I. W. HEYSINGER.

BREECH-LOADING FIRE-ARMS.

No. 194,679. Patented Aug. 28, 1877.

Fig. 2.

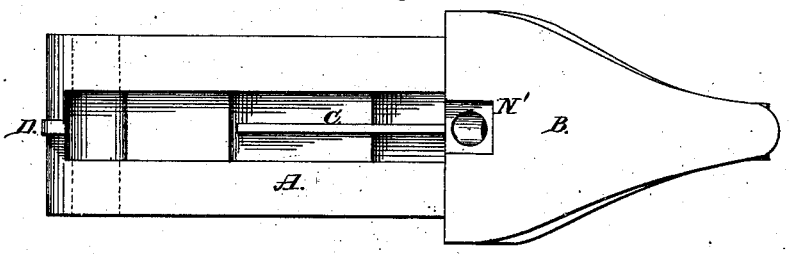


Fig. 1.

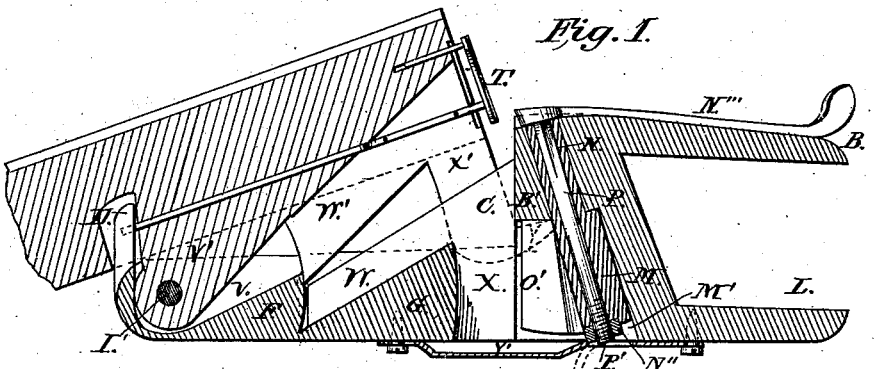


Fig. 3.

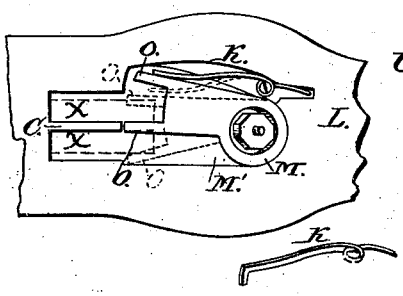


Fig. 4.

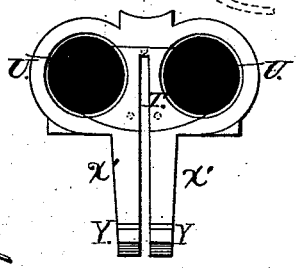
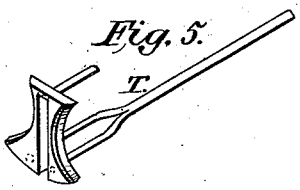


Fig. 5.



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IMPROVEMENT IN BREECH-LOADING FIRE-ARMS.

Specification forming part of Letters Patent No. **194,679**, dated August 28, 1877; application filed February 2, 1877.

To all whom it may concern:

Be it known that I, ISAAC W. HEYSINGER, of Philadelphia, in the county of Philadelphia, State of Pennsylvania, have invented certain Improvements in Breech-Loading Fire-Arms, of which the following is a full, clear, and exact description, reference being had to the drawing accompanying and forming part of this specification.

Figure 2 is a top view of the breech portion of a drop-gun with my improvements applied thereto, the barrels and locking-lever having been removed therefrom. Fig. 1 is a longitudinal vertical section alongside the brace-plate C, to be hereinafter described. Fig. 3 is a view from beneath, the guard and triggers having been removed therefrom, as well as the barrels and locking device. Fig. 4 is a rear-end view of the barrels, and Fig. 5 shows the extractor in perspective.

