M. F. SMITH.

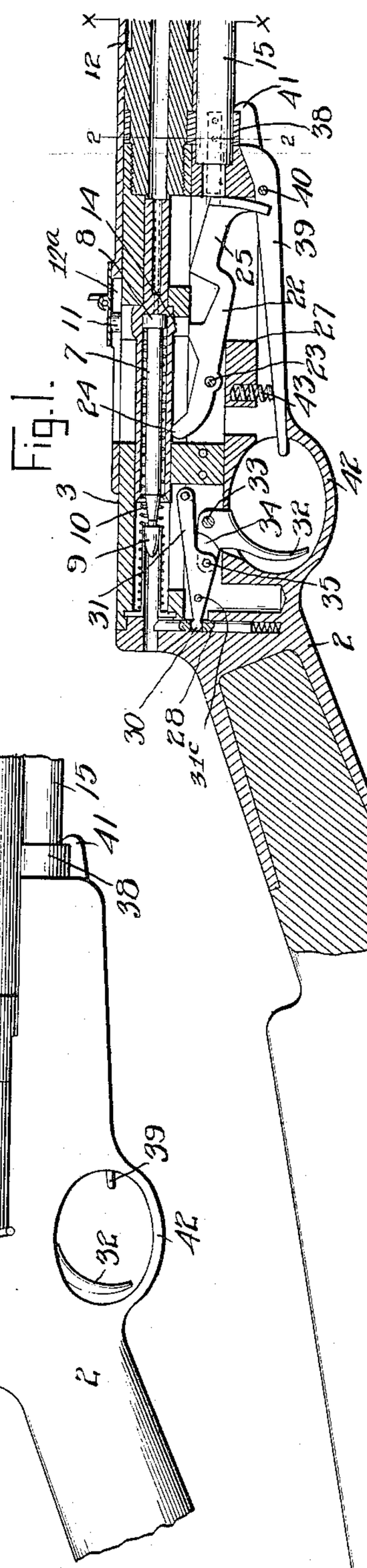
FIREARM.

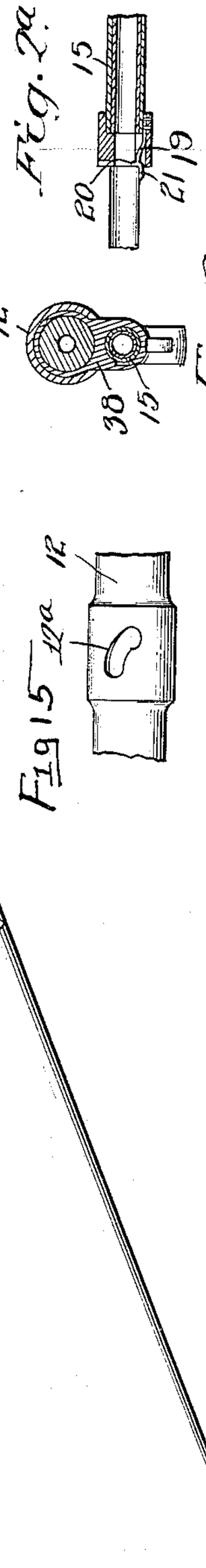
APPLICATION FILED DEC. 10, 1909.

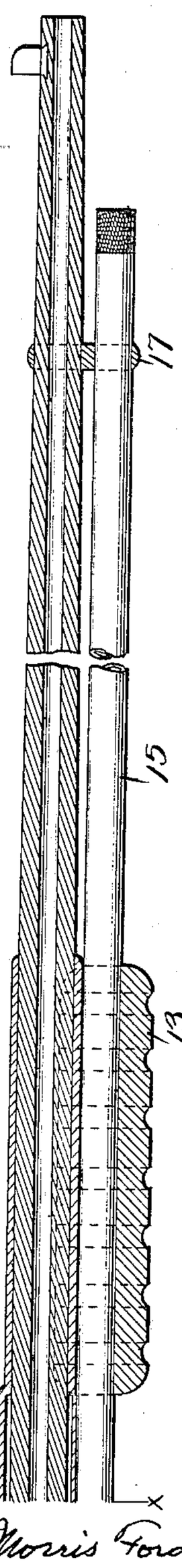
1,166,554.

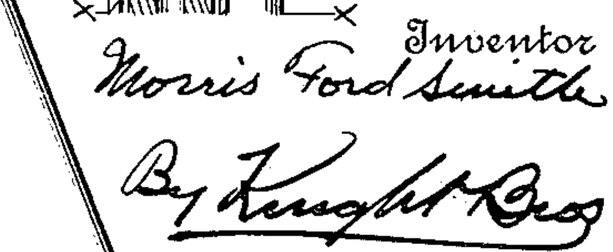
Patented Jan. 4, 1916.

