(No Model.) 3 Sheets—Sheet 1.

W. J. GRAHAM.

BREECH LOADING FIRE ARM.

No. 338,732. Patented Mar. 30, 1886.

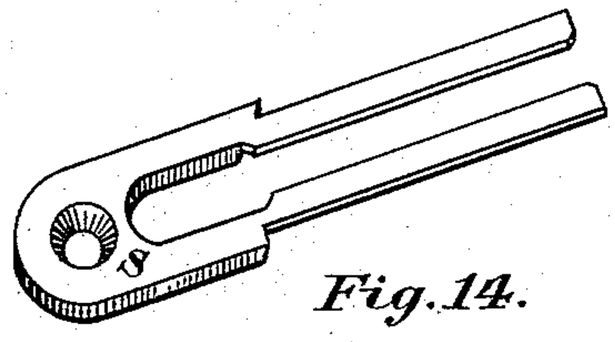

Fig. 14.

Fig. 1.

Fig. 13.

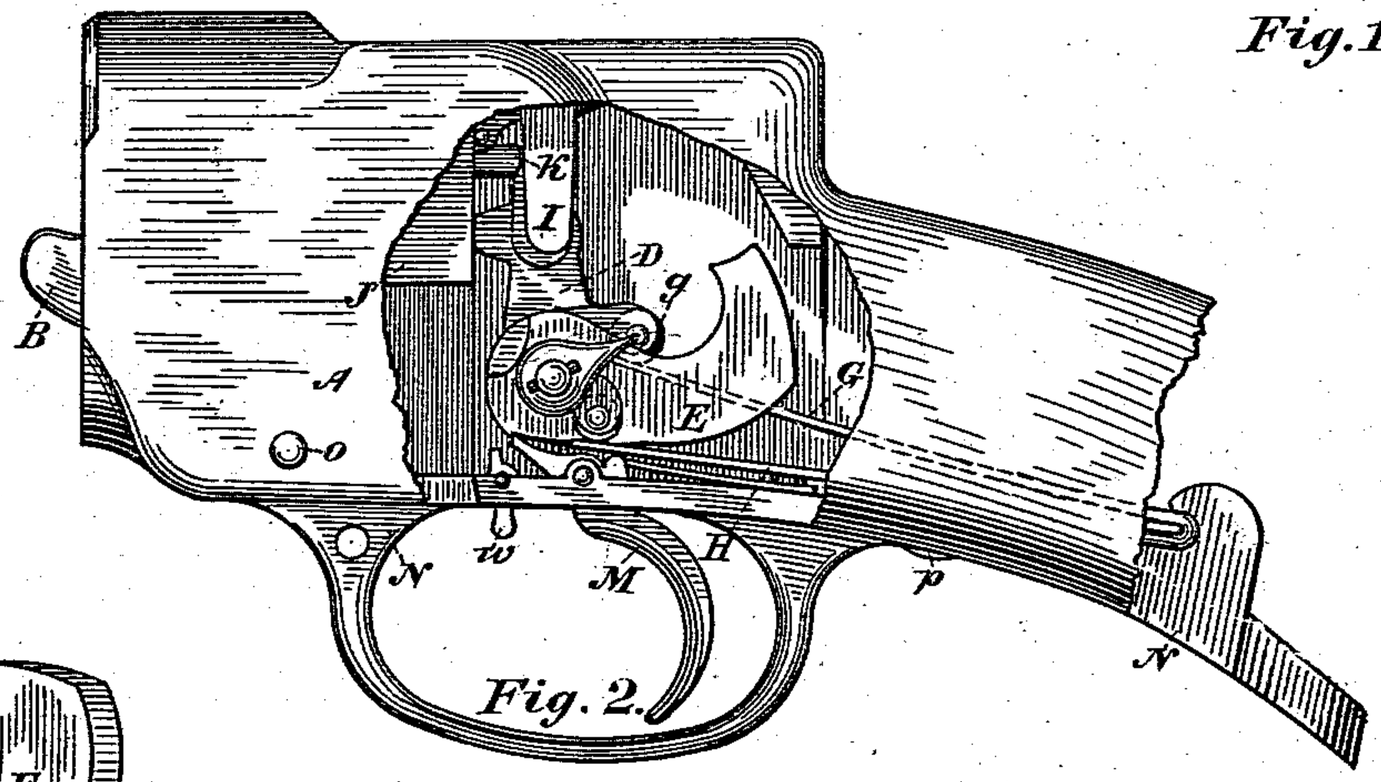

Fig. 2.