The first part of my invention consists of what I call a "diagonal brace-plate," C, connecting the standing breech B with the horizontal portion of said breech A, as shown in Figs. 1 and 2. This construction, by taking upon the bar or brace-plate C the force of the recoil at the time of firing, relieves the angle at the junction of the standing and horizontal portions of said breech of the excessive strain which has heretofore been an element of weakness and danger, while at the same time it permits a considerable reduction in the weight of metal in the neighboring parts. This brace-plate is attached to the standing breech by being brazed into a vertical dovetail in the face thereof, or worked out of the solid block, as may be preferred, so that it may be secure against the severest strain to which it may be liable. Its forward end is in like manner attached along the horizontal breech-frame, in the line of the axis of the barrels to the portions F and G, or parts corresponding thereto, against which abut the shoulders W′ and X′, as is shown in Fig. 1, thus equally supporting the horizontal breech against downward pressure at the moment of discharge. The barrels are separated at their rear end by a vertical slot, which extends downward and forward, corresponding in form to the brace-plate C. The extractor, as shown in Fig. 5, is also slotted in its lower part to accommodate the brace-plate C, and its stem is bifurcated for a portion of its length for the same purpose. The two arms of the extractor ride in the grooves shown alongside the central slot in Fig. 4. In Fig. 1 the extractor T is shown *in situ*. For obvious reasons I prefer having the brace-plate C in the median line, but I do not desire to confine myself thereto, as my invention comprises a diagonal brace-plate, C, for the above-described purpose generally, so long as it extends downward and forward vertically from the face of the standing breech, attached to the horizontal portion in like manner, and the barrels adapted in form thereto.

The second part of my invention consists of the construction of the lugs V′, W′, and X′, Fig. 1, and the parts corresponding thereto, which are formed in the following manner: From I′ as a center the anterior lines of W′ and X′ are described with corresponding radii. The metal is then removed so as to form the serrations shown in the figure. The horizontal breech-piece is recessed in a corresponding manner to fit accurately thereto, the rear-most recess passing entirely through said breech-piece, and opening also to the rear for the reception of the locking device, to be hereinafter described. The lug X′ is made so long that when the barrels tilt upon the hinge-pin at I the lugs W′ and X′ do not escape from their corresponding recesses, but play up and down therein in the manner of a plunger. From this it results that the strain, both lateral and longitudinal, is in great part taken from the hinge-pin I and transferred to the faces of the lugs X′ and W′, and the shoulders F and G, which mutually slide upon each other.

The third part of my invention is shown in the construction of the lug X′, Figs. 1 and 4, and the parts corresponding thereto. The said lug is formed flush with the face of the rear extremity of the barrels, and depending therefrom to a sufficient depth to allow the stud Y to fulfill its functions, as hereinafter to be described. This lug X′ is formed solid from top to bottom without undercutting in any part thereof. As shown in Fig. 4, it is made double to allow the interposition of the brace-plate C, and for another purpose, to be hereinafter described. From the bottom of its rear por-

tion extends backward the stud Y, which lies in position at Y′, Fig. 1, underneath the breech. As the barrels tilt, ready to receive a charge, the stud Y travels along a vertical recess, O′, back of the horizontal and beneath the standing breech, till its motion is arrested by the shoulder B′ of said standing breech, when the barrels are found to be in proper position for loading. The stud Y thus takes the strain from the hinge-pin I′ and forms a stop-motion at such distance from the center I that but little strain is felt at any part. The stud Y also forms a portion of the locking device, which constitutes the fourth part of my invention. As shown in Figs. 1 and 2, the gun is what is known as a "top-lever gun." From N′, Fig. 2, a cylindrical hole extends obliquely downward and backward through the standing breech, as shown in Fig. 1. Concentric with this, in the lower half of its length, is a larger cylindrical opening. (Seen at M″, Figs. 1 and 3.) This lower and larger cylindrical shaft is open in front into the vertical recess O′ provided for the movement of the stud Y and the lateral motion of the arm O, Fig. 3. This figure shows the parts adapted to said openings and working therein, which constitutes the locking device in question. From the cylinder M extends forward an arm, O, double for part of its length. This is so arranged that, when in position, and the barrels in place, the arm is interposed between the stud Y and the shoulder B′ in the manner of a strut, and not of an ordinary bolt, so that the strain in firing is a direct end thrust thereupon, which can only yield by crushing. The shaft of the lever P passes through the double cylinder, and is fastened from beneath by the nut N″, so that, since the cylinder was introduced from below, the whole is held securely in position. The square shoulder upon the upper end of P is adapted to a similar recess, N, so as to prevent the said shaft from turning in the cylinder. The guard-plate, Fig. 1, slides over and conceals the opening M′, and is itself perforated for the reception of the tip of the lever-shaft P′, which steadies the lever N‴, though the strain of the thrust is taken by the portion of the standing breech above and behind the parts O and M. Space is left, Fig. 3, for the lateral movement of the arm O on its center, so as to free the stud Y when the lever N‴ is pushed aside. The spring K lies across the opening M′, Fig. 3, and O′, on the under side of the breech, and bears, by a pin rising from its extremity, against the side of O, so as to return it quickly to its place over the stud Y when the gun is closed. Fig. 3 shows a dotted outline of the locking device in position. Several prominent advantages result from the use of this oblique cylinder-shaft. The lever N‴, Fig. 1, may be pivoted very far forward without weakening the standing breech, which makes it more convenient for handling. Again, as the lever N‴ is pushed aside, since it travels along the surface of a cone of which P is the axis, it will descend, thus following the natural motion of the thumb. It allows also a long leverage and quick action for the extremity of the arm O, which, by the division of the stud Y, is only required to travel half as far as would otherwise be necessary, since one part of O moves to the right of, and the other passes between, the two leaves of said stud Y, and thus allows it to rise. This makes a very small movement of the lever N‴ sufficient, while in nowise diminishing the strength or solidity of construction. As the barrels rise the stud Y assists in thrusting the lever N‴ still farther to the side, on account of the diminishing distance of the axis of M from the line upon which the stud Y travels. The lever is thus held aside without the use of any special device, while the stud Y slides up alongside the arm or strut O, and returns, till when the stud Y passes the lower line of O, the spring *k* throws the strut into position over the stud Y, and the barrels are locked. The locking device and the abutment of O upon the stud of the lug X′ is also thrown much farther to the rear than is found in other guns, which lengthens the leverage from the hinge-pin at least one-sixth, and correspondingly diminishes strain, shock, and liability of the machinery to work loose, while rendering the gun quicker in action, and much simpler in construction.

