M. F. SMITH.

FIREARM.

APPLICATION FILED OCT. 21, 1905.

954,654.

Patented Apr. 12, 1910.

5 SHEETS—SHEET 1.

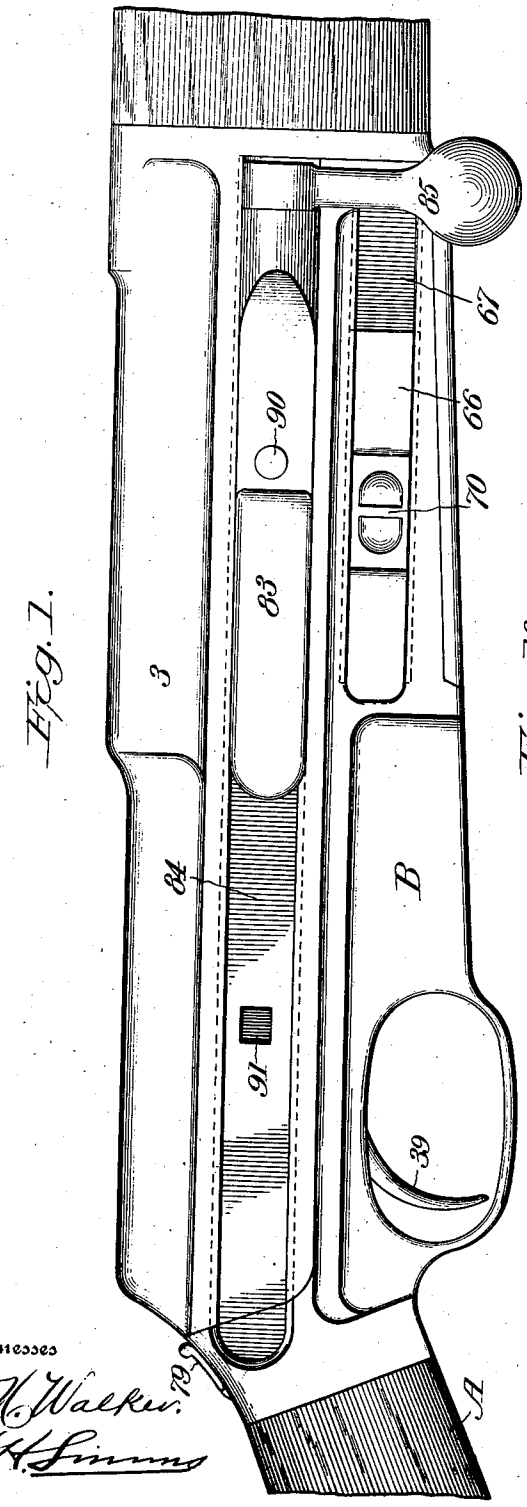

Fig. 1.

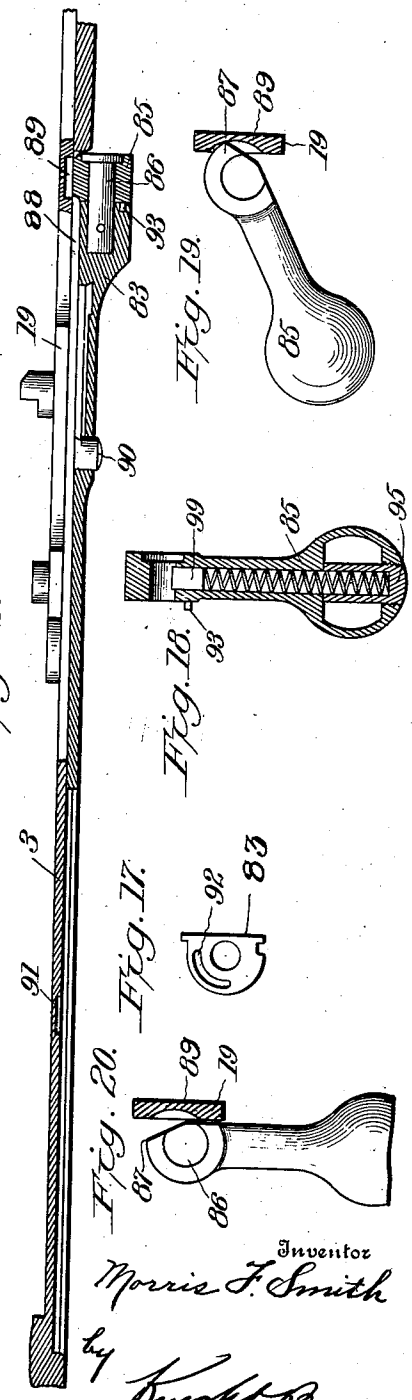

Fig. 16.

Fig. 19.

Fig. 18.

Fig. 17.

Fig. 20.

Witnesses

C. N. Walker.

H. H. Simms

Inventor

Morris F. Smith

by Knight Bros

Attorneys

M. F. SMITH.

FIREARM.

APPLICATION FILED OCT. 21, 1905.

954,654.

Patented Apr. 12, 1910.

