2 Sheets--Sheet 1.

J. LEE.

Breech-Loading Fire-Arm.

No. 160,919. Patented March 16, 1875.

Fig. 1.

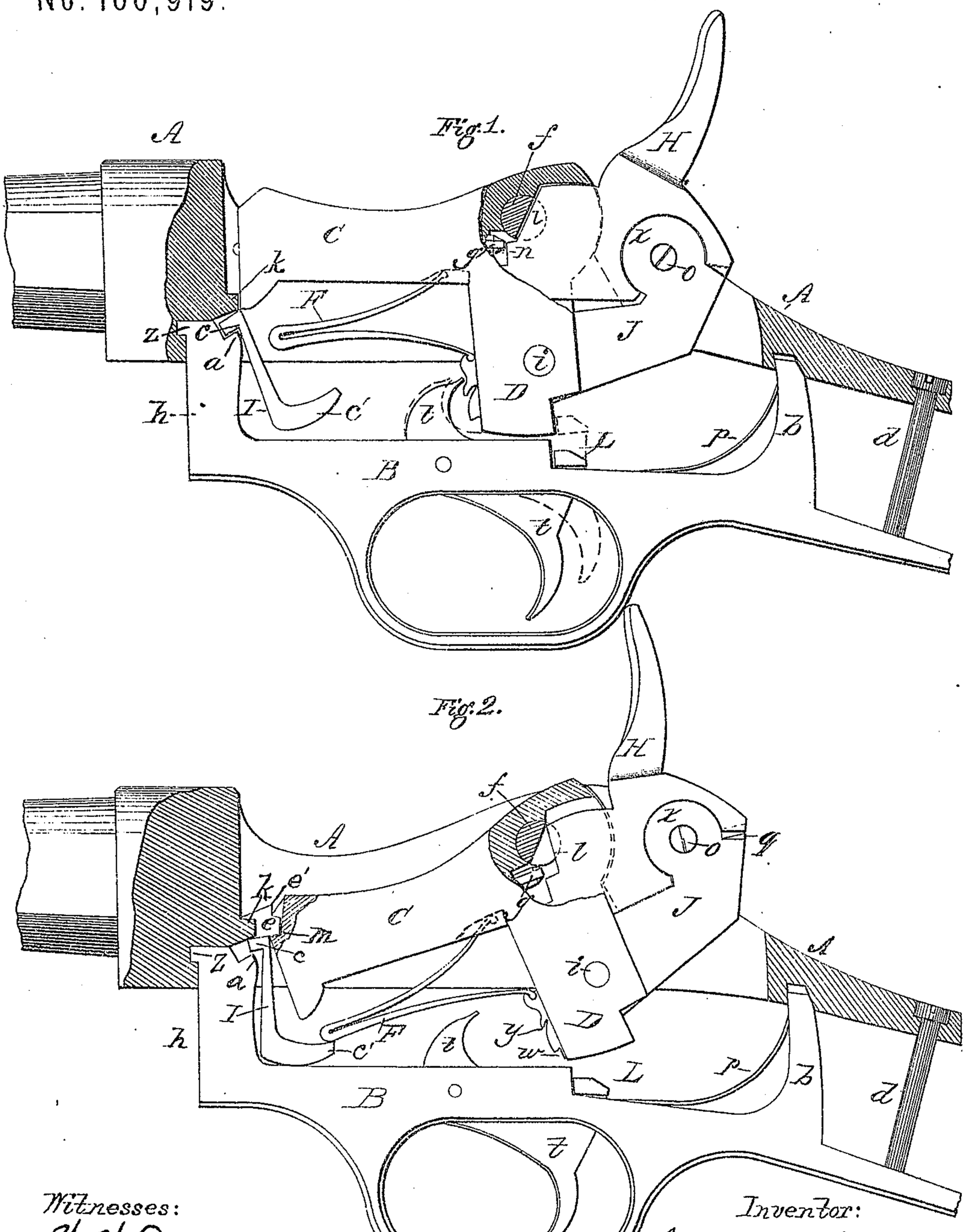

Fig. 2.

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Jno. L. Bass

Inventor:

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by Dodgerson

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2 Sheets--Sheet 2.

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Fig. 6.