2 SHEETS—SHEET 1.









Witnesses

C. K. Reichenbach

C. B. Mellon

Inventor

Morris Ford Smith

By Knight Bros

Attorney

M. F. SMITH.

FIREARM.

APPLICATION FILED DEC. 10, 1909.

1,166,554.

Patented Jan. 4, 1916.

2 SHEETS—SHEET 2.

Fig. 3.

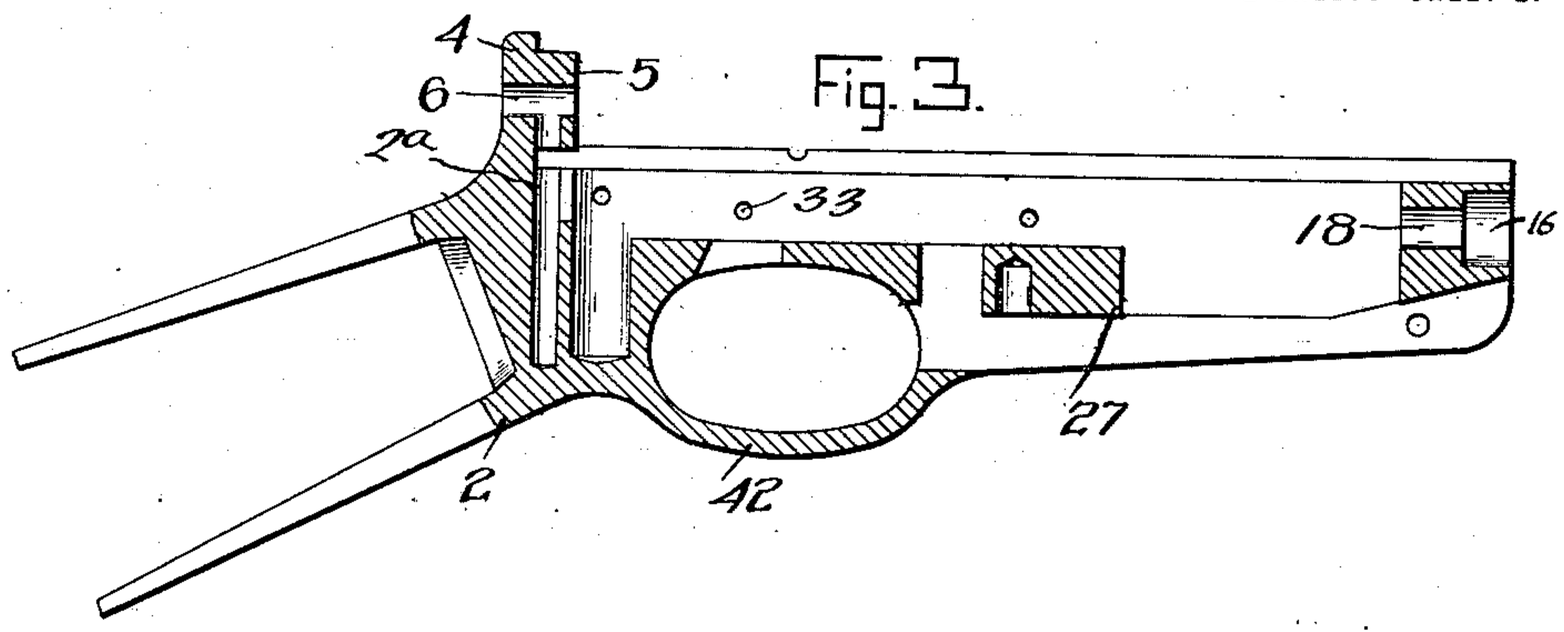


Fig. 4.