5 SHEETS—SHEET 2.

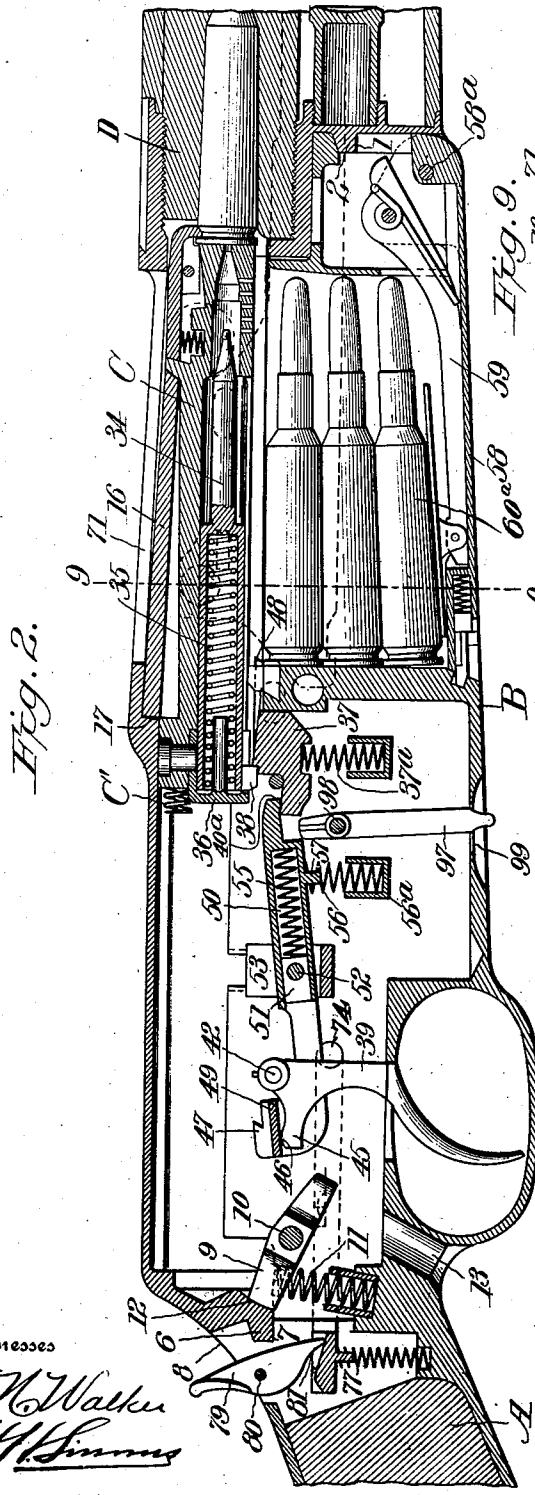

Fig. 2.

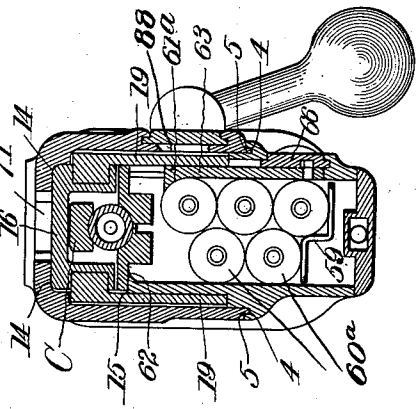

Fig. 9.

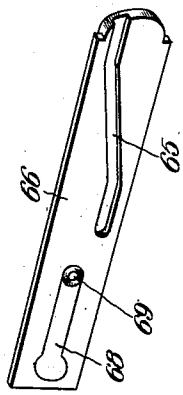

Fig. 11.

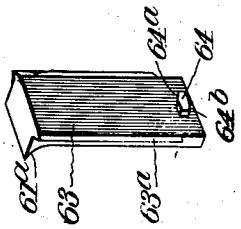

Fig. 10.

Witnesses

C. M. Walker

A. H. Simms

Inventor

Morris F. Smith

by Knight Bros

Attorneys

M. F. SMITH.

FIREARM.

APPLICATION FILED OCT. 21, 1905.

954,654.

Patented Apr. 12, 1910.

5 SHEETS—SHEET 3.

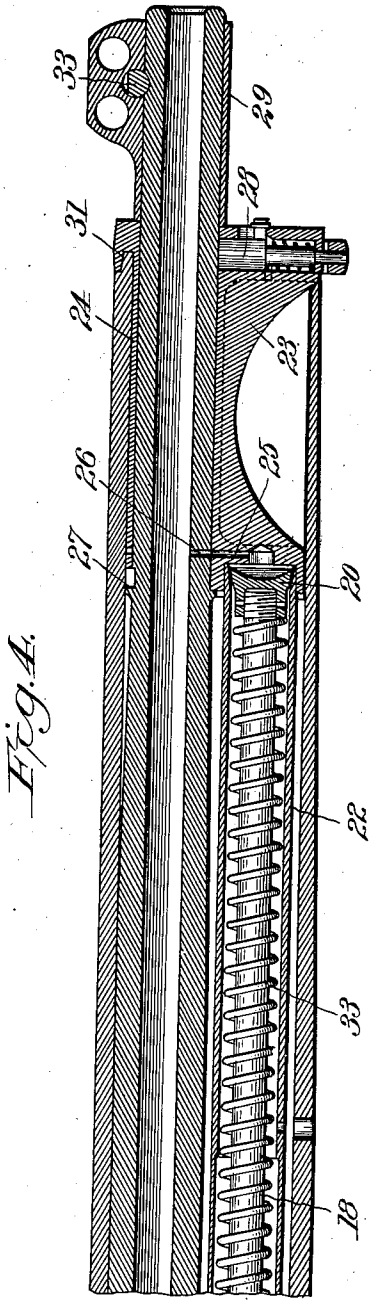

Fig. 4.

