(No Model.)

2 Sheets—Sheet 1.

I. LARSEN.

BREECH LOADING GUN.

No. 458,704. Patented Sept. 1, 1891.

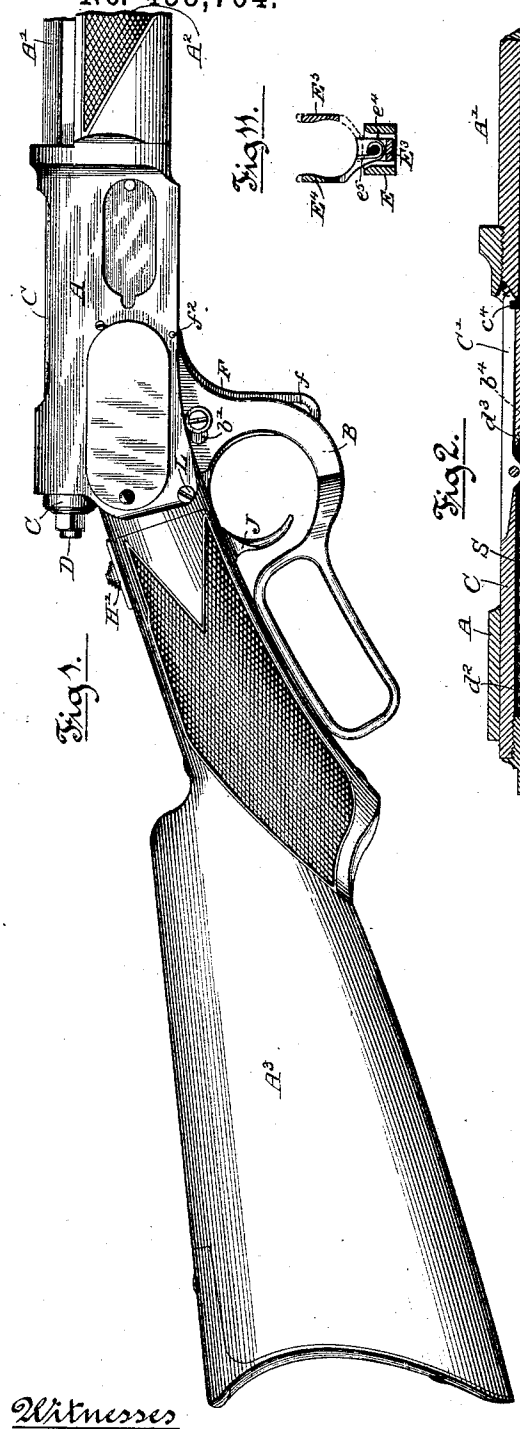


Fig. 1.

Fig. 11.