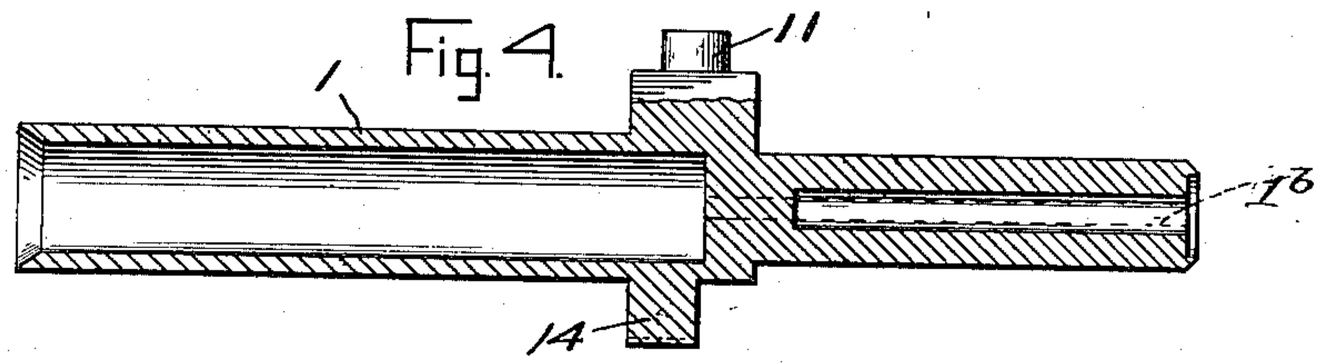


Fig. 5.

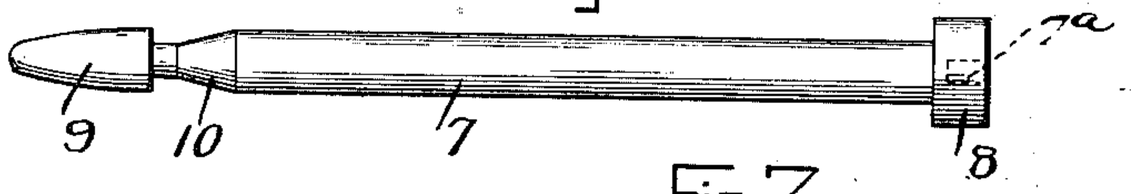


Fig. 6.

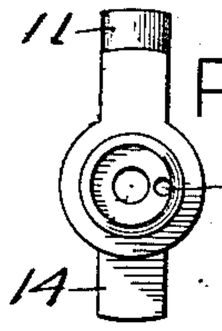


Fig. 7.

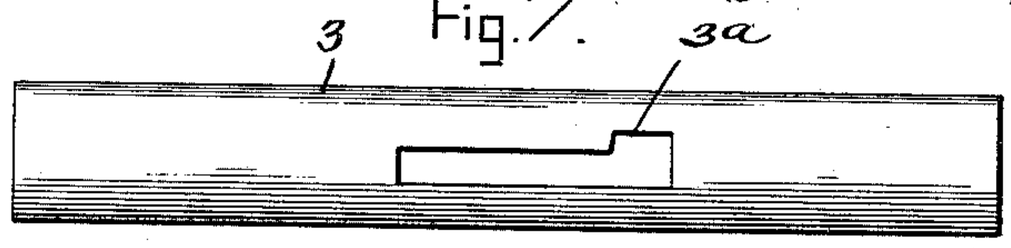


Fig. 8.

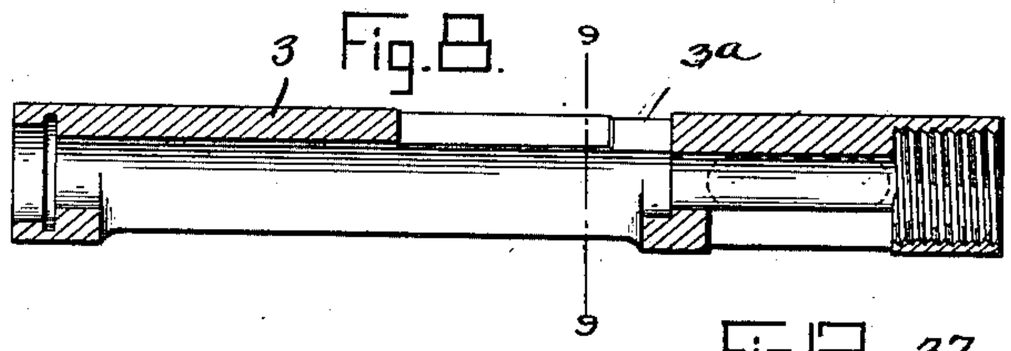


Fig. 9.

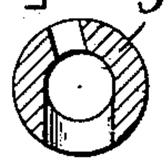


Fig. 10.