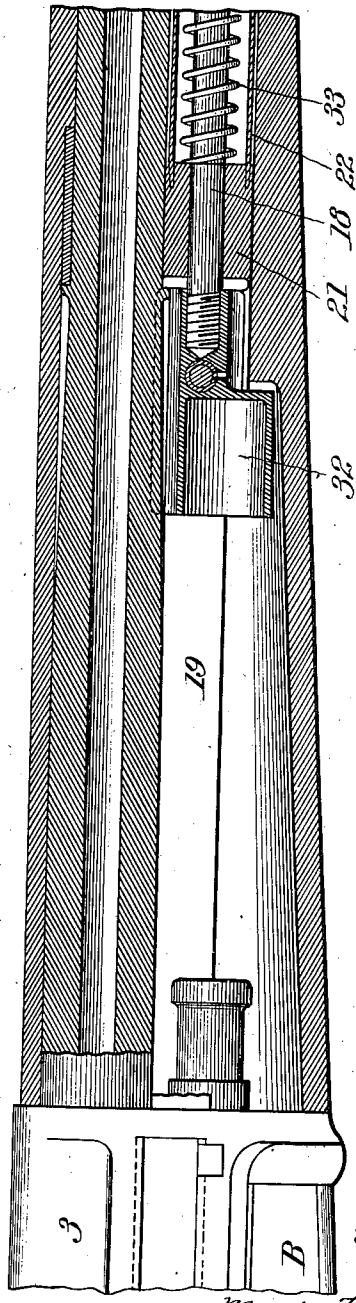

Fig. 3.

Witnesses

C. N. Walker.

H. K. Simms

Inventor

Morris F. Smith

By Knight Bros

Attorneys

M. F. SMITH.

FIREARM.

APPLICATION FILED OCT. 21, 1905.

954,654.

Patented Apr. 12, 1910.

5 SHEETS—SHEET 4.

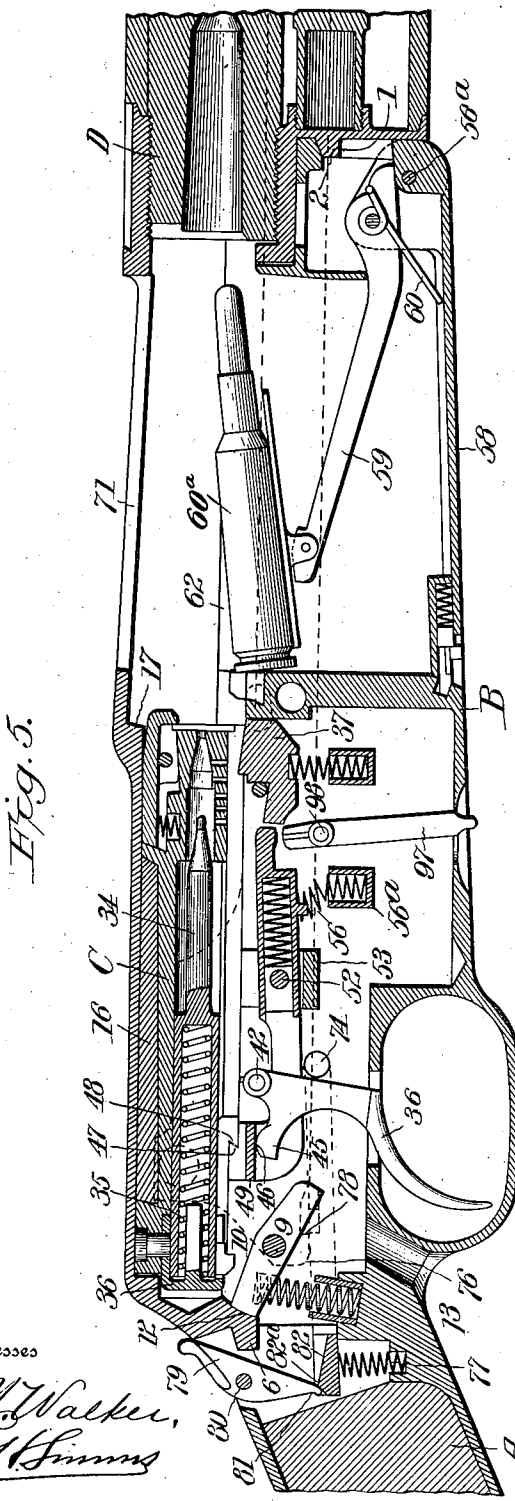

Fig. 5.

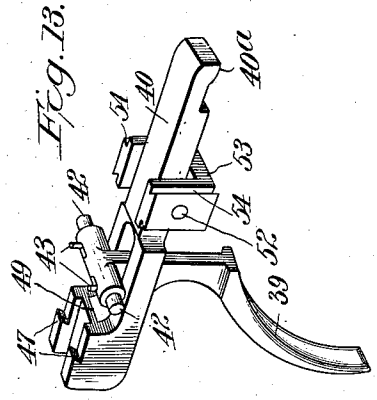

Fig. 13.