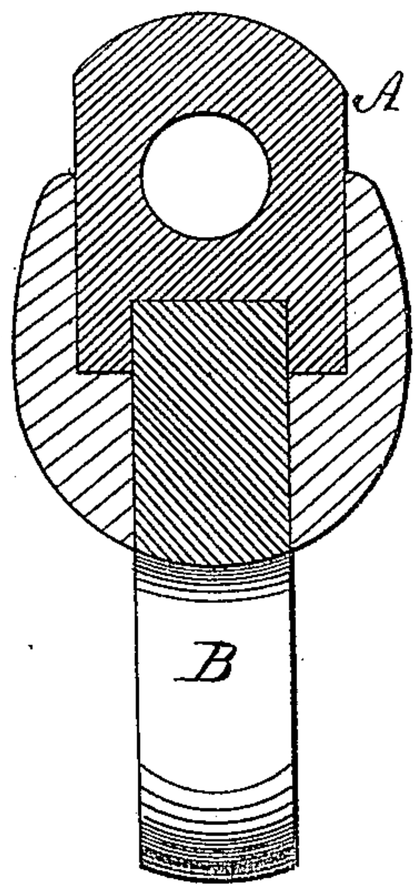


Fig. 3.

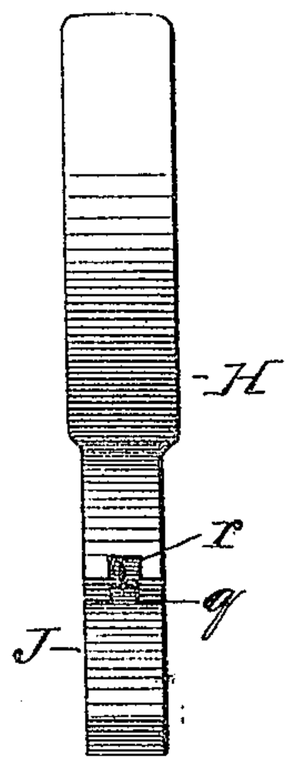


Fig. 7.

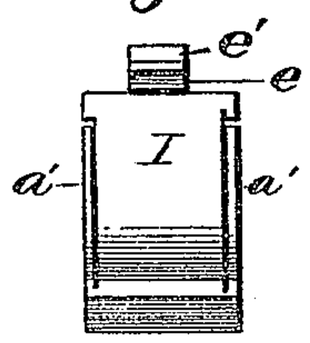


Fig. 4.

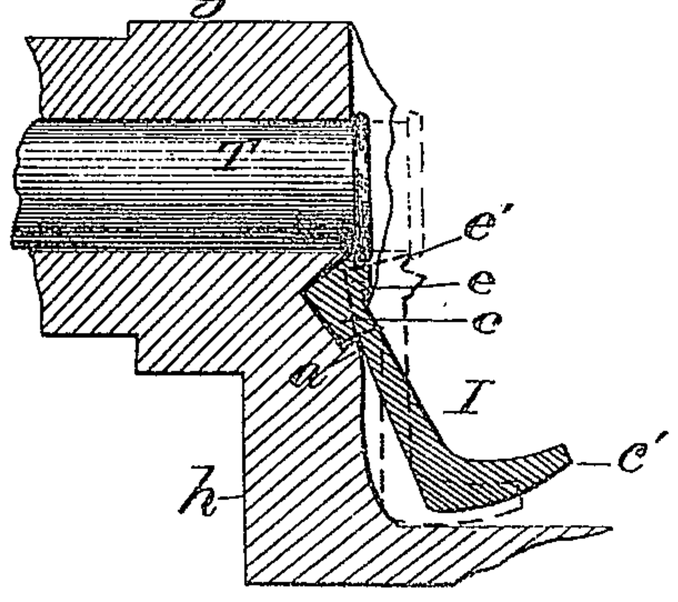
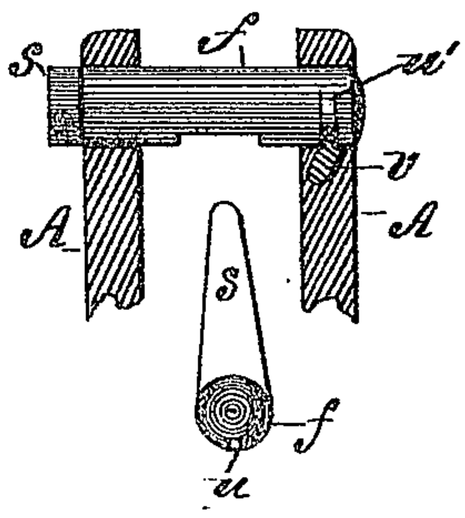


Fig. 5.



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UNITED STATES PATENT OFFICE.

