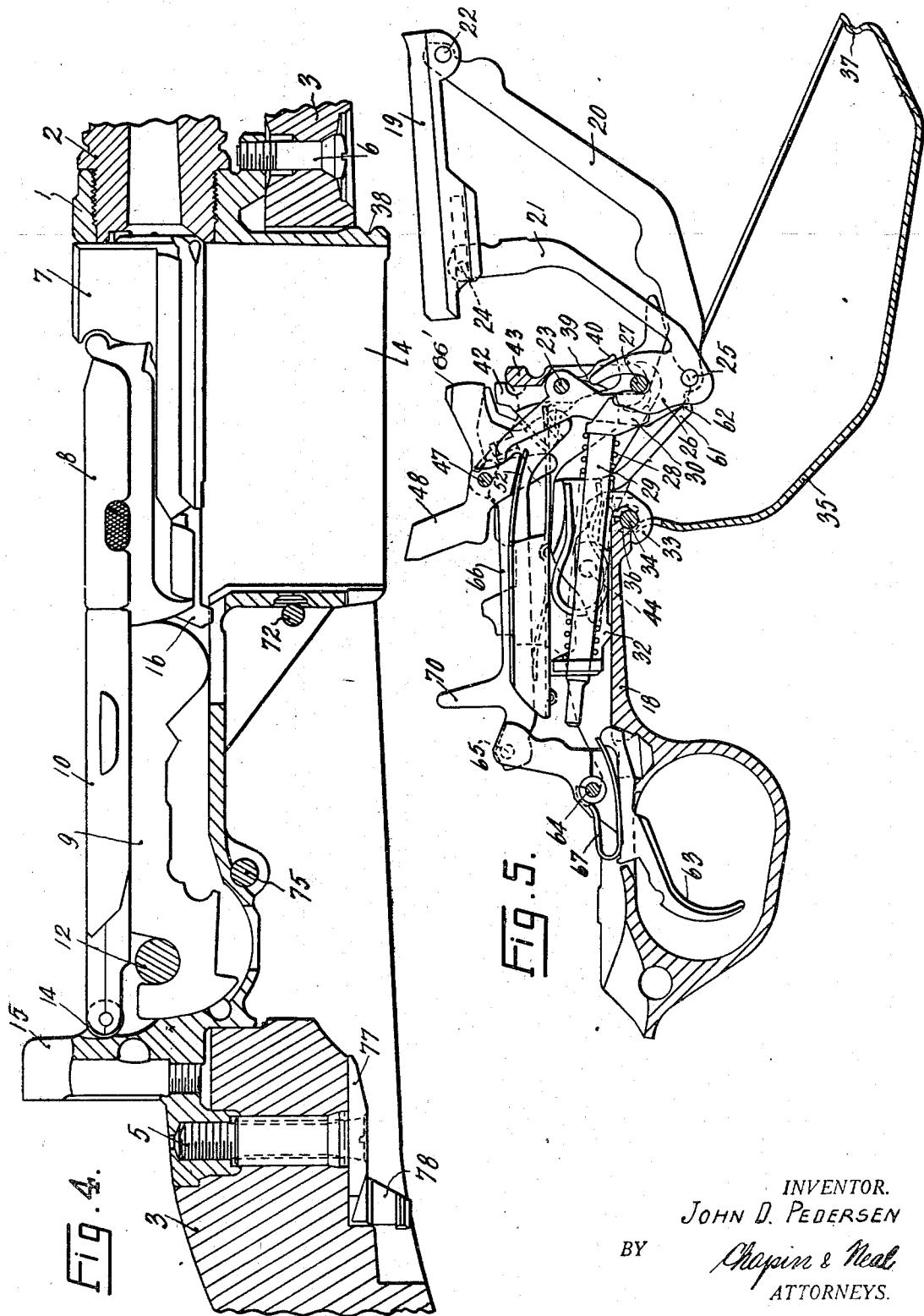
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INVENTOR.
JOHN D. PEDERSEN
Chapin & Neal
ATTORNEYS.