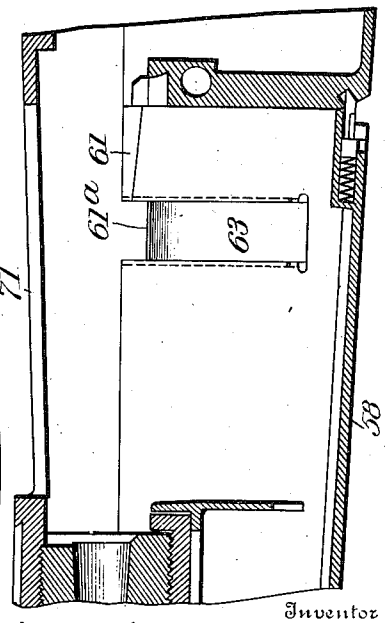

Fig. 12.

Witnesses

C. M. Walker.

H. H. Simms

Inventor

Morris F. Smith

by Knight Bros

Attorneys

M. F. SMITH.

FIREARM.

APPLICATION FILED OCT. 21, 1905.

954,654.

Patented Apr. 12, 1910.

5 SHEETS—SHEET 5.

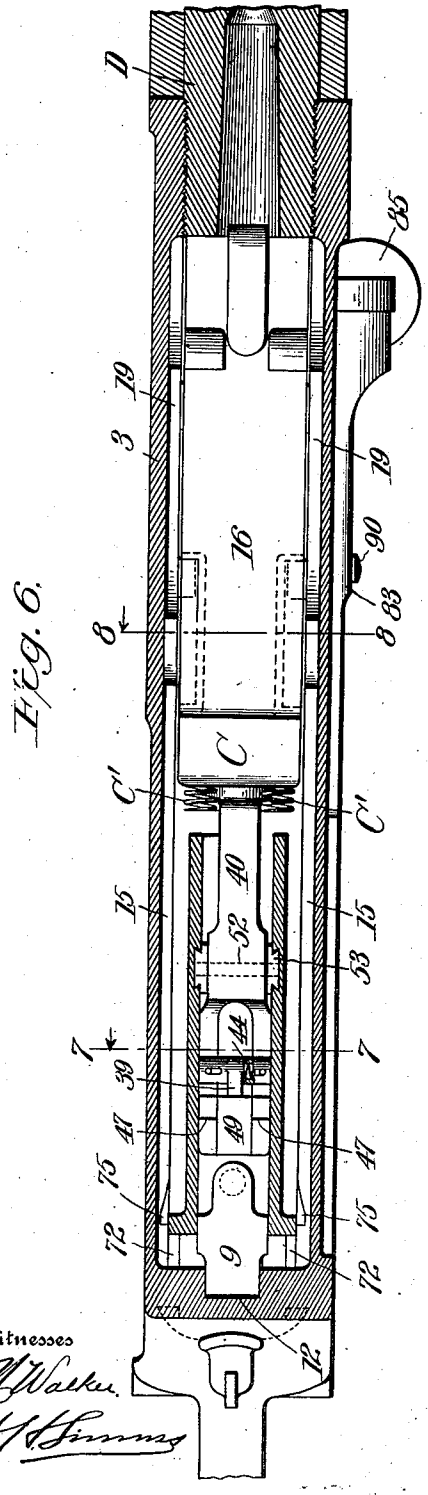

Fig. 6.

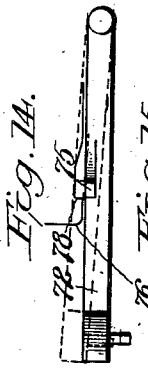

Fig. 14.

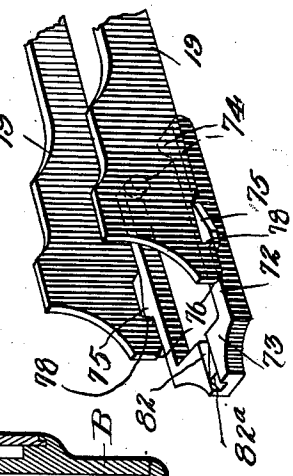

Fig. 15.

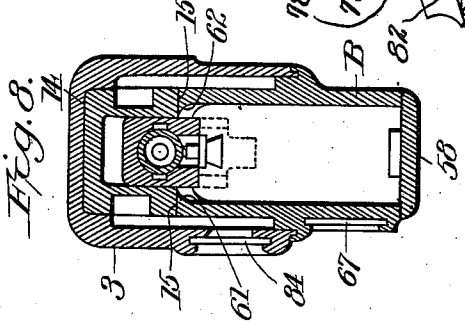

Fig. 8.

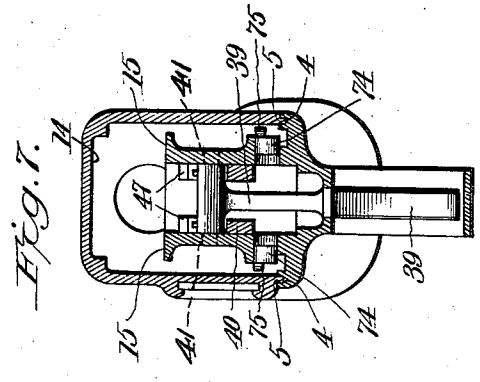

Fig. 7.