JAMES LEE, OF MILWAUKEE, WISCONSIN.

IMPROVEMENT IN BREECH-LOADING FIRE-ARMS.

Specification forming part of Letters Patent No. **160,919**, dated March 16, 1875; application filed May 9, 1874.

To all whom it may concern:

Be it known that I, JAMES LEE, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain Improvements in Breech-Loading Guns, of which the following is a specification:

My invention consists of certain improvements in the construction of breech-loading guns, as hereinafter more fully explained.

Figure 1 is a side elevation of the breech mechanism, with one side of the frame removed to show the mechanism, the breech being closed. Fig. 2 is a similar view, showing the breech opened, and Figs. 3, 4, and 5 are portions shown in detail. Fig. 6 is a cross-section, showing the frame with the stock on Fig. 7 is a rear view of the extractor, slightly modified.

My present invention is an improvement upon the arm for which patents were granted to me June 20, 1871, and January 16, 1872, whereby the arm is rendered more perfect in several respects.

In this case the frame or receiver A to which the barrel is secured is made quite narrow vertically, with a vertical slot for the breech-block C to swing in, and having its sides cut away or curved on their upper edges, as shown in Fig. 2, with its rear end extended back to form the upper tang. The guard-strap B is made of the same width as the breech-block, and is provided at its front end with a strong vertical arm, *h*, having a lip, *z*, on its front upper corner to lock into a corresponding notch in the frame A. It has also another arm or lug, *b*, near its rear end, slightly beveled on its rear face at its extremity, where it engages in a corresponding recess in the frame A, its rear end being extended back to form the lower tang, the two being united by a screw, *d*, which serves also to secure these parts to the stock. As this screw is tightened the inclined face of the lug *b* crowds the strap B forward, thereby forcing the lip *z* into its seat, and thus locks the parts very firmly together. This arm or lug *b* is provided on its end with a central notch, which engages with a central rib in the recess to prevent lateral movement. The breech-block C consists of a solid piece of metal, of the form represented in Figs. 1 and 2, made concave on its upper surface, with its rear end resting in a circular recess formed in the rear portion of the frame and turning on the pin *f* as a pivot or center of motion. From the rear of the block C there depends two strong arms or lugs, D, as shown in Figs. 1 and 2, which reach as near the guard-strap as possible and allow a free motion, and between which is pivoted the tumbler J on a pin, *i*. The trigger *t*, which is pivoted in the guard-strap B, is provided at its rear end with a strong lug, L, projecting from each side, so that when the trigger is pulled to fire the gun these lugs are thrown up behind the arms D of the breech-block, as shown by dotted lines in Fig. 1, thereby locking the breech securely in place.

The tumbler consists of an oblong block of metal pivoted near its front end between the arms D, and is provided on its front end with the half and full cock notches, marked *y* and *w*, respectively, the point of the trigger *t* being curved backward, as shown, to engage therein. Its front end is also provided with another notch at its upper front corner, in which engages one end of the bent mainspring E, its opposite end resting in a recess in the under side of the breech-block C; this mainspring being as wide as the breech-block, and so arranged that when its lower end is placed in its notch in the tumbler, and its upper end is shoved back into position, it will remain there without other fastening, it being thus capable of being inserted and removed by the hand with ease and without the use of any tools whatever. At its rear end the tumbler J is bent upward and provided with a circular head, *x*, which is inserted sidewise into a corresponding recess in the side of the hammer H, there being a split-pin, *o*, attached rigidly to the hammer and fitting in a hole in the head *x*. To prevent the hammer from working off it has a vertical notch, *r*, cut in its rear under side, as shown in Fig. 3, which engages over a corresponding tongue or projection, *q*, when the hammer is drawn back. The hammer H has its under face made on a straight line, as is also the upper face of the tumbler J, and their shoulders in rear of the joint are so formed as to allow of but little movement of the hammer independent of the tumbler. When the hammer is shoved over forward, so