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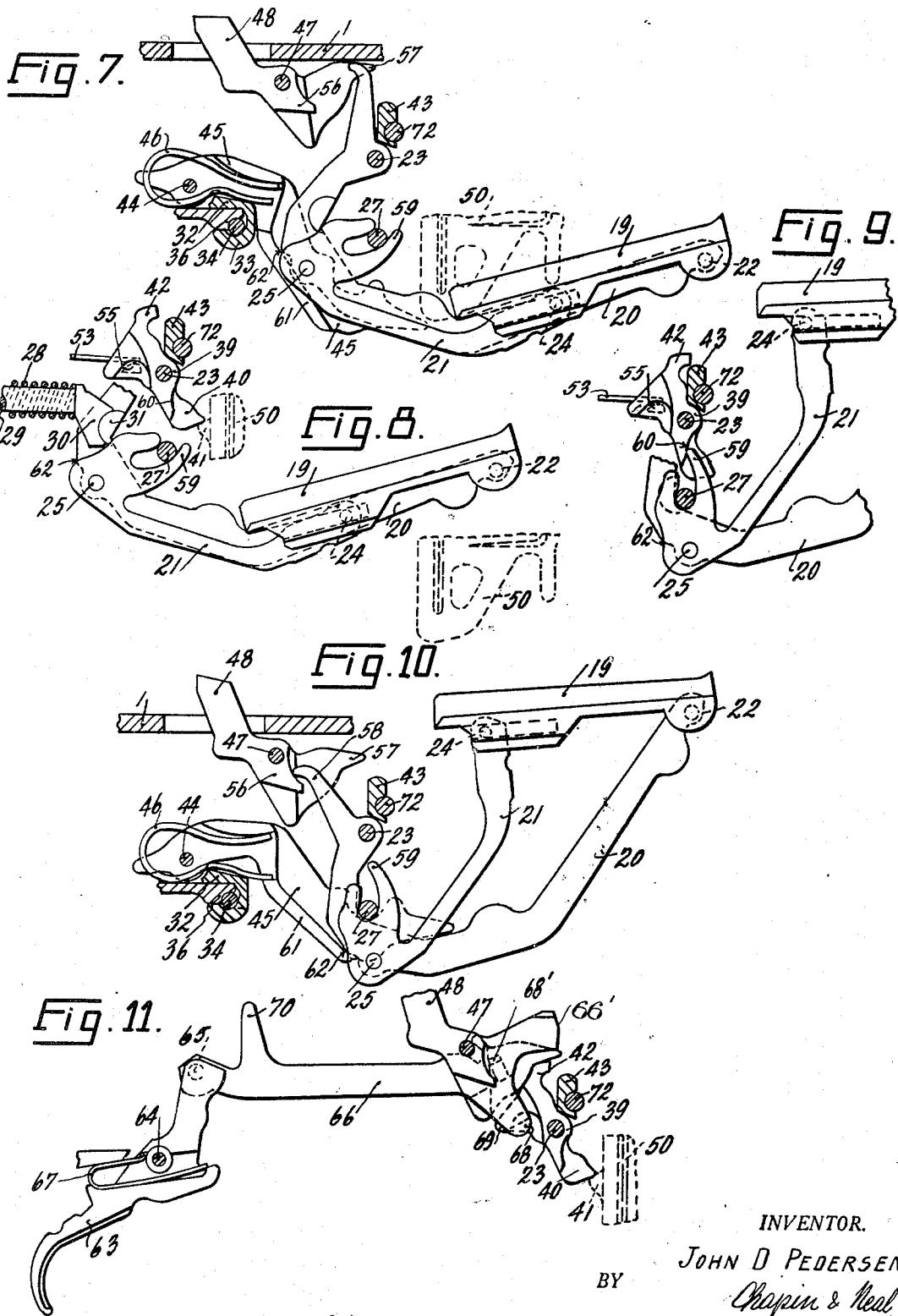
J. D. PEDERSEN

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INVENTOR.

JOHN D PEDERSEN
Chapin & Neal
ATTORNEYS.