Witnesses

C. M. Walker.

H. H. Simms

Inventor

Morris F. Smith

Knight Bros

By

Attorneys

UNITED STATES PATENT OFFICE.

MORRIS FORD SMITH, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO SMITH-CONDIT ARMS COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF NEW JERSEY.

FIREARM.

954,654. Specification of Letters Patent. Patented Apr. 12, 1910.

Application filed October 21, 1905. Serial No. 283,829.

To all whom it may concern:

Be it known that I, MORRIS FORD SMITH, a citizen of the United States, and resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Firearms, of which the following is a specification.

My invention relates to magazine fire arms and more especially to that type in which the functions of opening the breech, discharging the spent shell, feeding a new cartridge and closing the breech, are accomplished by the act of firing.

My invention has for an object to render such a gun easily convertible from automatic loading to hand loading or magazine reserve shooting and to facilitate the hand loading by interrupting or arresting the automatic operation after each shot with the breech open ready to receive a cartridge dropped in by hand and then permitting completion of the cycle of automatic movements by releasing the breech closure, the magazine being locked off during this use of the gun so as to be held in reserve.

Further objects are to provide an improved means for locking the receiver and the frame together; an improved means for securing the gas cylinder to the barrel, said means being also adapted to hold the wooden casing to the barrel; an improved firing mechanism; an improved magazine lock off; and an improved means for retracting the breech bolt.

With these and other objects in view, the invention consists in the parts and combination of parts hereinafter described, shown in the accompanying drawings, and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a side elevation of the receiver and the frame of the gun. Fig. 2 is a vertical longitudinal section through the receiver and the frame in position ready for firing. Figs. 3 and 4 are respectively longitudinal sections of two adjacent portions of the barrel and the gas operated parts. Fig. 5 is a longitudinal section, showing the breech bolt open and ready to return to firing position. Fig. 6 is a horizontal section through the receiver. Fig. 7 is a vertical transverse section on line 7—7, Fig. 6. Fig. 8 is a like section on line 8—8 of the same Fig. 6. Fig. 9 is a like section on line 9—9, Fig. 2. Figs. 10 and 11 are perspective views respectively of the magazine lock off slide and its operating slide. Fig. 12 is an inside view of one wall of the magazine, showing the lock off slide lowered. Fig. 13 is a perspective view of the trigger and the connector. Fig. 14 is a side elevation of the latch or detent for engaging the members of the drive rod. Fig. 15 is a detail perspective view of a portion of the drive rods and latch or detent. Fig. 16 is a longitudinal section through one wall of the receiver, showing the retracting slide and one member of the drive rod. Fig. 17 is an end view of the retracting slide. Fig. 18 is a longitudinal section of the retracting arm. Figs. 19 and 20 are detail sectional views showing the two positions of the retracting arm.

While I have herein shown and described my improvements as applied to a gun of the type shown in my Patents No. 814,242, dated March 6, 1906, No. 817,198, dated April 10, 1906, and No. 818,920, dated April 24, 1906, it is to be understood that the improvements may be adapted to guns of other types.

Assembling gun.—In the gun shown, A indicates a stock having a frame B rigidly secured thereto. The forward portion of the frame is provided with a recess 1 in which enters the lug 2 on the receiver or barrel extension 3 and holds the front part of the frame and the receiver together. The upper edge of the frame is provided with grooves 4, one on each side and in these grooves fit tongues 5 on the receiver 3.

Locking the frame and the receiver together.—I combine with this construction a particular form of locking device which I have found to be simple and effective for locking the rear of the receiver to the frame. This locking device comprises a lug 6 on the rear end of the receiver adapted to enter a notch 7 in a projection 8 on the frame. The frame and receiver, when connected together, are locked by a latch 9 pivoted intermediate its ends at 10 and pressed upwardly at its rear end by a coil spring 11. When the receiver is slid rearwardly on the frame, the latch is engaged by the receiver and depressed. After the lug 6 enters the notch, the latch moves, under the action of its spring, behind a shoulder 12 on the receiver. To separate the receiver and the frame, a projectile or other pointed device is introduced through an opening 13 in the frame

to engage the forward end of the latch to move the latter out of the path of the shoulder 12.

Breech bolt and its operating mechanism.—Arranged to move on tracks 14 within the receiver and on the tracks 15 on the top of the frame is a breech bolt C which is locked to the breech of the barrel D preferably by a pivoted locking bolt 16 engaging a shoulder 17 in the receiver and moved into and out of locking position by a drive rod. The rear end of the breech bolt carries projecting coil springs C′ which are adapted to engage the rear of the receiver and prevent any shock being transmitted to the bolt. This drive rod is composed of a piston rod 18 and a bifurcated rear end portion forming two members 19 arranged on either side of the breech bolt and connected thereto in any suitable manner, such, for instance, as shown in my Patent #817,198. The piston rod carries a piston 20 and extends through a lug 21 depending from the barrel and works in a tube or cylinder 22 seated at one end in the lug 21. As an improvement over my Patent #817,198 this tube is seated at its other end in a member 23 which is hung from the barrel by a sleeve 24 and is provided with passageway 25 that communicates with a transverse port 26, this port being in communication with the bore of the barrel near one end of the latter to take powder gases from the barrel as usual. This member 23 slides on the barrel from the muzzle end and is held at its rear against an annular shoulder 27 on the barrel, by means of a sliding pin 28 and a sleeve 29 which in turn is locked by an eccentric pin 33. Also carried by the member 23 is a rib 31 which forms a seat for one end of a hollow wooden casing which surrounds the barrel and the cylinder, the other end of the casing being seated in the front ends of the receiver 3 and the frame B. The drive rod is cushioned by dash pot 32 and returned by a coil spring 33, the constructions of both forming no part of the present invention.