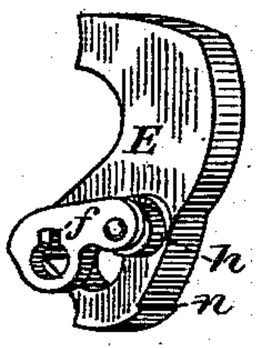

Fig. 11.

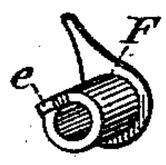

Fig. 12.

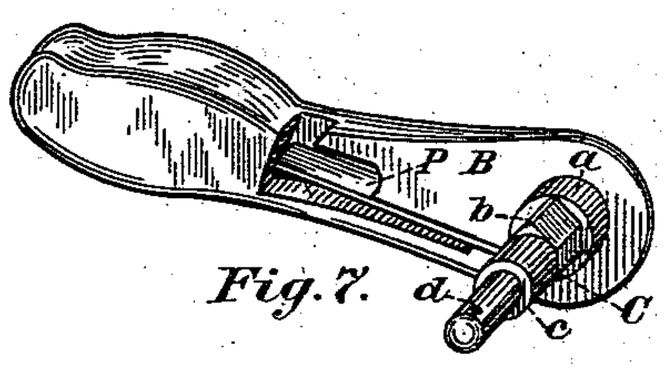

Fig. 7.

Witnesses.

G. W. Wabory.

S. C. Smoke

Inventor:

William J. Graham

(No Model.) 3 Sheets—Sheet 2.

W. J. GRAHAM.

BREECH LOADING FIRE ARM.

No. 338,732. Patented Mar. 30, 1886.

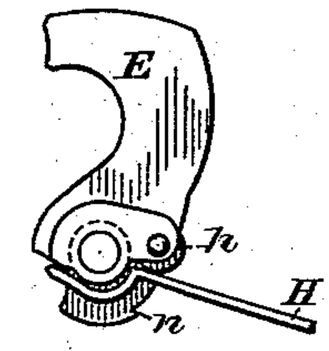

Fig. 16.

Fig. 3.

Fig. 4.

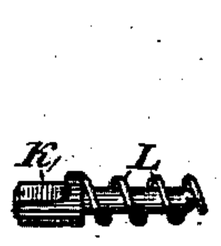

Fig. 15.

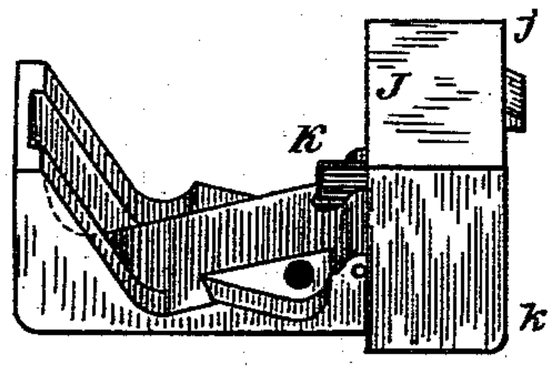

Fig. 10.

Witnesses.

G. W. Walsoy.

S. C. Smoke.

Inventor:

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(No Model.) 3 Sheets—Sheet 3.

W. J. GRAHAM.

BREECH LOADING FIRE ARM.

No. 338,732. Patented Mar. 30, 1886.