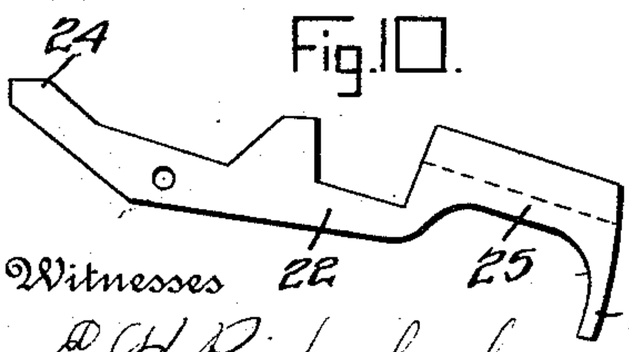


Fig. 11.

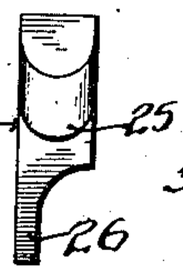


Fig. 12.

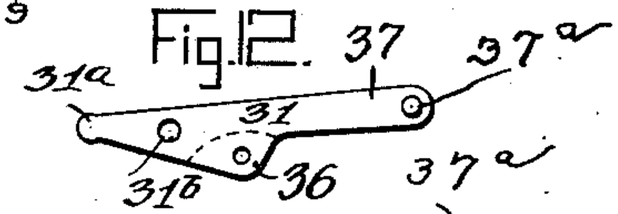
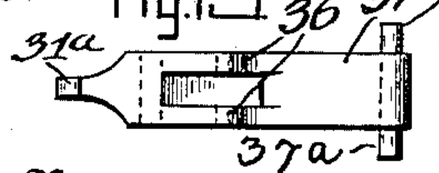


Fig. 13.



Witnesses

E. H. Reichenbach.

L. B. Mellon

Inventor

Morris Ford Smith

By Knight Bros

Attorney

UNITED STATES PATENT OFFICE.

MORRIS FORD SMITH, OF PHILADELPHIA, PENNSYLVANIA.

FIREARM.

1,166,554. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed December 10, 1909. Serial No. 532,408.

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 State of Pennsylvania, have invented certain new and useful Improvements in Firearms, of which the following is a specification.

In the drawings, Figure 1 is a vertical longitudinal section of a fire arm embodying my invention; Fig. 1ª, longitudinal view of the gun barrel and cartridge magazine, partly in section; Fig. 2 is a section on the line 2—2, Fig. 1; Fig. 2ª is a horizontal longitudinal section of part of the magazine; Fig. 3 is a detail sectional view of the frame; Fig. 4 is a detail sectional view of the breech bolt; Fig. 5 is a detail view in elevation of the striker; Fig. 6 is an end elevation of the breech bolt; Fig. 7 is a detail view in elevation of the receiver; Fig. 8 is a longitudinal section of Fig. 7; Fig. 9 is a sectional view on the line 9—9, Fig. 8; Fig. 10 is a side elevation of the cartridge lifting tray; Fig. 11 is an end elevation of the lifting tray; Fig. 12 is a side elevation of the fulcrum trigger lever; Fig. 13 is a bottom plan view of the same; Fig. 14 is a side elevation of a fire arm embodying my invention, parts being broken away, and Fig. 15 is a detail plan view showing the slot in the breech slide.

This invention relates to fire arms wherein the operations of opening the breech, extracting and ejecting the shell of the spent cartridge, presenting a new cartridge in front of the breech closure, cocking the gun, then moving the breech closure to closed position and introducing the cartridge into the chamber of the barrel, are all performed by reciprocating movement of a driving connection.

The object of the invention is to greatly simplify the parts so as to cheapen the construction and render it more reliable and durable in use; also to make it more easily assembled and disassembled without the use of screws or permanent holding means.

My present invention provides a breech closure having a rotating locking and unlocking movement and a reciprocating opening and closing movement. The breech bolt 1 is preferably constructed and arranged so that it may be introduced into its place without the necessity of taking apart the housing 2 in which it is mounted, further than the removal of the receiver 3 into which it is inserted through the long opening on the under side of the receiver. The frame is provided with a vertical lug 4, on the inner face of which is an annular boss 5, there being an opening 6 through the boss and lug. The end of the receiver has a neat sliding fit around the annular boss 5.

The striker 7 is mounted in the breech bolt 1 and is provided with a head 8, the rear end of the striker being more or less tapered as at 9 and provided with a reduced portion 10. The breech bolt is provided with a radial locking and controlling projection or lug 11, which extends through the receiver and the breech slide 12, said breech slide being connected to the hand-hold 13. 11 is a lug or projection extending radially from the upper face of the breech bolt which is adapted to enter a cam groove 12ª formed in the breech slide. 14 is a projection or lug extending radially from the lower face of the breech bolt and which operates the cartridge lifting tray 22. It will be noticed from the drawing that the projection 11 is diametrically opposite the lug or projection 14. This lug 11 coöperates with a cam groove 12ª and rotates the bolt 1 when the breech slide is reciprocated by means of the hand-hold and moves into and out of a locking notch or seat 3ª at the beginning of the opening movement and at the end of the closing movement.