Firing mechanism.—The breech bolt C carries a firing pin or striker 34 which is pressed forwardly by a coil spring 35 mounted in the hollow rear end of the striker and bearing against a removable abutment 36. This firing pin is moved rearwardly in the breechbolt by lugs on the drive rod, as shown in my previous patents, and, immediately before the breech bolt reaches its firing position, a sear 37 preferably pivoted to the frame below the breech bolt in the manner set forth in my Patent #817,198, enters into engagement with a shoulder 38 on the firing pin and holds the latter in firing position. The sear is pressed upwardly by a spring 37ª.

In a semi-automatic gun it is well recognized that it is necessary to provide means for releasing the sear before the trigger is released. In my Patents #817,198 and #818,920, I accomplish this result by shifting the trigger. This, however, has some disadvantages and in my present construction, I provide a fixed fulcrum 42 for the trigger 36 and an intermediate pivoted member or connector 40 between the sear and the trigger, this connector being provided with a shiftable fulcrum. The trigger is mounted between the side walls of the frame, the side walls being provided with alined perforations 41 shown in dotted lines in Fig. 7 into which are adapted to project trunnions 42 carried by the trigger. These trunnions 42 are adapted to be pressed within the trigger to permit the trigger to be withdrawn from the frame, the trunnions each having a pin and slot connection 43 with the trigger and being pressed outwardly by a spring 44. The trigger is further provided with a rearward extension 45 having a curved face 46. This extension is straddled by the bifurcated rear end of the connector 40 which is formed on its upper rear face with a shoulder 47 lying in the path of shoulders 48 on the under side of the breech bolt, and has its under face provided with a plane surface 49 slidable on the curved face 46; thus providing a loose connection between the trigger and the connector. In front of the surface 49 the connector lies below the trunnions 42 and on opposite sides of the trigger, while in front of the trigger the connector is formed with a hollow portion or bore 50 in which works a block 51. This block 51 has loosely extending therethrough a pivot pin 52 whose ends are secured within the arms of a U shaped cradle 53 which has dovetailed connections 54 with opposite sides of the frame, thus permitting the cradle and the connector to be withdrawn vertically from the frame. The forward end of the connector 40 is provided with a nose 40ª which lies normally above the rear free end of the sear, and is held in this position by a helical spring 55 arranged in the bore 50 and abutting the forward end wall of the bore and the front end of the block 51. The forward end of the connector 40 is normally held in a raised position by a helical spring 56 whose upper end surrounds a lug 57 depending from the connector and whose lower end is seated in a pocket 56ª in the frame below the connector.

It is apparent that, with the parts as shown in Fig. 2, if the trigger is pulled, the rear end of the connector 40 will be elevated and the front end will be depressed, thus causing the sear to release the firing pin and the cartridge to be fired. Upon the rearward movement of the breech bolt, the shoulder 48 will engage the shoulder 47 on the connector and move the connector to

release the sear. Owing to the loose connection between the trigger and the connector, the trigger will not be affected. On the forward movement of the breech bolt, the connector is released and moves forward under the action of its spring 55. If the trigger has been released the connector will now lie in the position shown in Fig. 2, but, if the trigger is still held, the forward end of the connector will engage the rear end of the sear and when the trigger is released will ride above the sear.

A lock for the firing mechanism may be provided, that shown consisting of a lever 97 pivoted intermediate of its ends at 98 and having its upper end adapted to be thrown beneath the sear and its lower end projecting through a slot 99 in the bottom of the frame.

Hand loading.—An automatic gun is desirable both in hunting and in warfare, in the former when the object aimed at is missed on the first fire and will escape if hand reloading is necessary; and in the latter when the warfare is being conducted in close quarters. However, in both hunting and in warfare it is unnecessary to at all times have an automatic magazine gun and therefore the magazine may be held in reserve until actually needed, and the breech may be prevented from returning to firing position so that a projectile may be introduced into the barrel by hand.

Magazine lock off.—To hold the magazine in reserve, I provide a magazine lock off. This magazine lock off has been adapted for that type of magazine arranged on the forward end of the frame and shown in my previous patents in which the cartridges 60ª are arranged in two rows and are fed into the magazine through the bottom of the latter, the bottom being closed by a cover 58 hinged at 58ª and carrying a feeding lever 59 which is moved by a spring 60 to feed the cartridges through the contracted discharge of the magazine. The contracted discharge is formed by two overhanging lips 61 and 62, one extending inwardly from each wall of the magazine, and both gradually decreasing in thickness from their rear ends so that they are positioned some distance from the front end of the magazine. The discharge is thus less in width at its rear than the diameter of a cartridge so that the shell of a cartridge cannot enter the receiver under the action of the feeding lever but has to be moved through the front end of the discharge of the magazine and into the barrel, by the front end of the breech bolt, the lower portion of which is adapted to fit between the overhanging lips. This construction of magazine is, as before stated, old.