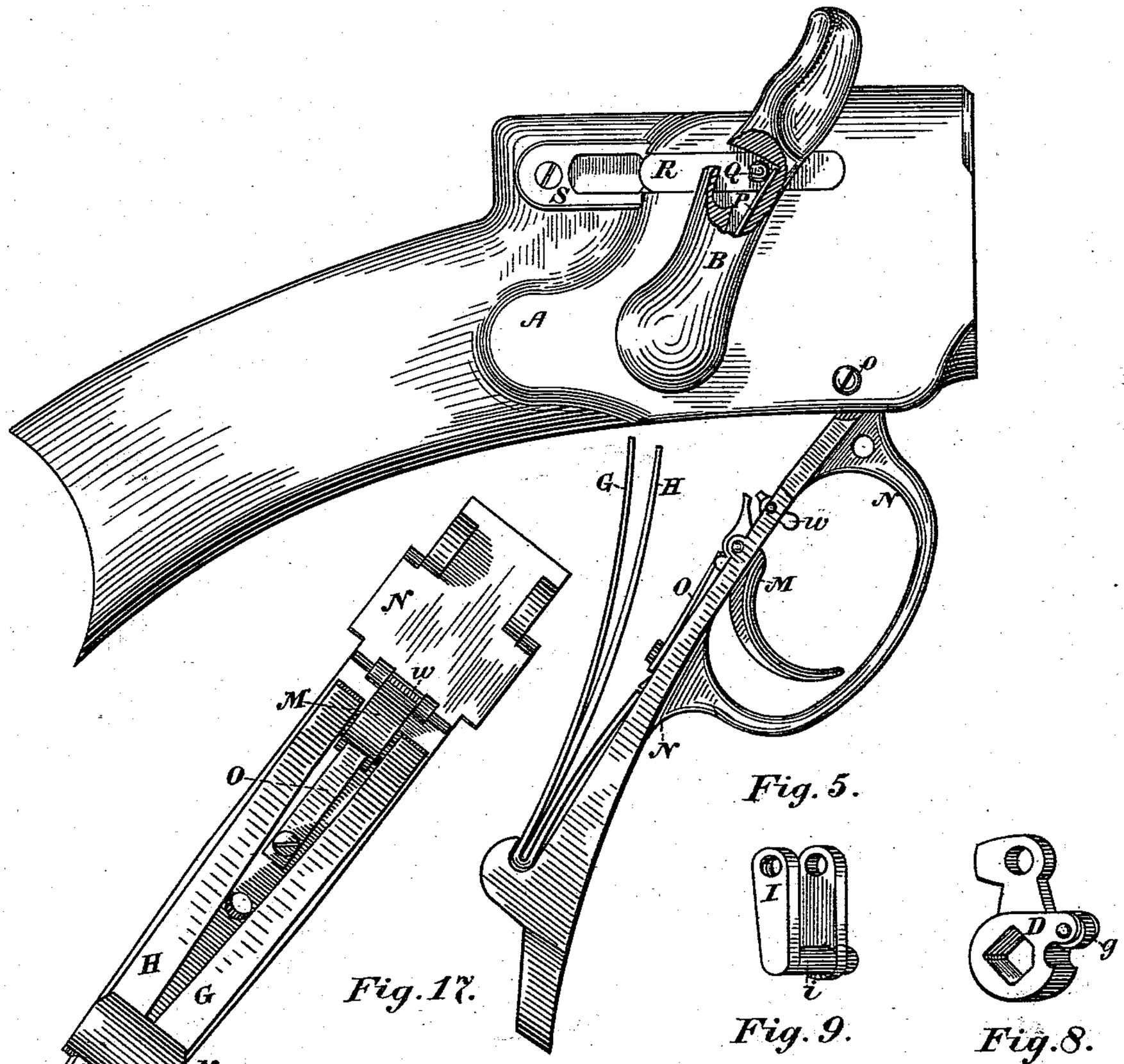

Fig. 5.

Fig. 17.

Fig. 9.

Fig. 8.