that its under surface rests on the tumbler, then the projection *q* is disengaged from the notch *r*, and the hammer can be readily slipped off sidewise and disconnected from the tumbler, the mainspring being first removed, so as to permit the tumbler to swing down far enough to disengage the nose of the hammer from the recess in the rear end of the breech-block, the breech-block with the hammer and tumbler being first removed from the frame, by simply withdrawing the pin *f*. The hammer is provided with a flat or vertical nose, *n*, for striking the firing-pin *g*, and above that with an inclined face, *l*, as shown in Fig. 1. When the hammer it cocked it is turned backward on the pin *o*, until its shoulder in rear strikes against the shoulder on the rear end of the tumbler, this limited motion of the hammer on its pivot being sufficient to elevate the nose *n* of the hammer far enough to cause it to strike the firing-pin as it is thrown forward. The friction of the split pin *o* serves to hold the hammer with its nose elevated, besides which, the centrifugal force exerted on the hammer as it is thrown forward, will cause it to assume that position and hold it so until it has delivered its blow; but when pressure is applied to the back side of the thumb-piece, to open the breech, the hammer first turns on its pivot *o*, whereby its nose *n* is thrown below the firing-pin, as shown in Fig. 2, thereby leaving the pin free to slide back within the block C, so that it will not rest against the cartridge or its primer. As the hammer is thus pressed forward its lower side rests on the tumbler J, its inclined face *l* at the same time coming in contact with the pin *f*, which is flattened at its center, as shown in Figs. 1, 2, and 5, and as the forward pressure is continued the front end of the breech-block C is depressed by the pulling back on the arms D, through the connection therewith of the tumbler and hammer. At the same time the inclined face *l* of the hammer, resting against the flat side of the pin *f*, is forced back a little by pressure against the upper edge of the flattened side of the pin *f*, as the pin remains stationary, while the breech-block, tumbler, and hammer move around it as a center, as shown in Fig. 2. The mainspring, operating all the time on the hammer through the medium of the tumbler, tends to make the inclined face *l* of the hammer resume its position parallel with the flattened side of the pin *f*, and this causes the parts to swing back into the position shown in Fig. 1, thus closing the breech the moment the front end of the breech-block is released from the extractor, which, as shown in Fig. 2, is provided on its rear face with a projection, *e*, that engages in a notch, *m*, in the front upper edge of the breech-block at its center. It will also be observed that the instant the front end of the breech-block begins its downward movement it carries with it the front end of the firing-pin, which is thereby thrown below the primer of the cartridge, thas preventing the possibility of igniting the charge. But independent of this, the peculiar construction and arrangement of the parts, as above described, whereby the nose of the hammer is made to drop below the firing-pin the instant it begins to move, renders an accidental explosion impossible, even if the hammer when down, with its nose resting on the pin, be struck a violent blow.

The firing-pin is rectangular is cross-section, or nearly so, so that, when resting in its round hole in the block C, it has but little of its surface in contact therewith, and hence is not liable to be stuck fast by corrosion, or the accumulation of dirt. It is so located in the breech-block that its rear end, when shoved back, comes against the pins *f*, as shown in Fig. 2, which prevents it from falling out. Its rear end is beveled off above and below, as shown, so as to present a narrow transverse face, by which means only a slight movement of the hammer is required to remove the nose *n* from contact therewith.

As shown in Figs. 1 and 2, the receiver or breech-frame A is provided with a transverse or horizontal lip or ledge, *k*, in line with the front end of the breech-block near its lower edge, and against which the breech-block abuts when closed. This abutment or lip *k*, together with the sides of the frame A, form a recess, in which the head of the cartridge rests, and which is open at the top, so that, in case the cartridge bursts, the gas has a free escape above, and is prevented from entering the recess or chamber below the breech-block. This abutment also serves to prevent the breech from rising above its proper position, as the lower edge of the latter, moving in the arc of a circle, of which the pin *f* is the center, cannot pass by the ledge *k*.

The extractor I, while being of the general form of a bell-crank lever, has several peculiar features. As represented in Figs. 2 and 4, it is provided at its upper end with a lip, *e'*, which, as shown in Fig. 7, projects centrally from its upper portion to engage with the flange of the cartridge, there being just below this a projection, *e*, which, as shown in Fig. 2, engages in a notch, *m*, in the top of the breech-block C, to hold it down when the breech is opened. This projecting portion *e* and *e'* rests in a central recess or notch cut for it in the ledge *k*, so that, when the extractor I is shoved forward, there is no space left in the ledge, and the lip *e'* is in its proper position to engage with the flange of the cartridge. On its front face the extractor I has a projection, *c*, which fits into a corresponding recess, as shown in Figs. 1, 2, and 4, the under wall *a* of this recess being inclined upward and backward, and its outer edge forming a fulcrum, on which the extractor rests and turns at the first part of its movement in withdrawing the shell T, the rear surface of the arm *h* being slightly rounded or curved, as shown in Figs. 1 and 2, so that, as the extractor moves, its projection *c* is caused to slide on the incline shoulder *a*,

thereby causing the point *e'* of the extractor to move back in a straight line, slightly inclined upward, whereby it is made to keep firm hold on the cartridge, even when the latter has been moved so as to be loose in its chamber. By this peculiar construction and arrangement the extractor never releases its hold or slips off the cartridge.