To lock off the magazine, a portion of one wall of the magazine is formed into a vertical slide 63 which carries a portion 61ª of one of the overhanging lips. This slide has a tongue and groove connection 63ª with the adjacent portions of the magazine wall and on its outer face is provided with a lug 64 formed with beveled faces 64ª and 64ᵇ. This lug 64 extends into a longitudinal cam groove 65 on one face of a slide 66 arranged to move transversely of the slide 63 and on a track 67 which is positioned on the outside of the gun frame. Secured at one end to the slide 66 is a leaf spring 68 which is formed with a projection 69 at its free end, adapted to enter notches in the frame and thus to hold slide 66 in both of its extreme positions. When the slide 66 is moved to the rear by finger piece 70 the slide 63 will be depressed and vice versa, thus providing a means for operating the slide 63. The overhanging lip on slide 63 forms a means to engage the uppermost cartridge to depress the same and prevent it being fed into the path of the breech bolt, thus preventing feeding from the magazine.

Automatically locking breech bolt open.—To cause the breech bolt to remain open so that a projectile may be introduced through the discharge opening 71 and thus feed independently of the magazine, I provide a latch or detent comprising two arms 72 connected by a cross piece 73. The two arms lie approximately horizontal and are pivoted at their forward ends as at 74, within the gun frame adjacent to the stock. On their outer faces, these arms carry lugs or shoulders 75 which, when the rear end of the latch or detent is elevated, lie in the path of the beveled rear ends 76 of the drive rod members 19. These beveled ends of the drive rod cause the depression of the latch which, then under the action of a helical spring 77, rises and causes the lugs or shoulders 75 to enter notches in the under side of the members 19 and to engage the shoulders 78 formed by said notches, and thus prevent the return of drive rod and the breech bolt. To release the breech bolt and thus permit it to return to firing position there is provided a releasing device in the form of a trip or lever 79 pivoted intermediate of its ends at 80 and having one portion projecting above the frame at the rear of the receiver, and at the forward end of the grip, to provide a finger piece, and its other portion extending into the frame and provided with a nose 81 adapted to move in a cam groove 82 in the cross piece 73, of the two-armed detent 72 (Figs. 2, 5, 14 and 15). When the nose is positioned in the forward portion of the groove in front of shoulder 82ª as shown in Fig. 2, the latch or detent 72 will be raised by its spring 77 to position shown in Fig. 2 partly in full lines and partly in dotted lines and by dotted lines in Fig. 14 where its shoulders 75 can engage shoulders 78 on the drive rod members; and when said nose

is positioned in the rear of the shoulder 82ª, as shown in Fig. 5, the latch will not engage the drive rod members, and will not hold the breech bolt open; or if the breech bolt is being held open by the latch, when the trip 79 is moved to this latter position, the breech bolt will move to firing position.

Retracting breech bolt by hand.—The breech bolt may also be retracted by hand. For this purpose, a slide or bolt 83 is arranged to reciprocate upon tracks 84 arranged upon the side of the receiver. This slide carries on its front end an arm 85 which is journaled upon a bearing or pin 86 carried by the slide. This arm is formed with a nose or projection 87 adapted when the arm is thrown upwardly to pass into a slot 88 in the receiver and engage in a notch 89 in a member 19 of the drive rod. If, in this position, the arm 85 is pulled to the rear, the slide 83 and the drive rod with the breech bolt will also be drawn to the rear. The breech bolt may in this position be locked either by detent in the rear of the receiver or by the spring latch 90 carried by the slide and adapted to engage in a notch 91 in the receiver. When the arm 85 is in an inoperative position the breech bolt and drive rod are disconnected therefrom. The end of the slide 83 is also provided with an arcuate groove 92 concentric with the pivot of the arm 85, and the arm is provided with a pin 93 which works in the groove and limits the swinging movement of the arm. To prevent the free swinging of the arm 85, said arm is made with a central bore closed at the outer end of the arm and terminating at the pivot pin 86. In this bore is arranged a helical spring 94 which bears at its outer end against a removable plug 95 closing the outer end of the bore, and bears at its inner end against a block or plunger 96 frictionally engaging the pin 86.

Having thus described my invention, what I claim as new therein and desire to secure by Letters Patent is:

1. In an automatic fire arm, a barrel, a breech bolt, a drive rod automatically moving said breech bolt to and from the breech of the barrel, firing mechanism arranged to fire the gun while the breech is closed, and a detent independent of the firing mechanism automatically engaging the drive rod while the breech is open and holding the breech bolt in such position until the drive rod is released.

2. In a fire arm having a breech-bolt, a pair of drive rods moving to open said breech-bolt on firing, a releasable detent automatically engaging each of the said drive rods to detain the breech-bolt in open position, cocking means, independent of said detent, and releasing mechanism operative to discharge the arm at will, after closure of the breech.

3. A fire arm, having an automatically opening breech-closure, a detent, releasable at will, locking the breech open, and firing mechanism operative at will, after closing the breech, to cause firing; said detent comprising a pair of pivoted arms, each having engaging means, that restrain the breech-bolt on one side thereof.

4. In a fire arm, having a breech closure automatically opening as a result of firing, automatic closing means for said breech closure, a detent engaging the closing means, means releasing said detent to permit closing the breech, and firing mechanism operative at will, after closing of the breech, independent of the detent releasing means.