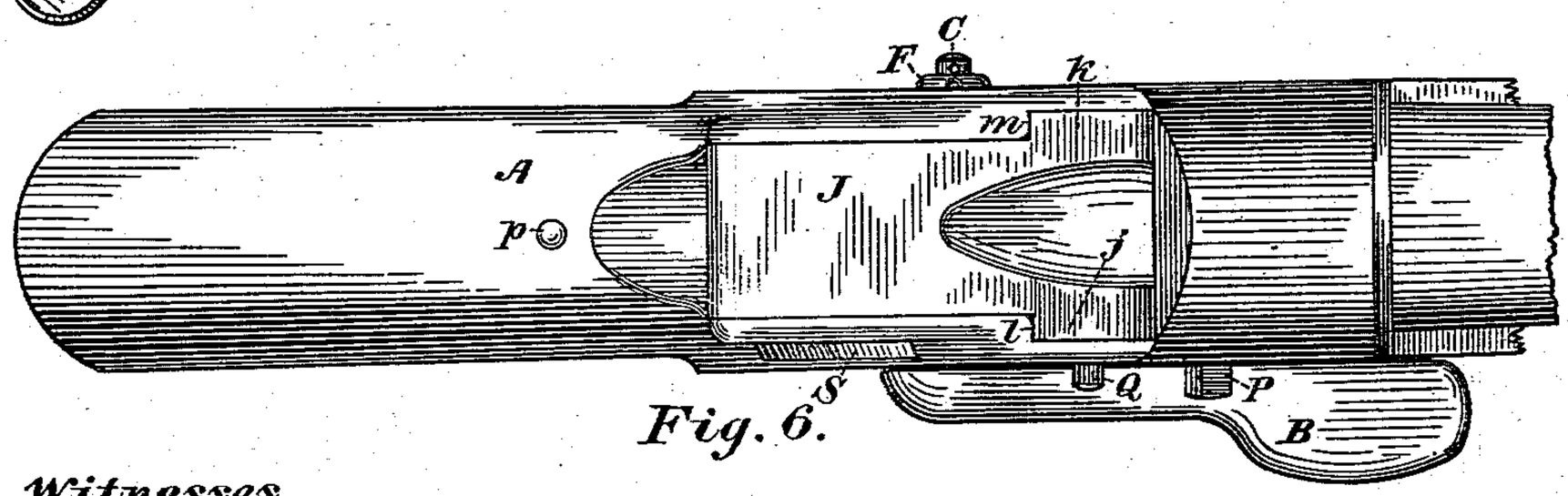

Fig. 6.

Witnesses.

G. W. Watson

S. G. Snoke

Inventor.

William J. Graham.

UNITED STATES PATENT OFFICE.

WILLIAM JOHN GRAHAM, OF TORONTO, ONTARIO, CANADA.

BREECH-LOADING FIRE-ARM.

SPECIFICATION forming part of Letters Patent No. 338,732, dated March 30, 1886.

Application filed December 12, 1885. Serial No. 185,512. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM JOHN GRAHAM, a subject of the Queen of Great Britain, residing in the city of Toronto, in the county of York and the Province of Ontario, Canada, have invented a new and useful Breech and Lock Mechanism of a Single-Shot Breech-Loading Fire-Arm, of which the following is a specification.

My invention relates to improvements in the breech and lock mechanism of single-shot breech-loading fire-arms having a vertically-sliding breech-block in a suitably slotted and recessed receiver-frame or receiver.

The objects of my invention are, first, to devise the breech and lock mechanism of a single-shot breech-loading fire-arm capable of being operated in the least number of motions, (on the part of the operator using the arm,) by dispensing with the motion of closing the breech after the cartridge is placed in the cartridge-chamber; secondly, the arrangement of and provision for the working of the parts composing my improved breech and lock mechanism in as small space as is in accordance with strength and the preservation of a good and suitable external form of the receiver containing the parts; and, thirdly, additional and in accordance with the foregoing arrangement and provision, that of having easy access to the interior and working parts in the receiver for the purposes of cleaning, oiling, and examination. I attain these objects by the mechanism fully shown connected and detailed in separate and distinct parts in the accompanying drawings, in which—

Figure 1 is a side elevation of the receiver and a short portion of the barrel and fore-arm of a fire-arm broken off. Fig. 2 is a view, in elevation, of the left-hand (or the opposite side to that shown in Fig. 1) side, having a part removed or broken out, exhibiting the interior mechanism in the ready position. Fig. 3 is a vertical longitudinal section of the receiver and part of the trigger-guard, the lever-axle being in cross-section. Fig. 4 is also a similar view of receiver, but showing the positions occupied by the parts when the lever seen in Fig. 1 is drawn full back, hereinafter described. Fig. 5 is a view somewhat similar to Fig. 1, but exhibiting the means of access to the parts for cleaning, &c., without dismounting the lock, also showing the side lever coming in contact with the cartridge-extractor. Fig. 6 is a plan of the arm as shown in elevation in Fig. 1. Fig. 7 is a perspective detail of the lever and its axle. Fig. 8 is a perspective detail of the crank, which fits closely on the axle and operates the striker, breech-block, &c. Fig. 9 is a perspective detail of the U-shaped or double connecting-bar employed in operating the breech-block and connecting it with the crank. Fig. 10 is an angular view of the breech-block inverted. Fig. 11 is an angular elevation of the striker complete. Fig. 12 is a perspective view of the indicator. Fig. 13 is a perspective view of the extractor-bar. Fig. 14 is an angular perspective view of the plate employed in retaining the extractor-bar in position. Fig. 15 is a detail of the plunger and its spring. Fig. 16 is a side view of the striker and end of the alternative or rebounding form of mainspring. Fig. 17 is a plan of the top of the trigger-guard, showing the positions of the main and operating springs, trigger, trigger-guard, and safety-stop in their respective positions.