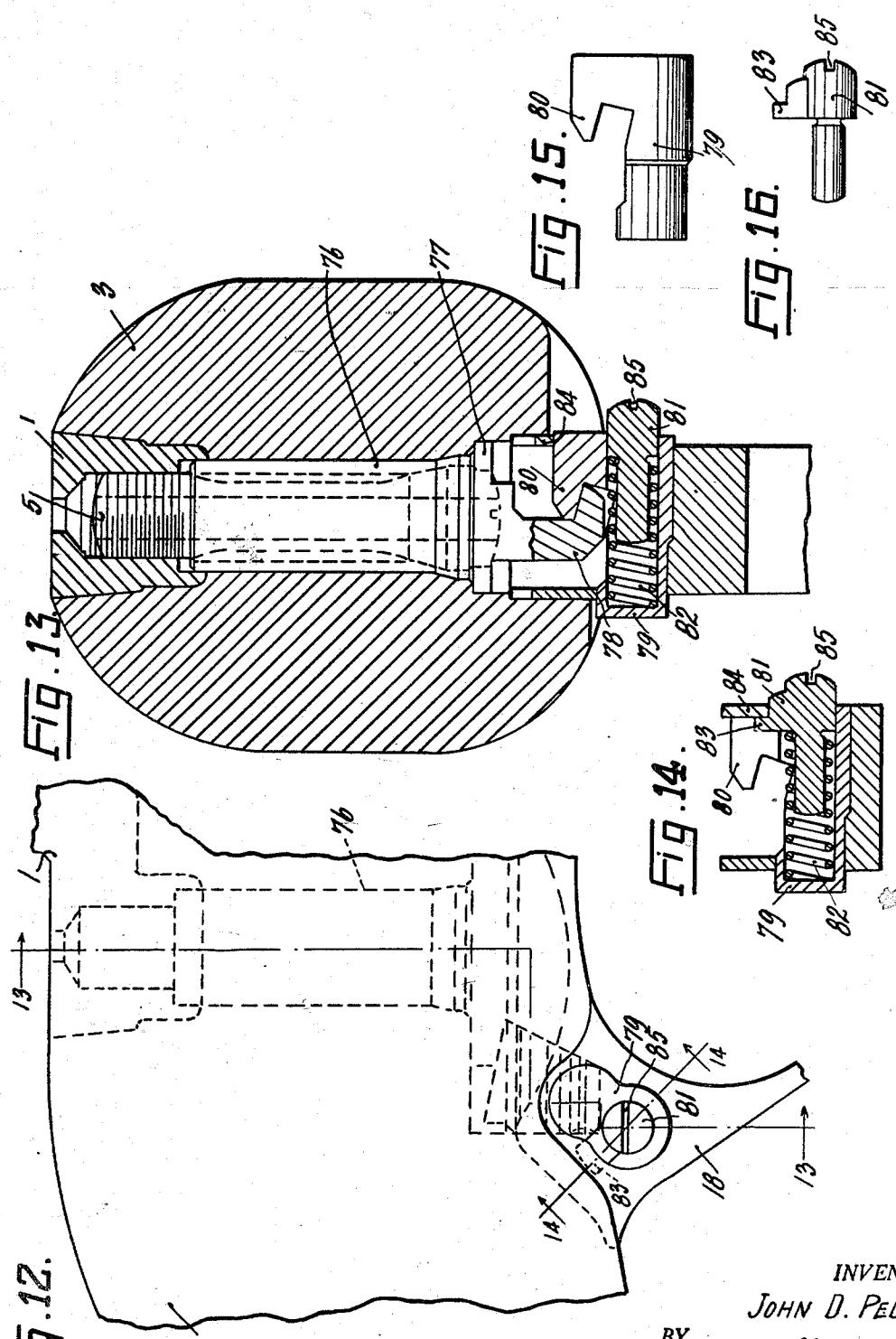
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J. D. PEDERSEN

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RIFLE

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INVENTOR.

JOHN D. PEDERSEN

BY

Chapin & Neal
ATTORNEYS.

UNITED STATES PATENT OFFICE

JOHN D. PEDERSEN, OF JACKSON, WYOMING

RIFLE

Application filed November 29, 1930. Serial No. 499,030.

This invention relates to improvements in rifles and more particularly to rifles of the self loading type adapted for military service, such as is disclosed in my previous Patent No. 1,737,974, dated December 3, 1929.

The invention has for one of its principal objects the organization, design and mounting of the several parts of the rifle as will facilitate its assembly and disassembly in the hands of the ordinary soldier, whereby all parts of the rifle will be easily accessible for cleaning, repair and replacement. In the carrying out of this feature of the invention, I have built the several parts of the rifle around three main groups or unitary assemblies which will be referred to as the receiver group, the breech closure group, and guard group. Each of these groups is so organized as to its component parts that it may be separated from the rifle as a self contained unit, and when thus separated from the rifle may be replaced as a whole or may be easily cleaned and repaired as to said component parts.

