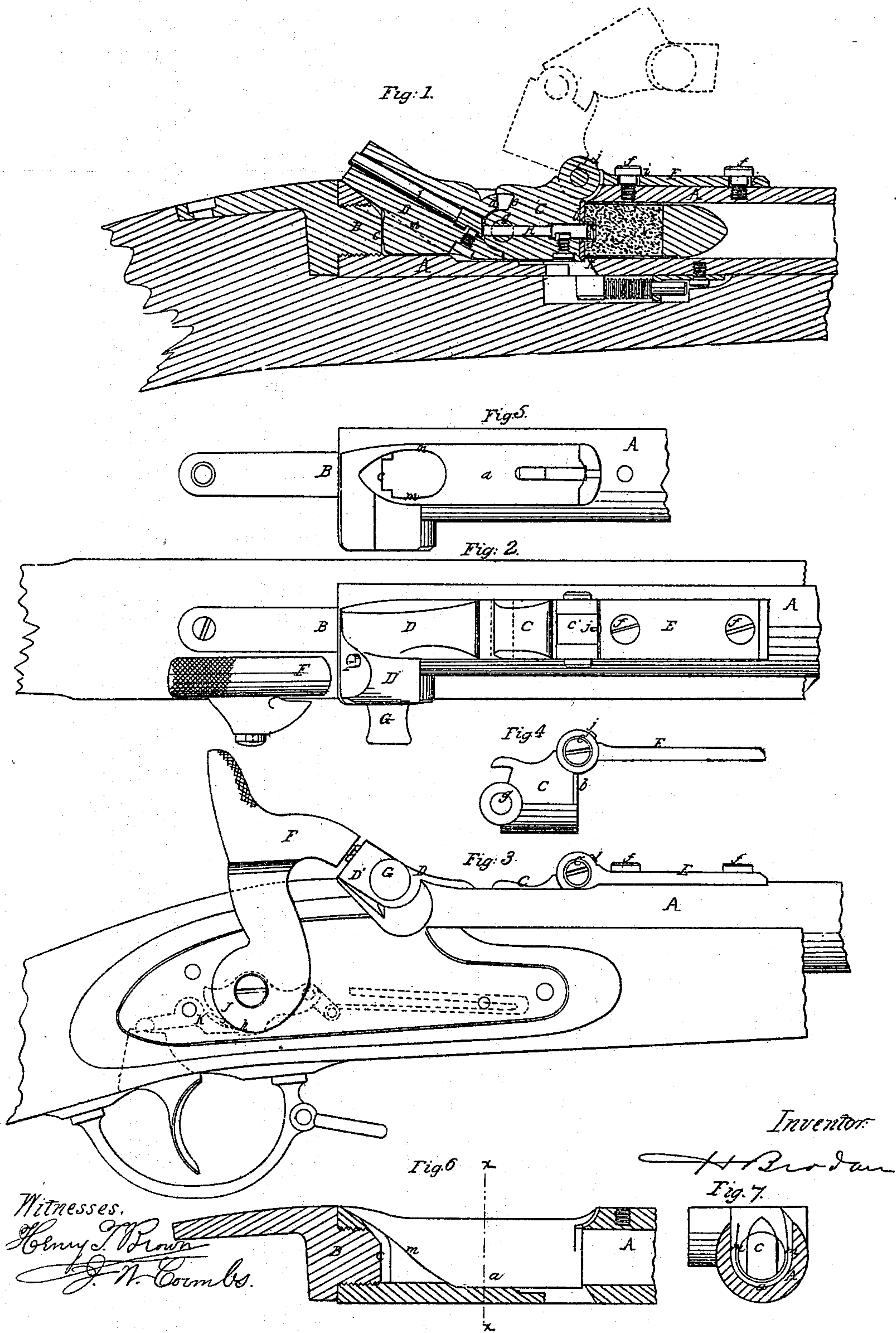


H. BERDAN.
BREECH LOADING FIREARM.

No. 52,925.

Patented Feb. 27, 1866.



UNITED STATES PATENT OFFICE.

HIRAM BERDAN, OF NEW YORK, N. Y., ASSIGNOR TO THE BERDAN FIRE ARMS MANUFACTURING COMPANY, OF SAME PLACE.

IMPROVEMENT IN BREECH-LOADING FIRE-ARMS.