The breech slide is, as will be understood, movable relatively to the breech bolt for the purpose of effecting the unlocking and locking movement, and then driving the breech bolt endwise to effect the opening and closing movements; this surrounding breech slide is constructed to completely close the opening through the receiver in which the locking and controlling projection 11 of the breech bolt works, and is also adapted to close the joint between the parts of the gun which are separated in taking down. This breech slide 12 may, as shown in the drawing, extend forward to receive the action handle sliding on the gun, or the rod of a gas driven piston suitably mounted in a cylinder provided on the forward part of the gun, as may be desired.

15 is the cartridge magazine, the rear end of which has a neat sliding fit in the recess 16 formed in the forward arm of the frame 2, the front end of the magazine being supported on the gun barrel by means of the yoke or clip 17.

18 is an opening in the frame registering with the interior of the magazine.

The means for transferring cartridges from the magazine to the receiver is so constructed that cartridges of varying lengths may be introduced into the magazine indiscriminately without impairing the operation of the gun. This feature of the invention consists of a spring catch 19 mounted in the opening 18 provided with a lip 20 and a projection 21 extending beyond the lip, said lip 20, providing a detent for the column of cartridges, is only moved to release a cartridge when the lifting tray 22 is in position to arrest further rearward movement of the cartridge after its release from the magazine. The lifting tray is pivoted to the frame at 23 and is provided with a rearwardly extending arm 24 which is adapted for engagement with the lug 14 of the breech bolt. The forward end of the tray is concaved as at 25, below which depends to one side the tail 26. The downward movement of the cartridge tray is limited by the element 27 of the frame 2, as shown in Fig. 1.

When the lifting tray is in a position to arrest further rearward movement of the cartridge after its release, it is so related to the detent or projection 20 that in moving to a position in which it will receive the cartridge, it releases the detent so that the latter may arrest the next cartridge in the column which is pushing the released cartridge on to the tray; from this, it follows that whatever the length of the cartridge, the spring pressed plunger acting through the cartridge in front of it, will advance it on to the tray, but in so doing the rearmost cartridge in the column is necessarily arrested by the detent and is not released until the tray moves upward to present the previous cartridge to the receiver during which time a depending portion of tail 26 of the tray closes the end of the magazine against the escape of the next cartridge which is awaiting the return of the tray to pass into it. The tray is preferably operated by the lug 14 of the receding breech bolt impinging the arm 24 of the tray beyond its fulcrum.

Another feature of my present invention relates to the detent and the trigger control thereof, whereby the construction is greatly simplified and the trigger is forced to present the sear 28 in position to arrest the striker 7 when the breech is open and thereafter prevent it from releasing the sear until the breech is closed. The sear 28 is preferably in the form of an upwardly pressed vertically sliding bolt or pin mounted in a slideway 29 formed in the frame 2. This sear is provided with a socket 30, in which one end of the fulcrum trigger lever 31 is mounted. The rear end 31^a of the fulcrum trigger lever in the socket 30 is ball-shaped, as clearly shown in Fig. 1. This lever 31 is fulcrumed on the pin 31^c, which runs through the opening 31^b in said lever and is seated in the bearings 2^a in the frame or housing 2. The trigger 32 is pivoted to the frame at 33 and has a rearwardly projecting nose 34. The fulcrum trigger lever is provided with ears 36, between which the nose 34 of the trigger is pivoted by means of the pin 35, said fulcrum trigger lever being provided with a tail 37 carrying the pins 37^a which project through the slots 37^b (one only being shown) in the receiver, and are held depressed until the hand-hold 13 or breech slide 12 has fully completed its forward movement when they may slide up in slots 37^b and permit movement of the sear, thus providing a safety catch to prevent the accidental discharge of the fire arm. When the trigger 32 is pulled back assuming the mechanism to be closed, the forward end of the fulcrum trigger lever 31 moves upward, thereby depressing its rear end 31^a and the sear 28; unless the breech bolt is fully closed, the lever 31 cannot move to withdraw the sear and release the striker 7, and when the lever has been moved to release the sear, the opening movement of the breech bolt rocks the lever 31 in the direction to again present the sear in position to engage the striker.