The receiver group constitutes the skeleton-like chassis for the rifle to serve as the support for the other groups, and is made up of such fixed and stationary parts of the rifle as the receiver, barrel and stock. When the breech closure group and guard group are separated from the receiver, the latter becomes stripped of all moving parts of the rifle and is so designed as to be accessible interiorly as well as exteriorly for cleaning.

The breech closure group comprises in general the reciprocating bolt, including the firing mechanism and appurtenances, and the self closing actuating mechanism therefor. This group is removably assembled on the upper side of the receiver group. The guard group comprises in general a trigger guard frame detachably mounted at the lower side of the receiver group, and carried on this guard frame for removal therewith are trigger mechanism, bolt stop mechanism, cartridge feeding mechanism, and clip handling mechanism,—and in fact all of the remaining moving parts of the rifle except those contained in the breech closure group.

A further object of the invention is the

provision of simple and effective means for detachably securing the trigger guard frame to the receiver whereby a soldier may remove the guard group by the mere pressure of his finger or a spare cartridge against a releasing member.

A still further object of the invention is to facilitate the charging of a magazine chamber with a clip of cartridges in en bloc form and wherein the pressure of the soldier's fingers required for thrusting a fresh clip of cartridges into the chamber will meet only a gradual and steady increase of resistance from the magazine spring and clip discharge spring as the latter are compressed.

Other and further objects of the invention will become apparent from the following description taken in connection with the accompanying drawings showing the preferred embodiment of the invention and in which:

Fig. 1 is a longitudinal section through the receiver and part of the stock and barrel of a rifle showing moving parts in elevation;

Fig. 2 is a sectional view of the receiver separated from the gun stock and barrel;

Fig. 3 is a detached view in section of the trigger guard frame stripped of its movable parts;

Fig. 4 is a view similar to Fig. 1 showing only the breech closure group assembled on the receiver group;

Fig. 5 is a sectional view of the trigger guard frame and movable parts in elevation mounted thereon constituting the guard group and as they would appear after having been just removed from the receiver group in Fig. 4;

Fig. 6 is a detached plan view of the triple spring member which actuates the latch, the bolt stop and trigger bar;

Fig. 7 is a fragmentary view of the follower mechanism in its lowest position when a full clip is in the magazine, the position of the clip being indicated in dotted lines, but the cartridges being omitted;

Fig. 8 is a similar view with parts removed to show the action of the magazine spring on the follower mechanism and of the latch on the clip;

Fig. 9 is a fragmentary view of the fol-

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lower mechanism in its upper position showing the action of releasing the latch;

Fig. 10 is another fragmentary view of the follower mechanism in its upper position showing the action of setting the bolt stop;

Fig. 11 is a fragmentary view of the trigger mechanism showing the method of releasing the latch manually;

Fig. 12 is an enlarged fragmentary side elevation of the gun stock just rearwardly of the receiver showing means for securing the trigger guard frame to the receiver;

Fig. 13 is a vertical section taken along jogged section line 13—13 of Fig. 12 looking in the direction of the arrows;

Fig. 14 is a detail section taken along the line 14—14 of Fig. 12;

Fig. 15 is a detached view of the hook; and

Fig. 16 is a detached view of the hook plunger which constitutes part of the means for securing the guard frame to the receiver.

Receiver group

Referring more particularly to the drawings, the receiver group comprises the receiver 1, the barrel 2, and gun stock 3, all intended to be permanently fixed together but which may be separated by proper tools. The contour and shape of the receiver is shown more clearly in Fig. 2 and its forward end is formed with a well-like passage 4 therethrough constituting the magazine chamber adapted to receive a clip of cartridges, as indicated in dotted lines in Fig. 1. The barrel 2 is screw threaded into the receiver as indicated, and the gun stock 3 is fastened to the receiver by means of the guard screw 5 and receiver screw 6.