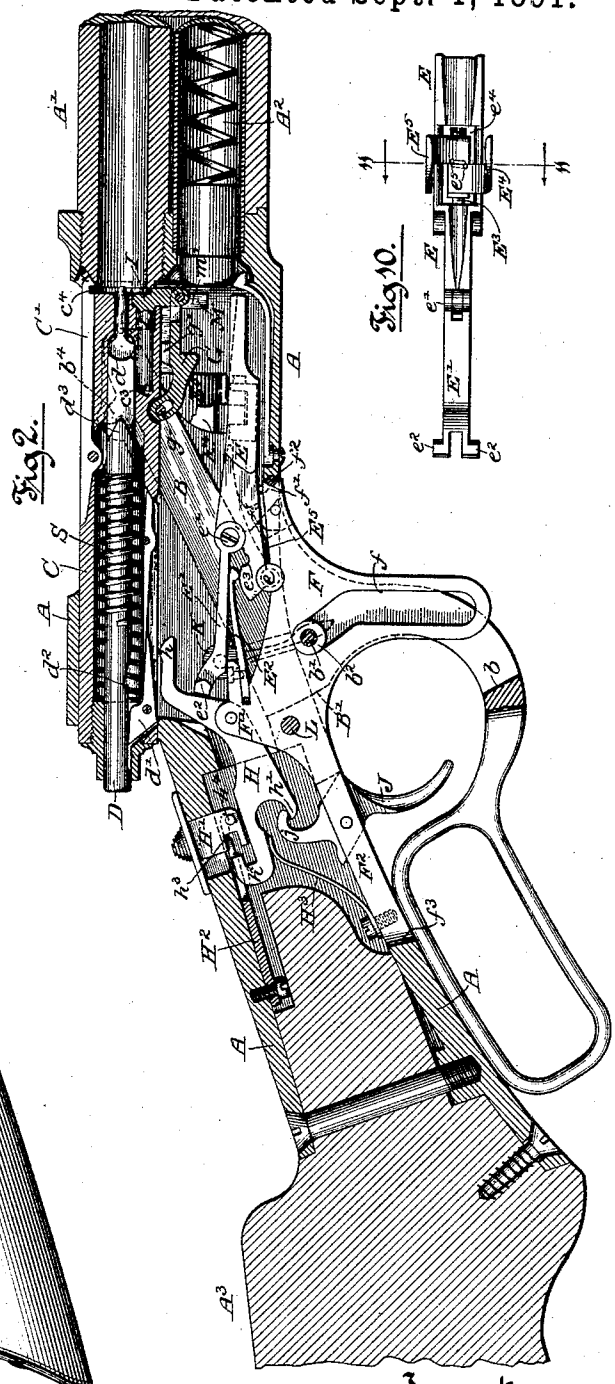


Fig. 2.

Fig. 10.

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(No Model.) 2 Sheets—Sheet 2.

I. LARSEN.

BREECH LOADING GUN.

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Fig 3.

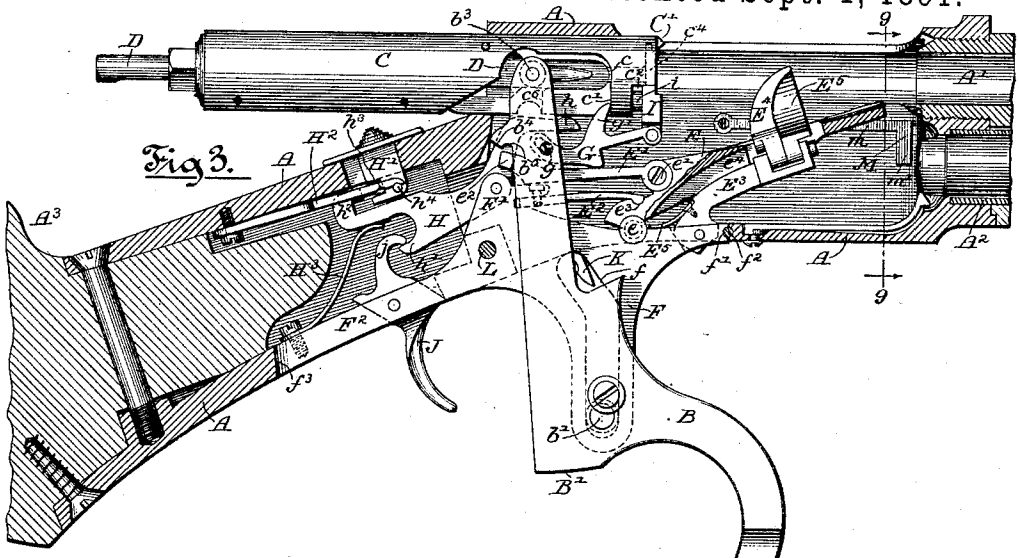


Fig 7.

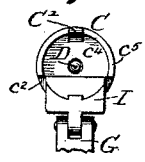


Fig 8.

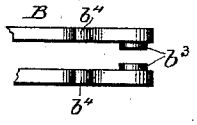


Fig 9.

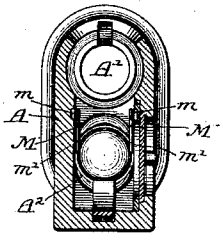


Fig 6.

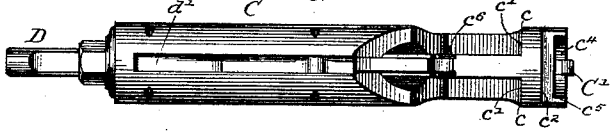


Fig 4.