Similar letters refer to similar parts throughout the several views.

The receiver A, containing my improved breech and lock mechanism, is made of suitable metal, (as are all the parts contained in it,) differing only from other receivers in that class of fire-arms (having the barrel screwed or otherwise securely attached to it) in such respects as suit and adapt it to the particular form of breech and lock mechanism it contains, and for having the same operated in and about it. The lever B is the only and externally-projecting means whereby the breech and lock mechanism can be operated, and is substantially for that purpose only. By having an axle, C, connected to the lever B and moving with it the internal and attached parts are operated. The axle C is formed in different-shaped parts, and referenced as *a*, *b*, *c*, and *d*. (Shown in detail in Fig. 7.) *a* being the round part is adapted to revolve in a round hole in the right side of the receiver A. The part *b* is squared or has flat sides suited to the square hole in crank D, which is seated on it and fitting closely, moving with the lever-axle C rigidly. On the part *c* (round and

smaller in size than *a*) is seated and revolves with freedom the striker E; and on the part *d*, also round and still smaller than *c*, is fitted the indicator F, which also revolves and is fitted suitably in the left side of the receiver A. Around and on the shoulder formed between the parts *c* and *d*, by the difference in size of the parts, is a collar or ring on the side of the striker E. (Shown in the detailed Fig. 11.) In this collar is a key-slot, *e*, or a piece cut out of the ring at the top to the depth inside of the larger hole in the striker E, which is seated on the part *c* of the axle C. The indicator F, already referred to, has a small projection, *f*, fitting neatly into the key-slot *e* in the striker E, and causing the striker E and indicator F to move as one part, indicating to the operator the position of the striker E inside the receiver A. Through the end of the part *d* of the axle C, and flush with the indicator F, a small pivot passes, securing the parts already mentioned on the axle C; and by the head on the indicator F, the lever B and axle C are secured through the frame or receiver A. The pivot is shown in Fig. 2, and in plan, Fig. 6. The crank D (shown detailed in Fig. 8) has pivoted to it at the back the anti-friction roller *g*, against which the operating-spring G bears, for the purpose hereinafter specified. The striker E has also a similar anti-friction roller, *h*, pivoted on the side and receiving the pressure of the mainspring H, which is considerably stronger than the operating-spring G. The main and operating springs H and G, respectively, (shown in Figs. 2, 3, 4, and 5, and in plan in Fig. 17,) are double or half-return springs, secured substantially as shown. The mainspring H, bearing, as already stated, against the anti-friction roller *h*, operates the striker E, for the purpose of and during the operation of firing, by continually pressing against the anti-friction roller *h*, pressing the striker E upward and forward against the plunger K, suitably located in the breech-block J, hereinafter referred to. The operating-spring G bears against the anti-friction roller *g*, causing the crank D to press against the breech-block J, as shown in Fig. 3, and the lever B to press downward, being about seventy degrees in advance of it on the same axle C. The crank D has on its upper and smaller end a hinged joint-connection with the connecting-bar I, (the latter detailed in Fig. 9,) which forms the connection between the crank D and breech-block J. The connecting-bar I is double or U-shaped, substantially as shown in Fig. 9, for the purpose of securing and insuring a uniform push and draw on the sides of the breech-block J, when being elevated and depressed, the breech-block J being securely connected by the screw, as shown; also, for the purpose of carrying back the striker E and depressing it by the part *i* of the connecting-bar I, crossing and being in front of the striker E, rendering it impossible to depress the breech-block J without first drawing back and depressing the striker E, thereby making place for the block J, which follows the striker E always when being depressed, and has, as seen in Fig. 10, a suitable recess in its lower side, to admit of the free movement of the crank D, the striker E, &c., covered over and protected by it. The breech-block J has the extended parts *j* and *k*, for the purpose of guiding the block J in its vertical movement in the channels *l* and *m*, formed substantially in the receiver A, and also for supporting it in its place securely and rigidly, as a direct rear support to the block J, at the instant of the explosion of the cartridge against its face and in the cartridge-chamber of the arm. At or near the center vertical height of the breech-block J is a recess adapted to and containing the plunger K, which passes through the block J at right angles to the vertical channels *l* and *m*, in which the block moves in the receiver A. The plunger K is therefore a direct-acting central-fire plunger. On the removal of the pressure of the striker E the spring L withdraws the plunger K from projecting through the face of the block J. The position of the plunger K in the block J and spring L can be seen connected and separated in Figs. 10 and 15. The trigger M, formed substantially as shown in the different figures, is securely pivoted to the trigger-guard N and operated by the trigger-spring O, causing it to drop into the nick or catch *n* in the bottom and rounded part of the striker E, retaining it drawn back in the firing position until removed by pressure on the lower projecting part of the trigger M. The guard N is secured in position by the stud-screw *o*, at the forward end, passing through suitable lugs on the guard N and the sides of the receiver A. At the rear end the screws *p* and *q* secure it vertically, *p* also serving the purpose of keeping the springs G and H to their respective positions under the anti-friction rollers *g* and *h*. On removing the screws *p* and *q* the trigger-guard N and all its attachments will, assisted by the springs G and H, drop or revolve down on the front screw, *o*, into the position occupied in Fig. 5, affording the advantage of being cleaned, oiled, &c., without being totally dismounted. The side lever, B, has, as shown in detail Fig. 7, a recess, into which is set a spring, P, with sufficient space for its working and for the admittance of the stud Q on the extractor R (shown in Figs. 1, 5, and 6, and detailed in Fig. 13) into the slot in the lever B. The extractor R is formed substantially as shown in Figs. 1 and 5, and in detail, Fig. 13, having the part *r* at a right angle to the bar which has the stud Q on it. In the right side of the receiver A is formed a suitable slot to contain the extractor R, running parallel to the top of the breech-block J and through the side of the receiver A, and at right angles to the channels *l* and *m*. In the lower and upper edges are the grooves *s* and *t*, into which the plate S fits. In the receiver A are corresponding grooves, *u* and *v*. Into these grooves, which are all rectangular in section, the suitably-shaped plate S is slipped,