It will be observed that when the extractor begins its movement its fulcrum is the point *a*, and that, as the block C descends, causing the front part of the mainspring F to strike on its horizontal arm *c'*, its leverage is very great, and that, consequently, it exerts great force on the cartridge at the beginning of its movement, so that, however tight it may be in its chamber, the extractor is sure to start it. As the extractor continues its movement the projection *c* is disengaged from the shoulder *a*, and its lower corner comes in contact with the guard-strap below, thus changing its fulcrum or point of bearing to that point, after which it rocks on the under rounded surface of the arm *c'*, thereby greatly accelerating the motion of its upper end, and giving such an impetus to the shell or cartridge as to throw it entirely out of the gun, especially if the movement be a quick one. Thus the extractor is made to exert great force to start the shell from the chamber in the first instance, and then to greatly increase its velocity to eject it from the arm.

This extractor is made as wide as the breech-block, and is set loosely in the frame without any pin, it being prevented from being displaced by the breech-block when the parts are placed in position in the frame. If desired, to prevent the extractor from being loose in its seat, it may be made, as shown in Fig. 7, with a slit cut through it near each edge, thus leaving a small strip, *a'*, at each edge to serve as friction-springs, these bearing against the sides of the frame, and holding the extractor in any position it may be placed.

It will be readily understood that the extractor may be modified in its construction, and still operate on the same general plan or principle—for instance, the shoulder *c* and its bearing *a* may be omitted, and still, by a suitable configuration of the bearing surfaces, the extractor may be made to produce the movements described.

The bearing face of the extractor, or the bearing face of the part on which it works or bears, may be so curved or modified as to modify the motions of the extractor to any extent desired. It may be made so its point *e'* will move in a straight line parallel with the bore of the gun, or in a straight line inclined more or less either above or below the lower line of the bore, or it may be made a certain distance in a straight line, and thence in the arc of a circle, as may be desired.

The pivot-pin *f* is provided at one end with a laterally-projecting arm, *s*, as shown in Fig. 5, and at its opposite end it has a small groove, *u*, extending from its outer end in a short distance, where it intersects a circumferential groove, *u'*, there being a small pin, *v*, inserted in the side of the frame A in such a manner as to leave its point protruding into the hole in which the pin *f* rests in the frame, as shown in Fig. 5. To insert the pin *f* it is turned to the position that will bring the groove *u* in line with the point of the pin *v;* then shoved into its seat, which will bring the groove *u* opposite the pin *v*, when the pin *f* is given about one-quarter turn, which locks it securely in place, its arm *s* resting against a pin or projection of any kind on the outside of the frame when turned down, the pressure of the hammer against the flat side of the pin *f* tending to hold it in that position.

It will be observed that the guard-strap B is made very strong, and that the arms D of the breech-block extend as near to its upper side as possible and permit their free movement, the object being to protect the parts from injury by a blow, accidental or otherwise, on the guard-strap.

The form of the frame renders it extremely simple and cheap to make, and, as shown in Fig. 6, it permits a full stock to be used with the greatest facility, it requiring only a plain mortise or slot to be cut in it to receive the frame and breech mechanism. By withdrawing the pin *f* the breech mechanism can all be lifted out from above, and when out it can all be taken apart and put together by the hand and without the aid of any tool.

By loosening the tang-screw *d* the guard-strap *B* can be, in like manner, removed separately, this being the only screw used in the entire breech part of the arm.

As shown in Figs. 1 and 2, the trigger-spring consists of a flat piece of steel inserted so that one end rests in a notch in the rear end of the trigger, while the other end rests against the lug *b* of the guard-strap, no other fastening being used, and it being capable of being removed or replaced by the hand at will. In this arm, as here shown, the extractor is not operated by contact of the breech-block therewith, as is usual in this style of arms, but instead it is operated by the main spring F, which is made of such a length and so located that its front or bent portion strikes the arm *c'*, and thus causes the extractor to operate, as hereinbefore described, first prying the cartridge from its seat with great force, and then, by its greatly-accelerated motion, ejecting it entirely from the arm. It is also necessary that the front end of the spring F, which strikes the rear arm of the extractor, should be so located as to come into action just at the instant the front end of the breech-block has fallen low enough to permit the shell to start; and to insure its prompt action on the extractor, and also to make it operate and close the breech, I arrange the upper end of the mainspring in a recess in the under side of the block C, as indicated in dotted lines in Figs. 1 and 2, this recess being of