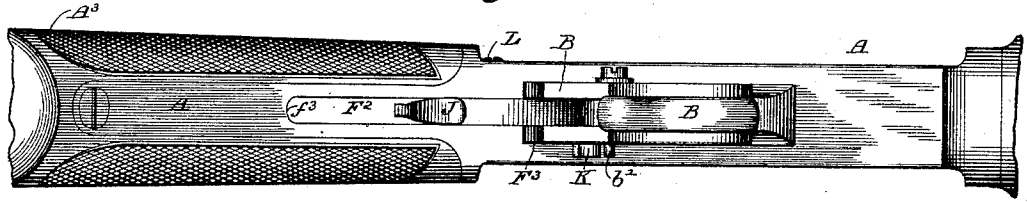
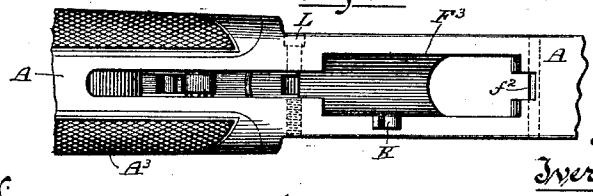


Fig 5.



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UNITED STATES PATENT OFFICE.

IVERT LARSEN, OF CHICAGO, ILLINOIS.

BREECH-LOADING GUN.

SPECIFICATION forming part of Letters Patent No. 458,704, dated September 1, 1891.

Application filed January 30, 1890. Serial No. 338,656. (No model.)

To all whom it may concern:

Be it known that I, IVERT LARSEN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Breech-Loading Fire-Arms; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to breech-loading fire-arms in which a reciprocating bolt is employed to open and close the breech.

The invention has among its objects to provide a construction in which the bolt carries the firing-pin, the mainspring by which the firing-pin is thrown, and a pawl which holds the firing-pin cocked, a construction by which the guard-lever that reciprocates the bolt is given a movable fulcrum, a construction by which the guard-lever cocks the firing-pin in the retraction of the bolt, a construction by which the mainspring supplies the force for flipping out the shell, and a construction by which the principal parts of the lock mechanism are removable with a particular part of the metal breech-frame.

Before describing in detail the accompanying drawings, which illustrate my invention, I point out that the extremity of the guard-lever bears backwardly on the firing-pin, which in turn acts through the mainspring upon the bolt to retract the latter. In the retracting movement of the bolt and firing-pin, when there is no cartridge or shell in the gun, the bolt is held from recession to the same extent as the firing-pin by means of a part acting for this purpose as a stud between the bolt and the guard-lever and having its connection with the said guard-lever at a distance from its extremity. By this means the firing-pin is cocked in the act of retracting the bolt, and it is held cocked by means of a spring-catch located in the bolt and engaging the firing-pin. When a shell is present in the gun, said shell is concerned in the retardation of the bolt till the shell is released from the barrel, whereupon the stud mentioned acts, as above described, for the rest of the retracting movement of the bolt and firing-pin. For such action on the shell and for its ejection at the proper time the stud above referred to has a prolongation which connects with a sliding block in the lower front end of the bolt. The guard-lever operates to throw the breech-bolt forward through the stud above referred to; but for the purpose of holding the breech-bolt firmly against the breech the extremity of the guard-lever bears against the breech-bolt and is itself sustained by a suitable bearing on the breech-frame. The fulcrum of the guard-lever is a pin fixed in said lever, but having a movement in a slot formed in a stationary part of the breech-frame. This stationary portion of the breech-frame is desirably a separate and removable member of the breech-frame and supports the trigger and carrier mechanisms, and said portion of the breech-frame is detachable by the removal of a single screw. The guard-lever being also detachable from the bolt and firing-pin, the removal of this single part of the breech-frame allows almost the entire lock mechanism to be readily withdrawn for the purpose of inspection and repair.

Describing the figures of the drawings, Figure 1 is a side elevation of a fire-arm constructed in accordance with my improvement. Fig. 2 is a central longitudinal vertical section showing my improvements, the guard-lever being in position to have advanced the bolt to the breech of the barrel and the firing-pin having been let off. Fig. 3 is a similar section, showing the guard-lever in its outwardly-thrown position, the bolt retracted, the firing-pin cocked, and the feed devices elevated. Fig. 4 is an under side view of the gun, presented for the purpose of showing the outlines of the detachable portion of the breech-frame, to which the guard-lever and other mechanisms are connected, as above described. In this Fig. 4 these parts are represented in place. Fig. 5 is also an under side view of that portion of the breech-frame occupied by the removable portion of the frame above referred to, the said removable portion being withdrawn to show the opening which it occupies. Fig. 6 is an under side view of the bolt and its contained firing-pin, the sliding block at the forward end of the bolt being removed. Fig. 7 is a front end view of the bolt and the sliding block applied thereto, together with a part of the link which connects said sliding block with the guard-lever. Fig.