5. A fire arm having a breech-closure, automatic breech-opening mechanism, automatic breech closing mechanism, a detent locking the breech-closure in open position, means releasing said detent to permit automatic action in the closing means and firing mechanism, embodying means causing ignition, a sear independent of the detent standing in engagement with and restraining the ignition-causing means after closure of the breech, and means independent of the detent-releasing means, for releasing the sear and causing firing.

6. In an automatic magazine fire arm, automatic means holding the breech open on firing, and means for preventing the feeding of cartridges from the magazine, comprising means for depressing the column of cartridges and means for holding said depressing means in its depressed position.

7. A firearm having means automatically holding open the breech at time of firing and means whereby the magazine is prevented from presenting a cartridge in position for insertion into the gun comprising a device for depressing the column of cartridges and a slide controlling said depressing means.

8. The combination of a frame having a recess near the rear thereof, a receiver having a separable connection with the front of the frame, and a lug at its rear to enter the recess in the frame, and a latch pivoted to the frame and arranged in the path of and adapted to engage the receiver to hold the lug in the recess.

9. In a gun, the combination of a frame, having a recess at its rear; a receiver having a separable connection with the front of the frame, a tongue and groove connection with the sides of the frame, and a lug to enter the recess in the frame; and a latch pivoted intermediate of its ends and having its upper end arranged to be depressed by the receiver in assembling the gun and to engage the receiver and hold the lug in the recess.

10. In a gun, the combination with a frame, of a receiver having a separable connection with the front of the frame and an

interlocking connection with the rear of the frame, and a latch pivoted intermediate of its ends and having its upper end arranged to be depressed by the receiver in assembling the gun and then to engage the receiver and hold it interlocked with the rear of the frame.

11. In a gas operated gun, the combination with the barrel, and a gas cylinder arranged below the barrel, of a member in which one end of the cylinder is seated, hung from the barrel and removable therefrom, and a removable casing for the barrel and the cylinder, seated at its forward end in the removable member.

12. A member for gas operated guns provided with a gas port, a seat for a gas cylinder, a sleeve to fit a gun barrel, and a seat for a gun casing.

13. In an automatic gun, the combination with a breech bolt, of a sear, a trigger, and a connector between the sear and the trigger, having a shiftable fulcrum and shifted by the breech bolt.

14. In an automatic gun, the combination with the breech bolt, of a sear, a trigger having a rearward extension, and a connector adapted to be engaged by the rearward extension of the trigger and by the breech bolt, and having a shiftable fulcrum.

15. In an automatic gun, the combination with a breech bolt, of a sear, a trigger, and a connector operated by the breech bolt and having a block slidable thereon and carrying the pivots of the connector.

16. In an automatic gun, the combination with the breech bolt, of a sear, a trigger, and a connector between the trigger and the sear, having a loose connection with the trigger, and provided with a sliding block carrying a pivot and a spring tending to move the connector to the sear.

17. In an automatic gun, the combination with the breech bolt moving automatically upon firing, of a striker, a sear for said striker, a trigger, and a connector between the trigger and the sear, comprising an intermediately pivoted lever engaging the sear and trigger by its respective ends, and longitudinally movable independently of both the sear and trigger, and engaged by the breech bolt and carried rearwardly to remove it from the sear when the breech opens.

18. In a gun, a gun frame having a magazine opening formed at the forward end thereof, said magazine opening having a movable bottom closure mounted on the frame and lips extending from its opposite walls; and means for depressing a portion of one of said lips.

19. In a gun, the combination with the magazine, of a vertical slide carrying means to engage the cartridges and cause the depression of the latter, in a direction opposite to the feed, when the slide is depressed, and means holding the slide in depressed position, thereby preventing feed of the cartridges.

20. In a gun, the combination with a magazine, of a vertical slide for depressing the cartridges, and a slide movable transversely of the vertical slide and having a cam connection therewith.

21. In a gun, the combination with a magazine, having cartridge retaining lips extending from opposite walls thereof at the rear of the magazine only, of means for depressing a portion of one of said lips.

22. In a gun, a gun frame having a magazine opening formed at the forward end thereof, said magazine opening having a movable bottom closure; lips extending from its opposite walls; and a vertically depressible slide forming part of a wall of the magazine opening and carrying a portion of one of the lips.

23. In an automatic gun, the combination with the breech bolt and the gas operated drive-rod for moving the breech bolt, of a firing mechanism for firing the gun operable at will when the breech bolt is in closed position, a latch independent of the firing mechanism for engaging the drive rod to hold the breech open, and means for preventing the latch engaging the drive rod.

24. In an automatic gun, the combination with the breech bolt, and a gas operated drive rod having a bifurcated rear end, of a latch formed of two arms and a cross-piece, pivoted at its front and adapted to engage the drive rod.

25. In an automatic gun, the combination with the breech bolt, and a gas-operated drive rod having a bifurcated rear end, of a latch formed of two arms and a cross piece, pivoted at its front and adapted to engage the drive rod, and a trip adapted to engage the latch and operate the same.

26. In a gun, the combination with the drive rod, of a sliding retracting bolt carrying an arm movable relatively to the bolt into and out of engagement with the drive rod.

The foregoing specification signed at Philadelphia, Pa., this twelfth day of October, 1905.

MORRIS FORD SMITH.

In presence of two witnesses:

HENRY RAINEY,

T. ELLIOTT PATTERSON.