A further feature of the present invention relates to the take-down, according to which, as above stated, the end of the receiver has a neat sliding fit and engagement with the annular boss 5 and the magazine has a neat sliding fit or engagement with a recess 16 in the frame; the magazine being secured near its rear end to the barrel by means of a yoke 38 Fig. 2, so that the parts may be slid together longitudinally into firm embrace, whereupon a detent lever 39 pivoted at 40 to the frame 2, near its forward hooked end 41, and having a relatively long rear end projecting into the trigger guard 42, will snap into engagement with the yoke 38 and thereby prevent longitudinal displacement of the parts. The lever 39 is held normally in its locked position by means of a coil compression spring 43, which is seated in a recess in the element 27 which is a part of the frame.

Another feature of the invention consists in providing the spring pressed striker 7 see Figs. 4, 5 and 6, with an eccentric pin secured in the socket 7^a and extending forwardly through a hole 1^b in the reduced neck of the breech bolt in position to detonate rim fire cartridges, thereby leaving the center of the breech bolt for the introduction of a spring pressed ejector (not shown).

While the foregoing is the preferred construction and embodiment of the several features of the invention, some of the features are applicable to a gun constructed differently as to some of its details, for in-

stance, the surrounding operating sleeve 12 is not limited in its application to a breech bolt having a rigid locking and controlling projection extending through the receiver, or rear end of the barrel, but may be utilized in connection with a reciprocating breech bolt connected with the breech slide through the medium of a radial screw carried by the breech slide and extending through the wall of the receiver, into a cam groove in the breech bolt, or a pair of such radial screws extending diametrically into cam grooves on the opposite sides of the breech bolt.

The means for receiving various lengths of cartridges from the magazine and transferring them to the receiver may be employed in connection with a magazine constructed in the stock of the gun.

Furthermore, the detent for preventing longitudinal separation of the parts may be other than that already described, as for instance, a fixed notch or notched pin on the frame receiving a resilient tongue on the barrel.

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

1. In a gun the combination of a frame having an abutment for the receiver, a receiver adapted to slide longitudinally upon the frame when assembling and to engage with said abutment, easily releasable means for locking the receiver to the frame, a breech bolt mounted to reciprocate in said receiver and to revolve therein for locking and unlocking, the barrel being secured to said receiver, a slide embracing said receiver and a slot in the slide through which the slide controls the breech bolt.

2. In a take down fire arm having a frame and a rotary unlocking and reciprocating opening and closing breech bolt, the combination with a stationary receiver for said breech bolt, an abutment 4 on the frame for rigidly engaging with the rear end of said receiver, easily releasable means for locking the receiver to the frame, a firing hammer in said breech bolt, and an external breech slide embracing said receiver and having movement relatively to the breech bolt and also with the breech bolt and means whereby the breech slide rotates the breech bolt unlocking it from the receiver.

3. In a take down fire arm, having a frame with an upward projection, a rotary unlocking and reciprocating opening and closing breech bolt, a firing hammer in said breech bolt, a receiver for said breech bolt rigidly engaging said projection upon said frame, easily releasable means for locking said receiver to said frame, and an external breech slide embracing said receiver, an opening through the receiver, a projection on the breech bolt by means of which the breech slide is adapted to unlock said breech bolt from the receiver, said projection extending through said opening in the receiver.

4. In a take down fire arm having a frame with an upward projection, a rotary unlocking and reciprocating opening and closing breech bolt, and a firing hammer in said breech bolt, the combination with a receiver for said breech bolt rigidly engaging said projection, upon the frame, easily releasable means for locking said receiver to said frame, and an external breech slide adapted to slide longitudinally upon the receiver embracing the same, and a projection on the breech bolt projecting through and engaging said receiver and engaging a cam groove in the slide whereby the breech bolt actuated by said slide is adapted to be unlocked from the receiver.

5. In a gun, the combination of a frame having an abutment for the receiver, a receiver adapted to slide longitudinally upon the frame when assembling and to engage with said abutment, a breech bolt having rotary locking and unlocking and longitudinally opening and closing movements in said receiver, a sleeve surrounding the receiver, a slot in the sleeve, through which the sleeve controls the bolt.

6. In a gun having a receiver and a breech bolt rotating and reciprocating in said receiver, a projection on said breech bolt extending through and working in a slot in the receiver, a sleeve surrounding the receiver engaging said projection and covering the slot when the mechanism is open.