8 represents the bifurcated end of the guard-lever and the construction thereof by which it detachably engages the firing-pin. Fig. 9 is a transverse section in the line 9 9 of Fig. 3. Fig. 10 is a top view of the cartridge-carrier and its attachments, including the movable jaws for grasping the cartridge; and Fig. 11 is a transverse section in the line 11 11 of Fig. 10.

Describing the invention in the particular form in which it is illustrated in the drawings, A represents the metal breech-frame, to which the barrel A′ and magazine A^2 at one end and the stock A^3 at the other end are secured.

B is the guard-lever.

C is the breech-bolt.

D is the firing-pin within the bolt.

S is the mainspring actuating the firing-pin, and E is the carrier.

The guard-lever B is bifurcated from the point b to its inner extremity and embraces the projection F on the breech-frame, to which projection it is fulcrumed. The fulcrum is a pin b', inserted through the branches of the guard-lever and provided with the friction-roller b^2. This fulcrum-pin has bearing in a slot f, formed in the frame projection F and having the two directions indicated in Fig. 2, or, in other words, proceeding from its inner end outward a short distance in the arc of a circle drawn from the center of the bearing projections near the extremities of the guard-lever branches and for the remainder of its length being straight and about at a right angle with the barrel.

At or near their extreme inner ends the branches of the bifurcated guard-lever are provided with short oppositely-arranged and inwardly-directed studs b^3 b^3, Fig. 8, which engage correspondingly-shaped forwardly-directed shoulders d on the firing-pin near the front end of the latter. The ends of the branches of the guard-lever are also rounded concentric with these studs, and the sides of the bolt are milled away, as indicated in Figs. 3 and 6, to admit these branches of the guard-lever into engagement with the firing-pin, as described, and also to form shoulders or bearings at c c, against which the rounded ends of said branches of the guard-lever may bear for the purpose of holding the bolt firmly against the breech. The guard-lever is provided with shoulders at B′, which bear against surfaces of the breech-frame to meet the pressure of firing upon the bolt, said shoulders B′ being formed upon the arc of a circle having for its center the center of the studs b^3 or of the rounded extremities of the lever branches, which are concentric with these studs.

At a point g at a distance from the ends of the branches of the guard-lever is pivoted to said lever an arm G, which is a link-stud and which has two projections g', extending into the milled recesses of the bolt C and adapted to bear against the rearwardly-directed shoulders c' of said recesses. The arm G is pivoted at its forward end to a head I, (shown in front elevation in Fig. 7,) which occupies a notch c^2 in the lower part of the front end of the bolt C, Fig. 3, and is provided with a shank i, fitted to slide in a lengthwise hole c^3, formed in the lower portion of the bolt, as best shown in Figs. 2 and 3.

Between the rear wall of the notch c^2 and the shoulders c', parallel with said rear wall of the notch c^2, the bolt is left its full size and circular form. The distance between said surfaces is substantially that between the bearing-surfaces of the head I and the projection g' when the guard-lever is in its inner position; but as these separate when the guard-lever is thrown out from the breech-frame said head is permitted a backward and forward movement with reference to the bolt, except when the guard-lever is at its inner position. The front end of the bolt is recessed or cupped out to receive the head of the cartridge, as shown at c^4, Fig. 6, and by dotted lines in the side view of said bolt presented in Fig. 3. The head I is of such thickness that when its rear face bears against the rear wall of the notch c^2 its front face is flush with the bottom of the recess c^4. Below this flush surface the head I is extended forwardly in the transversely-curved direction shown in Fig. 7 to form a continuation of the circular rim c^5, which surrounds the recess or depression c^4 and by which the cartridge-head is laterally embraced. The pivot-pin g, which unites the arm G with the branches of the guard-lever B, passes through a short oblique slot in said arm, as indicated in Fig. 3, said slot being formed in the arc of a circle drawn from the center of the studs b^3 on the guard-lever branches when the guard-lever is at its inner position (shown in Fig. 2) and being of such length as to allow vibration of the guard-lever far enough to clear its abutting shoulder B′ from the breech-frame without retracting movement of the bolt.