securing the extractor R in position, and having a longer slot than the extractor R, allowing of a backward and forward movement only, operated by the lever B. The plate S (shown in Fig. 14 in detail) is secured by a screw to the side of the receiver A.

To provide for safety in carrying and using the arm loaded and in the ready position, I employ the trigger-stop *w* in front of the trigger M, movable on the pivot, securing it in position in the trigger-guard N, and locking the trigger M, engaged in the nick *n*, by pressing the lower and external portion forward.

Having now described and referred to the parts composing my improved breech and lock' mechanism in their normal positions, it will be next in order to describe the movements performed and the functions of the parts in the active, grouped under the three distinct motions of an operator using the arm in the acts of loading and discharging the same. Referring to Fig. 1, it will be seen that if the operator raises the lever B in an upward and backward direction toward him, he revolves the axle C, moving the crank D (seen in Fig. 4) backward and downward, carrying with it the striker E in the same direction, and operating the connecting-bar I, its single or hinged end moving with the crank D, while its upper and double end moves in a vertical plane, carrying with it the breech-block J, and depressing the same, the striker E and the crank D operating and depressing the operating and main springs G and H, respectively. When the lever B has been drawn back till the stud Q on the extractor R comes in contact with the extractor-spring P, the edge of the hollowed portion in the top of the breech-block J will have depressed till just flush with the bottom edge of the cartridge-chamber (shown in the barrel, Figs. 3 and 4.) Continuing the draw or backward movement of the lever B, the extractor R will, if an empty exploded shell is in the chamber, remain under ordinary cases fixed till the spring P against the stud Q is carried or sprung till they come in contact with the bottom side of the recess in the lever B, when the draw on the stud Q changes from a spring to a positive force, starting the shell in the chamber. The spring P then suddenly overcoming the friction retaining the shell, ejects it clear out of the chamber and to the rear of the breech-block J. At the point or instant the extractor R becomes positive acting the trigger M is dropping into the nick *n* in the striker E, when any further draw and traverse of the lever B is unnecessary, save when the positive action of the extractor R is required to eject the shell. The lever B and the internal mechanism will remain in this position, the pressure of the mainspring H being held by the trigger M, and that of the operating-spring G partially released from operating the parts by the friction of the extractor R, staying the lever B engaged, and with the decreased leverage in elevating the breech-block J by the crank D, occupying the position shown in Fig. 4, the first motion of the operator is completed, being simply the drawing toward him of the lever B. Should it be desirable (as in the use of the arm as a military weapon during inspection) to close the action and ease springs, this is performed by pressing the trigger M, disengaging it from the striker E, thereby throwing the additional force of the mainspring H against the crank D and elevating the breech-block J, when the action is closed and the springs G and H at ease in their normal positions. On the other hand, to continue the motions and load the arm, that of placing the cartridge into the chamber, carrying with it and being in contact with the extractor R, (part *r*,) completes the second motion necessary by the operator. The movements performed by the parts are the extractor R replaced in its usual position, carrying forward with it during part of its travel the lever B, and starting the operation of the parts operated on by the operating-spring G, the force of which increases as the breech-block J rises to its usual position in support of the cartridge. When, now, the striker E is still drawn, as shown in Fig. 2, the third and completing motion of the operation to discharge the arm is simply sufficient pressure on the trigger M, which sets free the striker E, when it flies up instantaneously, striking the plunger K, forcing it through the breech-block J, igniting the cartridge placed in by the second motion of the operator.