Breech closure group

The breech closure group comprises reciprocating bolt 7, connecting rod or conrod 8, crank 9, and slide 10. The bolt 7 is reciprocably slidably in grooved ways 11 in each side wall of the receiver, and the crank 9 is mounted on the crank pin 12 fixed in the receiver. The crank is articulated to the conrod through link 13. These parts and their functional operation are essentially the same as the breech closure shown and described in my previous patent referred to. It will be understood that the crank 9 and slide 10 house a closing spring (not shown) which thrusts the slide roller 14 at all times rearwardly against the cam surfaces on the back stop 15 of the receiver in a manner tending to close the bolt and also to act as a buffer when the bolt reaches its rearmost position. It will also be understood that the bolt 7 and conrod 8 contain the firing mechanism, as described in my previous patent. Only the protruding rear end of the sear bar 16 is here shown. Also, as described in my previous patent, this entire breech closure group may be removed from the receiver by

guiding the bolt 7 backwardly far enough to tilt upwardly into the inclined ways 17 in each wall of the receiver and thus be slid out from the receiver.

Guard group

The guard group comprises trigger guard frame 18, shown detached in Fig. 3, and the various parts mounted thereon as shown in Fig. 5. A follower mechanism is provided to perform the usual function of feeding cartridges upwardly through a clip held in the magazine chamber, as described in my previous patent. The present follower mechanism comprises a follower 19 pivotally supported on front and rear carrier levers 20 and 21 respectively. The front carrier lever 20 has its forward end pivotally connected at 22 to the follower, and pivotally mounted at pin 23 upon the guard frame. The rear carrier lever 21 is both pivotally and slidably connected at its forward end 24 to the follower 19 and is pivotally supported at pin 25 upon the front carrier lever 20. The rear portion of carrier lever 21 is formed with a slotted arm 26 which slidably works on a fixed pin 27 on the guard frame. The slot in arm 26 is appropriately shaped to give the proper guiding control for the carrier levers 20 and 21 in their supporting movement for the follower.

The magazine spring 28 which serves to actuate the follower mechanism is a coil spring mounted on a magazine rod 29 which has a thrust bearing 30 at its forward end 100 against a lug 31 of the carrier lever 21. The rear end of the magazine rod 29 extends slidably through a supporting bearing in a kicker base 32 and the magazine spring 28 thrusts rearwardly against said kicker base. The forward end of the kicker base 32 has a hook portion 33 which engages around a hinge pin 34 fixed upon the rear end of the magazine cover 35 and tends to hold said pin 34 firmly against a recessed shoulder 36 of the trigger guard frame. The forward end of the magazine cover 35 has a lip portion 37 adapted to engage in a groove 38 at the lower end of the magazine front wall for being retained in closed position. The magazine cover is unlatched by pulling it slightly forward against the pressure of the hook 33 until the lip 37 may be disengaged from its groove 38.

It will be understood that the design, arrangement and connections of the carrier levers of the follower 19 is such that the movement of the follower is governed in a positive manner between its lower and its upper position in feeding the cartridges so as always to present the topmost cartridge of a stack in the proper position for being loaded by the bolt. A similar function is performed by the follower mechanism shown in my previous patent referred to; but the pres-

ent change of design has the advantage among others of mounting both carrier levers at the rear of the magazine chamber whereby they may be conveniently supported on the trigger guard frame for removal therewith in the disassembly of the rifle.

Pivoted mounted on the same pivot pin 23 as supports the front carrier lever 20 is a clip latch 39, which has a lower arm 40 engaging a nib 41 of a clip 50 to retain the clip within the magazine chamber. The clip latch 39 is balanced at its upper end by an arm 42 adapted to engage a stationary part 43 of the trigger guard frame and limit the clockwise movement of said latch. A spring tongue 53 of the triple spring member 51 engages a rear shoulder 55 of the latch 39 tending to rotate said latch into its clip holding position (see Figs. 6 and 8).

Pivoted at pin 44 on the kicker base 32 is a kicker 45, the function of which is to kick out the cartridge clip and discharge it upwardly from the magazine at proper times. A hairpin shaped spring 46 is mounted between the kicker base and kicker to furnish power for the latter (see Figs. 7 and 10).

Pivoted mounted at pin 47 on the trigger guard frame is a bolt stop 48, the upper rear end of which is adapted to engage in a notch 49 at the lower side of the bolt for holding the bolt in its rear position at proper times. A spring tongue 52 of the triple spring member 51 bears against a lower forward shoulder 56 of the bolt stop 48 tending to keep its rear nose down in inoperative position where it will not engage the bolt notch 49. The forward end 57 of the bolt stop abuts a web of the receiver 1 to limit its anticlockwise motion (see Fig. 7).