7. A fire arm having a receiver and a breech closure rotating and reciprocating in said receiver to carry a firing device, a frame on top of which said receiver is fitted, said frame being provided with an abutment for said receiver for locking the parts together when assembled and with means for rotating and reciprocating said breech closure.

8. A fire arm having a receiver, a breech bolt reciprocating therein to open and close the barrel and carrying a firing device, a sleeve surrounding the barrel and receiver and means on the breech bolt, penetrating the receiver, by which the breech bolt is actuated by the sleeve.

9. A gun comprising a receiver and a frame, an annular boss integral with the frame, adapted to hold securely the rear end of the receiver, a breech bolt mounted to reciprocate in said receiver, a firing pin reciprocating longitudinally in the breech bolt but projecting when cocked through the rear end of the receiver and the frame in position for observation, a barrel fixedly mounted in the receiver and suitable connections for effecting the movements of the breech bolt to open and close the breech.

10. A gun comprising a receiver, a barrel fixedly mounted thereon and a frame, an annular boss integral with the frame adapted

to hold securely the rear end of the receiver, a breech bolt mounted to reciprocate in said receiver between said annular boss and the rear end of the barrel and a firing pin reciprocating longitudinally of the breech bolt, a barrel fixedly secured to the receiver and suitable connections for effecting the movements of the breech bolt to open and close the breech.

11. In a take down gun, a frame with an upwardly projecting abutment, a receiver mounted in the frame, easily releasable means for rigidly locking said receiver to said frame, said means comprising male and female portions on the abutment and on the rear end of said receiver respectively and a detent lever for retaining said male and female portions in engagement, a cylindrical breech bolt mounted to reciprocate within the receiver, and a barrel, said breech bolt having its forward end reduced in diameter, and said receiver having cylindrical cavities which fit the different diameters of the breech bolt.

12. In a take down gun, the combination with a frame having an upward projection and a receiver mounted on said frame and rigidly engaging with said projection, easily releasable means comprising a detent lever for rigidly locking said receiver to said frame, the receiver portion of reduced internal diameter and the rear portion of relatively large internal diameter, a breech bolt mounted to reciprocate in the receiver constructed with a reduced forward end fitting the reduced portion of the receiver cavity with a relatively larger rear portion fitting the larger cavity of the receiver and carrying means centrally located on the bolt for locking the bolt in closed position.

13. A gun having a receiver constructed with a radial slot, a breech bolt reciprocating in said receiver, said bolt having a projection working in said radial slot; said receiver being constructed with a slotted side opposite the radial slot, through which the breech bolt may be introduced and a second radial projection on said bolt for actuating it.

14. In a gun the combination of a frame, having a receiver abutment, a receiver detachably mounted in the frame and fitted to said abutment, a firing device working through said abutment, an upwardly pressed and vertically sliding sear mounted in said frame back of the firing device and adjacent to said abutment and adapted to engage with said firing device to hold the same in cocked position.

15. In a gun, the combination of the receiver having a breech bolt reciprocating therein and carrying a firing device; a frame upon which said receiver is fitted and constructed with an abutment for said receiver, and a sear having a sliding bearing on said abutment and on the frame beneath said abutment and adapted to engage the firing device to hold the latter in cocked position.

16. In a gun, the combination of a frame having a receiver abutment, a receiver fitted to the frame in abutment with the receiver abutment and having a firing device working through said abutment, and a sear mounted in said frame adjacent to said abutment and adapted to engage with said firing device to hold the same in cocked position and a safety means mounted in the frame and having a pin working through the wall of the frame, said safety means engaging the sear to prevent the release of the firing device while the mechanism is open.

17. In a gun, the combination of the receiver having a breech bolt reciprocating therein and carrying a firing device; a frame upon which said receiver is fitted and constructed with an abutment for said receiver, and a sear having a sliding bearing in said abutment and in the frame beneath said abutment and adapted to engage the firing device to hold the latter in cocked position, a socket in said sear, and a safety means mounted in the frame with a limited rocking movement therein, and having a rearward extension working in said socket to prevent the sear being withdrawn from the firing device.

18. In a gun, the combination of a frame constructed with a receiver abutment, a receiver detachably mounted on said frame and having an open rear end adapted to slide longitudinally upon the frame into engagement with said abutment in assembling, said receiver and abutment being constructed to interengage to prevent relative displacement transversely, a locking seat for interlocking the frame with the forward portion of the receiver and prevent movement of the receiver on the frame, and a barrel in fixed relation to the receiver.