Though I prefer the locking device above described, I do not desire to confine myself to the top-lever action; but the strut O may be hung upon a transverse axis above or below the stud Y, which would make it a side lever or a guard-lever gun, instead of the one described.

Having now described the parts in detail, I will briefly show their operation as a whole.

The top lever N‴, being pressed to the right by acting upon the arm O, uncovers the double stud Y. The rear ends of the barrels rise, the stud Y traveling alongside the strut O, which is held against it by the spring K, prevents the lever N‴ from returning to its place until the barrels are again down. The lugs W′ and X′ move upon their adjacent surfaces of F and G. Before the lugs W′ and X′ have cleared the recesses W and X the motion of the barrels is arrested by the stud Y striking against the shoulder B′. The extractor having, meanwhile, been thrust out, the old shell may be removed, and a fresh cartridge inserted. The barrels being brought up in front, the motion is reversed, the lever N‴ moves slightly toward the center line. Suddenly the stud Y passes the lower limit of the arm O, the spring K throws the lever N‴ into place, and the barrels are locked for firing.

Should, by long use, the arm O become loose in the chamber M′, a thin washer may be put

in above the larger cylinder, and the arm O and a few of these washers might be kept beneath the butt-plate for an emergency.

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

1. The combination of the brace-plate C, the slotted barrels U, bifurcated extractor T, and lugs W′ and X′, the whole constructed substantially as and for the purpose described.

2. The combination, in a drop-gun, of a horizontal breech-piece, with the upper surface substantially flat, the vertical brace-plate C, and the barrel portion U cut away to receive the same, the whole constructed to operate substantially as described.

3. The combination of the serrated lugs W′ and X′, the abutting shoulders F and G, and the recesses W and X, together with the stop motion or its equivalent Y, so arranged as to prevent the entire escape of said lugs from said recesses, substantially as described.

4. In a drop-gun, the lug X′ depending from the rear of the barrels, its rear face flush with the rear face of said barrels, formed solid, without undercutting or weakening in any part thereof, the stud Y projecting backward from its lower portion, above which engages the locking-arm when the barrels are closed, and which said stud Y, moving in a vertical recess in the breech-block, by impinging against the shoulder B′, forms a stop-motion for the barrels when being opened for loading, substantially as set forth.

5. The cylinder of two diameters, bearing the arm O, in combination with the stud Y, spring K, lever-shaft P, and locking-lever N‴, substantially as and for the purpose described.

6. In a breech-loading fire-arm, the cylinder N M, inclined obliquely downward and backward through the fixed breech-block, the whole constructed substantially as and for the purpose described.

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