In the operation of the rifle as described in my previous patent referred to, when the last cartridge in the magazine has been loaded and the bolt moves back uncovering the magazine, the follower is elevated to its highest position. This final movement of the follower serves to set the bolt stop in position for holding the bolt retracted and simultaneously releases the latch so that the empty clip will be discharged by the kicker. The mechanism for accomplishing these results is changed from that disclosed in my previous patent, in order to attain an improved action and is as follows. As shown in Figs. 7 and 10, the forward carrier lever 20 has a rear tail 58 adapted to strike against the upper side of shoulder 56 on the bolt stop 48 and rock it clockwise when the follower reaches its upmost position in Fig. 10. Also the rear carrier lever 21 has a rear tail 59 adapted to strike shoulder 60 on the latch 39 and rock it clockwise, as shown in Figs. 8 and 9. The clockwise movement of the bolt stop sets it in bolt holding position, and the clockwise movement of the latch releases the clip, as will be obvious. The power

of the magazine spring actuating the follower is sufficient to overcome the power of the bolt stop spring and latch spring in accomplishing the action described. When the follower is subsequently depressed as by the charging into the magazine of a fresh clip, both the bolt stop and the latch are released to the force of their respective springs 52 and 53. The latch 39 immediately becomes active to engage and hold the freshly charged clip, but the bolt stop is not withdrawn from its notch 49 and the bolt remains open. This is due to a slight undercut made in the bolt stop notch 49 which requires that the bolt be slightly retracted further by hand in order to release the bolt stop.

An important feature of improvement in the present invention resides in the means for compressing the kicker spring in a continuous manner throughout the entire depressing stroke of the follower. Heretofore the charging of a fresh clip of cartridges into the magazine met initially only the resistance of the expanded magazine or follower spring; and near the end of said depressing stroke of the follower when its spring was almost fully compressed, the additional load of compressing the strong kicker spring was encountered. This made the action of charging an irritating one for the soldier and the possibility existed of not charging the clip home in consequence thereof.

In the present construction, as shown more clearly in Figs. 1, 7 and 10, the kicker 45 is located in overlapping relation with the front carrier lever 20 and said kicker has projecting from one side thereof a horizontal ledge 61 arranged to be engaged by an elbow portion 62 of the carrier lever 20. During the stroke of depressing the follower 19, the elbow 62 of carrier lever 20 bears continually upon ledge 61 and by a cam like action thereon effects a continuous depression of the kicker 45 against the force of its spring 46. In this manner when the freshly charged clip reaches its home position for being latched in the magazine chamber, the kicker has been fully compressed and in fact may be slightly spaced from the lower end of the clip, as shown in Fig. 7, since the clip itself does not depress the kicker. In this view, the cartridges contained in the clip (but not shown) are assumed to be holding the follower down. If the clip latch be released with the parts in this position, the follower will discharge the full clip upwardly out of the magazine by acting through the cartridges. In the normal operation, however, the follower, during its upward travel in feeding cartridges, will in its initial upward movement carry its elbow 62 away from the kicker 45 so that the latter will then engage the lower end of the clip 50 and be in position to discharge the clip when the latter is released by the latch.

Also mounted on the trigger guard frame

constituting part of the guard group is the trigger mechanism. This comprises a trigger 63 pivoted at 64 on the guard frame and having its upper end pivotally connected at 65 to a trigger bar 66. The forward portion of the trigger bar is guided by a slotted engagement with pin 47 so that its forward end 66' is adapted to strike the rear end of the sear bar 16 when the trigger is pulled and thus accomplish the firing of the rifle. The trigger spring is indicated at 67 and this spring is so shaped and located that it resiliently holds the trigger in a normal neutral position. The present trigger is arranged for a forward movement as well as a backward movement, the forward movement thereof serving through connections to release the clip latch and set the bolt stop manually, as will be described.

A spring tongue 54 of the triple spring 51 bears upwardly against the lower side of the trigger bar 66 and resiliently holds it against its guiding pin 47. When the trigger is pulled and the rifle is fired, the breech closure goes through its cycle of opening and closing the breech at such a rapid rate that the soldier will ordinarily not have time to release his finger from the trigger before the conrod 8 has brought down the sear bar 16 on top of the forward end of the trigger bar 66. The trigger bar 66 is thus slightly depressed by the sear bar 16 against the force of the spring tongue 54; but immediately upon its release, the trigger will move forward to its neutral position and the trigger bar 66 will move back sufficiently to bring its forward end up behind the sear bar 16. The forward portion of the trigger bar 66 also is formed with a depending hook-like arm 68 which engages behind a rear extension 69 of the latch 39 whereby when the trigger is pushed forwardly it will, through trigger bar 66, pull the latch 39 out of its holding engagement with the clip 50 and thus release the clip manually. A lug 68' on the trigger bar also actuates the bolt stop to its bolt holding position at the same time (see Fig. 11).