In the top of the bolt is arranged a longitudinal spring-hook C′, of familiar construction, for engagement with the top edge of the cartridge-head. When a cartridge-shell is in the barrel and engaged with this hook C′ on the bolt at the time that the bolt is to be retracted, the vibration outwardly of the guard-lever not only retracts the bolt, but withdraws the cartridge-shell, and said cartridge-shell by its engagement with the barrel and with the hook C′ bears at the lower part of its head against the end of the sliding head I, so as to hold said head against the rear wall of the notch c^2, notwithstanding the prying action of the guard-lever at its bearings b^3 on the firing-pin and at g on the arm G. In consequence of the presence of the cartridge-shell, therefore, the pressure of the mainspring acting on the inner end of the bolt is communicated through the pivot g, the arm G, the head I, the cartridge-shell, (laterally to the barrel,) and to the

hook C′ to retard the movement of the bolt until the cartridge-shell escapes the barrel, whereupon the bolt flies back into bearing against the points g' on the arm G, and by this movement the cartridge is flipped out of the opening in the top of the breech-frame. The mainspring is thus the force by which the cartridge-shell is discharged. The range of movement on the part of the bolt is sufficient to allow a loaded cartridge to be thus flipped out of the breech-frame opening. In this retraction of the bolt and firing-pin the latter is manifestly carried farther back than the bolt. When the firing-pin and bolt have nearly but not quite reached the rear extremity of their movement, the spring-pawl d', pivoted in the lower rear portion of the bolt, engages the notch d^2 in the firing-pin and holds the firing-pin cocked during the forward movement of the bolt and till let off by the trigger through the medium of the lever H. Said lever H is pivoted to the upper end of the inward projection F′ on the breech-frame, the front end h of said lever being in position beneath the front arm of the cocking-pawl d' when the bolt is in its forward position, as shown in Fig. 2. The rear end h' of the lever H is in position to be engaged by the overhanging hook j on the upper end of the trigger J, as shown in Figs. 2 and 3. Said lever H is provided with an upper rear projection h^2, having the form of a forwardly-directed hook reaching nearly to the inner surface of the upper part of the breech-frame and adapted to be engaged by a sliding hook H′, having a forward and backward motion and extending through the breech-frame, so as to be accessible for the purpose of locking the lever H against movement when desired, and thus preventing the release of the firing-pin from the dog d' by any force accidentally applied to the trigger J.

H^2 is a spring provided with a notch h^3, which engages the pin h^4 on the slide H′ when the latter is in position to lock the lever H against movement by the trigger, and H^3 is a spring arranged to normally hold the lever H out of engagement with the pawl d'.

To prevent the firing-pin from being accidentally let off against the cartridge, so as to discharge the latter before the lever B is fully thrown against the breech-frame and the bolt C is carried firmly against the breech of the barrel, said firing-pin is provided with lateral shoulders d^3, and the branches of the guard-lever are provided with projections b^4, which are adapted to swing in front of the shoulders d^3 as the guard-lever approaches its inner position and the breech-bolt approaches the barrel. Said projections b^4 are undercut at b^5, so that when the bolt is fully thrown against the barrel and the guard-lever is fully thrown against the breech-frame the projection d^3 on the firing-pin may pass below the projections b^4 and strike the cartridge when the trigger is operated.

K is a detent-spring or gab secured in the inner surface of one side of the breech-frame and projecting therefrom, as shown in Figs. 2 and 3, in position to engage the prolonged fulcrum-pin b' of the guard-lever when said guard-lever occupies its innermost position, as shown in Fig. 2.

The carrier or carrier-block E is pivoted at its rear end to the lower part of the breech-frame at e and is provided with a rearwardly-extended arm E′, pivoted to an elevated part of the block at e'. Said arm E′ extends backward between the branches of the guard-lever when the latter is thrown out, as shown in Fig. 3, and is provided with lateral projections e^2 on its rear end, against which the branches of the guard-lever strike to tilt the carrier-block upward and to direct the cartridge to the barrel A′, as indicated in Fig. 3. The spring E^2, fixed to an inner projection F′ on the breech-frame, engages a depression at e^3 in the upper surface of the carrier-block near its pivot e to hold the said carrier-block in its elevated position while the bolt is being thrown forward during the first part of its forward motion and until the cartridge is started into the barrel.