19. In a gun, the combination of a receiver having a breech bolt cavity, a gun barrel fixedly connected with said receiver, a breech bolt mounted to reciprocate in the receiver to open and close the chamber of the barrel, a breech slide fitted over the barrel and receiver adapted to reciprocate thereon, and having connections through which it reciprocates the breech bolt within the receiver, a frame upon which said receiver is fitted and adapted to slide in the direction of the axis of the gun for assembling, said frame being provided with an abutment against which the rear end of the receiver abuts and with which said receiver is constructed to engage in a direction to prevent transverse displacement, a longitudinal projection on the forward portion of the frame, and means in fixed relation to the receiver and barrel interengaging with said projection by the longitudinal

movement of the receiver on the frame, and preventing transverse displacement of the forward portion of the receiver.

20. In a gun, the combination of the frame having an abutment for the receiver, and a longitudinal projection at its forward end, a receiver adapted to slide longitudinally upon the frame and to engage with said abutment through the medium of a projection on one of the parts entering a cavity of the other and also adapted to engage said longitudinal projection, means in fixed relation to the barrel and receiver engaging the forward projection in a direction to prevent longitudinal movement of the receiver out of its interlocked position.

21. In a take down gun, the combination of a frame having an upward projection, the receiver rigidly mounted upon the frame by engaging with said projection, easily releasable means for locking said receiver to the frame, the breech bolt mounted in the receiver, the barrel connected with the receiver, and a breech slide embracing the receiver and slidingly mounted upon the barrel and receiver, having connections through which said breech slide operates the breech bolt.

22. In a take down gun, the combination of a frame having an upward projection, the receiver rigidly mounted upon the frame by means of its rear end engaging with said projection, easily releasable means for locking said receiver to said frame, the breech bolt mounted in the receiver, the barrel secured to the receiver, and a breech slide slidingly mounted upon the barrel and receiver embracing the latter, having connections through which it operates the breech bolt and locks it to the receiver.

23. In a gun, the combination of the receiver, the breech bolt reciprocating in said receiver to open and close the breech, a frame having a magazine disposed longitudinally therein with means advancing a column of cartridges endwise, and a lifting tray, pivoted on a pin in said frame and adapted to be oscillated from a position to receive a cartridge from the magazine, to a position presenting the cartridge between the breech bolt and gun barrel; a depending tail integral with the tray, adapted to close the end of the magazine against the next cartridge said tray being provided with a rearwardly extending arm and a nose forward of said pivot pin; said breech bolt being provided with a lug for coöperating with said tray arm to raise the forward end of the tray into loading position during the rearward movement of said breech bolt and to cooperate with said nose to lower the forward end of the tray during the forward movement of said breech bolt.

24. In a gun, the combination of the receiver, the breech bolt reciprocating in said receiver to open and close the breech, a frame having a magazine disposed longitudinally therein with means advancing a column of cartridges endwise, and a lifting tray adapted to be oscillated from a position to receive a cartridge from the magazine, to a position presenting the cartridge between the breech bolt and the gun barrel; said tray being provided with a rearward toe and a forward nose on its upper side and a depending tail integral with the tray, adapted to close the end of the magazine against the next cartridge, said breech bolt being provided with a lug for coöperating with the toe and nose on said tray to raise and lower the forward end of the tray respectively during the opening and closing movement of said breech bolt.

25. In a fire arm having a rotary unlocking and reciprocating opening and closing breech bolt, the combination with an external breech slide, of a sear, a fulcrum trigger lever controlling said sear, and means controlled by the said breech slide to hold the sear, through the fulcrum trigger lever, out of action until the parts are locked in firing position.

26. In a gun the combination of a receiver, a breech bolt reciprocating in said receiver to open and close the breech; a downwardly extending lug on said breech bolt, a frame having a magazine disposed longitudinally therein with means for pushing a column of cartridges rearwardly, and a lifting tray pivoted in said frame, said tray being provided with a depending tail adapted to close the end of the magazine against the next cartridge when said tray is in the loading position; a spring catch located in said magazine having a transverse lip for intercepting rearward movement of the cartridges in the magazine when the tray stands in the non-loading position, a toe on said catch in coöperation with said depending tail on the tray for transversely moving the lips of said catch out of the path of the cartridges when the tray stands in the loading position, said tray having an arm to the rear and a nose to the front of its pivot pin and said arm and nose coöperating with said bolt lug to respectively raise and lower the forward end of the tray during the rearward and forward movements of said breech bolt.

The foregoing specification signed at Wilmington, Delaware, this seventh day of October, 1909.

MORRIS FORD SMITH.

In presence of—
CHARLES P. COLTON,
WM. BUSH.