such a length and form as to permit the end of the spring to slide back and forth a short distance, its backward motion being limited to a certain point. The leaves of the spring are so proportioned that when their two ends are set in their bearings the upper one will always slide forward and rest at the front end of its recess, thus depressing the elbow or front portion of the spring. When, therefore, the breech-block is opened this front portion of the spring F comes in contact with the extractor before the breech-block has descended far enough to let the extractor start, and as the block continues its movement, the upper end of the spring is forced back in its recess until the block has descended far enough to permit the extractor to begin its movement, at which time the upper end of the spring has reached the limit of its backward movement.

As shown in Fig. 2, the parts are so proportioned and arranged that the front end of the breech-block can drop some distance below the bore by continuing its movement after the spring has come in contact with the extractor, which gives more room for a backward movement of the upper end of the extractor to more effectually eject the shell, and as soon as the pressure is removed from the thumb-piece the spring F, by its pressure on the extractor, throws the breech-block up again to the position shown in Fig. 2, where it is held by the projection *e* on the extractor, which, as shown, then engages in the notch *m* in the top of the block. When in this position, the concave surface of the breech-block is in line with the under wall of the bore, ready to permit a cartridge to be inserted, and as the cartridge is shoved in its flange engages with the lip *c'* of the extractor, carrying it forward to its seat, and thereby releasing the breech-block, which, by the pressure of the spring F, is raised.

If by any means the breech is not entirely closed by this operation, the pressure on the hammer to cock it instantly completes its closing; and the instant it is closed the nose of the trigger, being depressed slightly by contact with the front end of the tumbler, throws up its rear end, thereby causing the lugs L to engage behind the arms D, thus securely locking the breech.

In my former patents the hammer and tumbler were in one piece—that of 1872 showing the thumb-piece pivoted to the hammer; but in this the hammer and its thumb-piece are all in one, while the tumbler is a separate piece.

The manipulation is as follows: The arm being as shown in Fig. 1, the breech is opened by pressing forward on the thumb-piece, which places the parts as shown in Fig. 2. A cartridge is then shoved in, carrying the extractor forward, when the breech closes automatically, when the hammer is cocked and the gun fired, as usual. Pressing the thumb-piece forward again opens the breech and ejects the shell, when another is inserted, and so on continuously.

So easy and rapid is the manipulation of this arm that I have fired thirty cartridges in about three-fourths of a minute, taking each cartridge by hand separately from the cartridge-box.

Having thus described my invention, what I claim is—

1. The trigger-guard B, attached to the frame A by means of the lip *z* and arm *b*, fitting in corresponding recesses, and secured by the screw D, substantially as set forth.

2. The hammer H, pivoted to the swinging tumbler J, the said parts being constructed and arranged to operate as described.

3. The hammer H, constructed and operating in relation to the firing-pin *g*, so that its nose *n* will be depressed below the firing-pin when pressed forward, as set forth.

4. The trigger *t*, provided with the lugs L, in combination with the arms D of the breech-block, for locking the latter closed, substantially as described.

5. The extractor I, arranged to bear on the shoulder *a* during the first part of its movement, and then to change its point of bearing to the strap below, substantially as set forth.

6. The mainspring F, constructed and located in reference to the breech-block and extractor, substantially as described, whereby it operates to elevate the breech-block to a level with the bore, and also operates on the extractor to make it hold the breech-block open until released.

7. The horizontal projection *k*, extending across the opening in the frame A, below the bore of the barrel, whereby a chamber is formed for the head of the shell in rear of the barrel, with an unobstructed opening above for the escape of the gas, as set forth.

8. The pivot-pin *f*, flattened at the point where the hammer bears against it, in combination with the face *l* of the hammer, whereby the mainspring, operating through the medium of the hammer, serves to keep the pin *f* locked in position, as set forth.

9. The combination of the tumbler J and the trigger *t* with the breech-block C, the trigger having its point arranged to bear against the front end of the tumbler when the hammer is let down, so as to prevent the breech-block from closing entirely, and thus keep the point of the firing-pin below the primer, while the hammer rests thereon, as set forth.

10. A vibrating extractor, constructed to operate substantially as described, whereby its lip or point which is in contact with the shell is made to move in a straight line, as and for the purpose set forth.

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