E^3 is an arm pivoted to the bottom of the breech-frame in front of the pivot e, on which the carrier-block E turns, said arm E^3 occupying loosely a longitudinal slot e^4 in said carrier-block, as shown in Figs. 3 and 11. At the free end of said arm E^3 are two projections or jaws E^4 and E^5, which rise above the carrier-block E and extend outwardly in opposite directions above said block. These jaws E^4 and E^5 are for the purpose of grasping the cartridge which rests on the carrier-block E and holding it laterally in the plane of the axis of the barrel, so that when the bolt advances it will direct the cartridge more easily and certainly into the barrel. To this end said jaws are pivoted on the arm E^3 to afford the lateral movement necessary to the free admission of the cartridge as it passes from the magazine to the carrier and for their subsequent grasp of the cartridge.

The compression of the jaws E^4 E^5 upon the cartridge is produced by the carrier-block in the rising movement of the latter, the arm E^3 being lifted solely by pressure of the branches of the carrier-block against the inclined sides of the jaws (see Fig. 11) and the arm E^3 being made to oppose such lifting action by a suitable spring E^5. The jaws are provided with light springs e^5, arranged to open them when the carrier-block is depressed to its lowermost position, said springs e^5 readily yielding when the bolt pushes the cartridge forward into the barrel.

As a special and independent improvement, a portion F^2 of the breech-frame is made detachable from other parts of said frame, and upon such detachable and removable portion F^2 of said breech-frame are mounted the trigger J, the lever H, the guard-lever B, the carrier-block E, the arm E^3, and the springs E^2 and H^3. Said detachable plate F^2 is held in place by means of a single screw or pin L.

(Shown in dotted lines in Fig. 5 and in section in Figs. 2 and 3.) To enable this single screw to retain the plate F^2, the forward end of said plate is transversely grooved at f' to bear against the through-pin f^2, (shown in Figs. 2, 3, and 5,) and the rear end of said plate is slightly beveled inwardly and forwardly, as indicated at f^3 in Figs. 2 and 3, to bear against a similarly-inclined surface of the fixed part of the breech-frame. Upon the withdrawal of the single screw L, therefore, the plate F^2 may be easily removed, and with it all of the parts thereto connected, including the arm G and the slide I, which is pivoted to the forward end of the said arm G.

To permit the removal of the guard-lever, with the plate F^2, the projections b^3 on the extreme inner end of said guard-lever are removable downward or in a direction of the guard-lever, (when thrown into the position shown in Fig. 3,) the central portion of the bolt being cut away to admit of their passage in that direction, as indicated by dotted lines at c^6 in Fig. 3 and by full lines in Fig. 6, which presents an under side view of said bolt detached. In this disengagement of the guard-lever from the firing-pin and the bolt by drawing it downward lengthwise when in the position shown in Fig. 3 the projections g' on the arm G are also disengaged from the shoulders c' of said bolt. As soon as the guard-lever is disengaged from the firing-pin and bolt in the manner just described said bolt may be farther pulled backward by the hand, and in such backward motion the shank i on the slide I may be withdrawn from said bolt, allowing the plate F^2, with the guard-lever and all the attachments of said plate and guard-lever, to be removed through the opening F^3 in the bottom of the breech-frame (shown in Fig. 5) and leaving the bolt C free to be withdrawn by hand from the rear end of its housing.

M represents an L-shaped spring, the body m of which is arranged lengthwise of the breech-frame and in the path of the slide I and the short arm m' of which stands out normally in position to oppose the egress of a cartridge from the magazine A^2. In the forward motion of the bolt carrying the block I said block presses inward on the inclined long arm m of the spring M and carries its short arm m' out of the way of the cartridge, so as to allow a cartridge to be fed by the usual spring behind it to a position upon the carrier-block E. In Fig. 9 two such springs are shown, one at each side of the path of the cartridge and of the slide I; but in practice a single spring will serve the purpose. The slide I has its sides vertical and its upper edge horizontal and in bearing upon a horizontal surface of the cylindric bolt C, so that by means of said slide I, running between the side walls of the breech-frame, the cylindric bolt C is prevented from rotation.

I claim as my invention—

1. In a breech-loading fire-arm, the combination, with a reciprocating breech-bolt, of a lever for throwing the bolt and having a fulcrum-pin fixed therein and a breech-frame provided with a projection having a slot in which the fulcrum-pin of the lever works.