A projection 70 on the trigger bar 66 cooperates with a cam portion on the crank 9 (said cam portion not being shown) in such manner that the trigger bar cannot be pulled backwardly by a forward movement of the trigger to release the latch except when the crank 9 stands in vertical position and the bolt is open, as in Fig. 1. In order to release the latch manually, therefore, the bolt must first be retracted and held back by hand during the forward movement of the trigger.

The triple spring member 51 is a channel-like piece of spring steel with three separate spring tongues 52, 53 and 54, the functions of which have previously been described. This triple spring member is located in a bed provided therefor in the trigger guard

frame 18 so that it normally remains in fixed position but may be easily detached.

Guard frame mounting

The trigger guard 18 (as shown in Fig. 3) 70 has at its forward end 43 a semi-circular recess or socket 71 adapted to seat against a fixed cross pin 72 of the receiver. A shoulder 73 on an intermediate upper portion of the trigger guard frame has a socket 74 adapted to seat against a fixed cross pin 75 also on the receiver. The rear end of the trigger guard frame is detachably secured to the receiver by a finger releasable spring pressed latch mechanism, shown in detail in Figs. 12 to 16. Surrounding the guard screw 5 and passing through the stock 3 of the rifle is a sleeve-like member or guard stem 76 which is formed at its lower end with a plate portion 77 and depending hook portion 78. Extending through an aperture at the rear of the trigger guard frame is hook member 79 with an offset hook 80 at one side thereof adapted to engage the hook 78 of the guard stem. 85

The hook member 79 is retained in position by means of a hook plunger 81 and hook spring 82 mounted as shown in Figs. 13 and 14. The hook spring 82 is interposed between the hook member 79 and the hook plunger 81, tending to move the former to the left and the latter to the right as viewed in Fig. 14. When the hook 80 is in its left position, it is in securing engagement with the hook 78 (as shown in Fig. 13). Pressing the hook member 79 with the finger or any hard implement will move the hook 80 far enough to the right to release it from the hook 78 and thus detach the rear end of the guard frame from the receiver. The hook plunger 81 has a projecting lip 83 to engage behind a wall portion 84 of the guard frame for retaining the parts in the position shown. This hook plunger is also provided with a screw driver slot 85 whereby it may be turned slightly clockwise to bring the lip 83 into register with the aperture of the hook member 79, whereby the complete assembly of the hook member, hook plunger and hook spring may be moved to the right outwardly of the guard frame. This maneuver is accomplished by first pressing the hook plunger 81 inwardly toward the left viewing Fig. 14 until the lip 83 will pass under hook 80 when the hook plunger is turned clockwise. 115

The mounting of the guard frame and its assembled parts upon the receiver is accomplished by inserting the forward end of said group into the receiver until the socket 71 engages cross pin 72 and socket 74 is about to engage cross pin 75; then the rear end of the guard frame is swung upwardly on the pin 72 as a pivot to engage hook 80 with hook 78, the latter part of the connection being preferably accomplished by a brisk blow at the rear of the guard frame to snap the parts into in- 120

terlocking relation. When thus interlocked, the guard frame is rigidly secured to the receiver in properly aligned position. Downward movement of the front of the guard frame is prevented by the semi-circular socket 71 in engagement with pin 72, and the guard frame may only be removed by first unlatching the hooks 80 and 78 and swinging the rear end downwardly and away from the receiver.

What I claim is:

1. In a rifle, in combination, a receiver, a trigger guard frame, means for detachably securing said guard frame to said receiver comprising a pivotal mortise connection between said receiver and one end of said guard frame, and a finger releasable spring pressed latch between the receiver and the other end of said guard frame, said latch arranged to be automatically engaged when the guard is pivotally swung on its mortise connection into assembled position with respect to said receiver.