Fig. 16 exhibits an alternative form of mainspring, and the kind probably the most likely to be used. It is a rebounding spring, or what is known as a "rebounding lock" when this form is used, differing only from the form shown in the figures by being longer and suitably curved to pass under the axle C and come in contact with the front portion *x* of the striker E, when the upper end of the striker E stands in its normal and usual position just clear of, and does not exert any pressure against, the plunger K, the pressure on the roller *h* being counteracted by the contact at *x* on the front of the striker E by the mainspring H. When the striker E is released from the firing position, it flies up, striking the plunger K, similar to the straight form of spring shown in the different figures. When it has reached the normal position, the part *x* comes in contact with the spring H, forcing down the spring and releasing the pressure of the same from the roller *h*. Then the striker E regains its normal position and rests on the spring H, both by the roller *h* and the part *x* in front of the axle C, the plunger K following the striker E in regaining their respective positions.

I am fully aware that single-shot breech-loading fire-arms have been and are to the present made, and secured by Letters Patent, having a vertically-sliding breech-block in a suitably recessed and formed receiver, and therefore do not claim such, broadly; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, with the suitably formed and recessed receiver A of a single-shot breech-loading fire-arm, of the vertically-sliding and closely-fitting breech-block J, suitably connected to the double end of a U-shaped connecting-bar, I, connected at its single end by a hinged joint to the crank D, having supported on it the anti-friction roller *g*, operated and pressed on by the operating-spring G, and operating the axle C, on which it is suitably and rigidly supported, and which is connected to the lever B, whereby all the parts of the lock mechanism are operated, substantially as and for the purpose specified.

2. The combination, with the breech and lock mechanism of a single-shot breech-loading fire-arm, of a side lever, B, having a longitudinally-extended recess in its inner side containing the inserted extractor-spring P, secured by one end, and allowing of the movement and working of the opposite end, which, when operated against the stud Q, (on and part of the extractor-bar R,) forms a spring-cushioned bearing between the side lever, B, and the grooved extractor-bar R, which is secured in a suitably-shaped slot in the receiver A by the divided plate S, fixed in corresponding grooves in and secured to the receiver A, the whole forming a combined spring and positive cartridge-extractor, substantially as and for the purpose specified.

3. In combination with and part of the mechanism of a single-shot breech-loading fire-arm, the suitably formed and recessed trigger-guard N, containing, having attached to, and operating in it the operating and main springs G and H, the trigger M, the trigger-spring O, and safety-stop *w*, the trigger-guard N being secured vertically at its rear end by the screws *p* and *q* and at its opposite end to the receiver A by the horizontal stud-screw *o*, on which the trigger-guard N revolves, substantially as and for the purpose specified.

WILLIAM JOHN GRAHAM.

Witnesses:
G. H. WATSON,
S. C. SMORLEY.