2. The combination, with a reciprocating breech-bolt, a firing-pin longitudinally movable in the bolt, and a spring between the bolt and the firing-pin, of a lever engaged with the firing-pin for the retraction of the firing-pin and bolt and engaged with the bolt for the advancement of the latter.

3. The combination, with a reciprocating breech-bolt, a firing-pin longitudinally movable in the bolt, and a spring between the bolt and the firing-pin, of a lever engaged with the firing-pin for the retraction of the firing-pin and bolt and engaged with the bolt for the advancement of the latter, said lever having a shoulder which abuts against a shoulder in the breech-frame to hold the bolt against the breech.

4. The combination, with a reciprocating breech-bolt, a firing-pin within the bolt, and the mainspring also within the bolt, of a lever arranged to press backward on the firing-pin in retracting the bolt, and an arm pivoted to the lever at a distance from that end thereof which engages the firing-pin, said arm bearing forwardly against the bolt.

5. The combination, with the barrel, of a reciprocating breech-bolt, a firing-pin longitudinally movable in the bolt, a mainspring within the bolt, a slide in the front lower end of the bolt, a lever engaged with the firing-pin to retract the latter, and an arm pivoted to the slide and also to the lever and provided with one or more projections engaging a rearwardly-directed shoulder or shoulders on the bolt.

6. The combination, with a reciprocating breech-bolt, a firing-pin longitudinally movable in the bolt and provided with a forwardly-directed shoulder or shoulders, and a mainspring engaging the bolt and firing-pin, of a pawl in the bolt engaging the firing-pin in its retracted position with reference to the bolt, a lever engaging the bolt to advance the latter, and one or more projections on the lever arranged to swing into the path of the forward projection or projections on the firing-pin when the bolt proximates its advanced position, said projections on the lever being clear of the firing-pin when the breech-bolt is in position against the barrel.

7. The combination, with the reciprocating breech-bolt, the firing-pin and the mainspring therein, and a pawl carried by the bolt for engaging the firing-pin in its cocked position, of a trigger and an intermediate lever, the latter of which is in position to detach the pawl from the firing-pin when the breech-bolt is in its advanced position.

8. The combination, with the trigger and with the breech-bolt carrying the firing-pin, the mainspring, and a detent-pawl carried by the bolt and adapted for engagement with

the firing-pin, of a lever pivoted to the breech-frame, through which the trigger acts upon the said pawl to release the firing-pin, and a movable locking device adapted to be engaged with said intermediate lever.

9. In combination with a reciprocating breech-bolt and a pivoted lever for retracting said bolt, a carrier-block pivotally supported within the breech-frame and having a rearwardly-extended arm provided with one or more lateral projections arranged in the path of the lever, whereby the latter tilts the carrier-block at or near the rear end of the retracting movement of the lever.

10. In combination with a pivoted carrier-block provided with a slot, an arm pivoted in front of the pivot of the carrier-block and occupying the slot thereof, said arm being provided with pivoted automatically-opening jaws which spread above the walls of the slot in the carrier-block.

11. The guard-lever provided with a shoulder B^3 and fulcrum-pin b', in combination with a reciprocating bolt engaged by the inner end of the guard-lever, and a breech-frame provided with a projection F, having a slot f, the inner portion of which is substantially in the direction of an arc drawn from the axial point of bearing of the guard-lever upon the breech-bolt when the latter is in its extreme forward position.

12. The combination, with a laterally-recessed breech-bolt and a firing-pin within the bolt provided with forwardly-directed shoulders which are exposed in the recesses of the bolt, of a bifurcated guard-lever provided with inwardly-projecting studs which engage with the forwardly-directed shoulders on the firing-pin, a fulcrum-pin fixed in the branches of the bifurcated guard-lever, and a projection on the breech-frame occupying the slot in the guard-lever and provided with a slot for the fulcrum-pin of said lever.

13. In a breech-loading fire-arm, the combination, with a reciprocating breech-bolt, of a detachable part of the breech-frame having a projection provided with a slot, and a guard-lever having a fulcrum-pin working in said slot and detachably engaging with the bolt and firing-pin, said detachable part of the breech-frame having connected therewith the trigger mechanism and the carrier mechanism, as well as the guard-lever, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

IVERT LARSEN.

Witnesses:
M. E. DAYTON,
C. CLARENCE POOLE.