2. In a rifle, in combination, a receiver, a trigger guard frame, means for detachably securing said guard frame to said receiver comprising a pivotal mortise-like engagement between said receiver and one end of said guard frame and an abutting mortise connection between the receiver and an intermediate upper portion of said guard frame, and a finger releasable spring pressed latch connection between said receiver and the rear of said guard frame, said latch arranged to be automatically engaged when the guard is pivotally swung on its end mortise connection into assembled position with respect to said receiver.

3. In a rifle, in combination, a receiver, a trigger guard frame, means for detachably securing said guard frame to said receiver comprising a pivotal mortise connection between said receiver and one end of said guard frame, and a finger releasable spring pressed latch between the receiver and other end of said guard frame, said latch having its engaging movement transversely of said receiver and arranged to be automatically engaged when the guard is pivotally swung on its end mortise connection in assembled position with respect to said receiver.

4. In a rifle of the type having automatic feeding and loading mechanism for cartridges, in combination, a receiver, a self closing breech action, a trigger guard frame detachably connected to said receiver and a follower mechanism mounted on said guard frame for removal therewith in the disassembly of the rifle.

5. In a rifle of the type having automatic feeding and loading mechanism for cartridges, in combination, a receiver, a self closing breech action, a trigger guard frame detachably connected to said receiver, a clip latch and a clip discharge kicker mounted

on said guard frame for removal therewith in the disassembly of the rifle.

6. In a rifle of the type having automatic feeding and loading mechanism for cartridges, in combination, a receiver, a self closing breech action comprising a reciprocable bolt, a trigger guard frame detachably connected to said receiver and a movable bolt stop mounted on said guard frame for removal therewith in the disassembly on the rifle.

7. In a rifle of the type having automatic feeding and loading mechanism for cartridges, in combination, a receiver, a self closing breech action comprising a reciprocable bolt, a trigger guard frame detachably connected to said receiver, a trigger mechanism, a follower mechanism, a clip latch, a clip discharge kicker, and a movable bolt stop, all mounted on said guard frame for removal therewith in the disassembly of the rifle.

8. In a rifle of the type having automatic feeding and loading mechanism for cartridges, in combination, a receiver, a self closing breech action comprising a reciprocable bolt, a trigger guard frame detachably connected to said receiver, a follower mechanism comprising a carrier lever and a movable bolt stop all mounted on said guard frame for removal therewith in the disassembly of the rifle, said carrier lever being arranged to actuate said bolt stop into bolt holding position after the feeding of the last cartridge.

9. In a rifle of the type having automatic feeding and loading mechanism for cartridges, in combination, a receiver formed with a magazine chamber, a self closing breech action, a trigger guard frame detachably connected to said receiver, and a follower mechanism mounted on said guard frame for removal therewith in the disassembly of the rifle, said follower mechanism comprising a pair of carrier levers both pivoted to said guard frame at the rear of said magazine chamber.

10. In a rifle of the type having automatic feeding and loading mechanism for cartridges, in combination, a receiver, a self closing breech action comprising a reciprocable bolt, a follower mechanism comprising a pair of carrier levers, a bolt stop for holding the bolt in a rear position, and a clip latch for retaining a clip in said rifle, said carrier levers being constructed and arranged so that one actuates said bolt stop into holding position and the other actuates the clip latch into releasing position after the feeding of the last cartridge.

11. In a rifle of the type employing a clip of cartridges adapted to be charged into a magazine chamber, in combination, a follower mechanism, clip discharge mechanism comprising a kicker and its actuating spring,

and means whereby said follower mechanism when depressed by the charging of the clip of cartridges acts to depress said kicker against the force of its spring.

- 5 12. In a rifle of the type employing a clip of cartridges adapted to be charged therewith into a magazine chamber, in combination, follower mechanism comprising a carrier lever, clip discharge mechanism comprising a kicker and its actuating spring, said follower having a relatively long stroke and said kicker a relatively short stroke, and means whereby during the long stroke of depressing said follower in the charging of a
- 10 5 clip of cartridges the carrier lever acts to depress said kicker through its short stroke against the force of its spring.
13. In a rifle of the type employing a clip of cartridges adapted to be charged therewith into a magazine chamber, in combination, a follower mechanism comprising a carrier lever, clip discharge mechanism comprising a kicker and its actuating spring, said carrier lever having a portion adapted to engage said kicker and depress the same against the force of its spring when the follower mechanism is depressed.

In testimony whereof I have affixed my signature.

JOHN D. PEDERSEN.