Specification forming part of Letters Patent No. 52,925, dated February 27, 1866.

To all whom it may concern:

Be it known that I, HIRAM BERDAN, of the city, county, and State of New York, have invented certain Improvements in Breech-Loading Fire-Arms; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a central longitudinal vertical section of those parts of a converted muzzle-loading musket which are necessary to illustrate the improvements. Fig. 2 is a top view of the same. Fig. 3 is a right-hand-side view of the same. Fig. 4 is a side view of the breech-piece and the strap-hinge which connects it with the barrel. Fig. 5 is a top view of the rear portion of the barrel which constitutes the breech-receiver, the breech and its appurtenances being omitted. Fig. 6 is a central longitudinal vertical section corresponding with Fig. 5. Fig. 7 is a transverse section in the plane indicated by the line *xx* in Fig. 6.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to a construction of and mode of applying, operating, and securing a swinging breech-piece, which are especially well adapted to the conversion into breech-loaders of fire-arms originally constructed for muzzle-loading, but also applicable to breech-loaders in general, and by which great efficiency and safety from accidental discharge are obtained. The breech-piece is hinged at the upper part of its forward end to the top of the barrel or breech-receiver in such manner as to be capable of swinging upward and forward over the top of the barrel to open the chamber for loading, and it has hinged or jointed to its rear end a brace, which drops into the back part of the breech-receiver for the purpose of bracing the breech-piece, while firing, against a recoil-bearing in the rear portion of the receiver, or in the case of a fire-arm converted from a muzzle-loader, against the breech-pin. The hinge of the breech-piece is so attached to the barrel or breech-receiver that, if necessary, it will permit the breech-piece and brace to adjust themselves to the recoil-bearing in firing, the for-

ward end of the breech-piece being constructed of circular form in its transverse section to enter like a piston into the chamber, and so relieve the hinge-joint of strain by preventing the breech-piece from being lifted up in case of the gas from the charge getting under it in firing. The percussive force of the blow of the hammer, by which the fulminate priming of the cartridge is ignited to fire the charge, is transmitted through two firing-pins, one sliding within the breech-piece and the other through the rear brace, the said firing-pins meeting at the joint between the breech-piece and brace, and one of said firing-pins passing through and serving to secure in its place the joint-pin which connects the breech-piece and brace. A portion of the brace is so arranged with respect to the hammer that when the hammer is locked in a position out of contact with the rear firing-pin by the entrance of the sear into a safety-notch in the tumbler it will, to such extent as the power of the mainspring is effective, prevent the brace from rising sufficiently high to unlock and permit the opening movement of the breech-piece; and when the hammer is brought into the aforesaid locked position it will, if necessary, bring the brace to a position against the recoil-bearing to secure the breech-piece in a closed position.

The invention also relates to novel means of throwing out the discharged cartridge-shells from the chamber while the fire-arm is in a horizontal position by or during the act of opening the breech-piece. The cartridge-shell is started by the action of a spur on the breech-piece against the front of its head, or against a suitable shoulder on its rear end, and is afterward thrown out from the chamber and breech-receiver by means of a hook arranged in a groove or mortise in the bottom of the breech-receiver and actuated by a spring; and in the rear part of the breech-receiver there are inclined surfaces, the construction of which is provided for by suitably recessing the recoil-bearing in the breech-receiver or face of the breech-pin, and a suitable construction of the bearing portion of the brace, and up or over which the shell or cartridge slides easily as it is ejected.

To enable others skilled in the art to under-

stand the construction and operation of my invention, I will proceed to describe it with reference to the drawings.

A represents the barrel, and B the breech-pin. The rear portion of the barrel in front of the breech-pin has its upper part cut out and the bore slightly enlarged to form a receiver, *a*, Figs. 5, 6, and 7, for the movable breech-piece C and jointed brace D. The movable breech-piece C—of about half the length of the receiver—has its transverse section of a form to fit snugly into the receiver, except a small portion, *b*, Fig. 4, at its front end, which is made cylindrical to enter and fit the rear part of the chamber of the barrel. It is connected at the upper part of its front end by a hinge, *c'*, with a strap-piece, E, which is secured by screws *f f* to the top of the barrel in front of the receiver *a*, and it has the brace D connected to its rear end by a hinge, *g*, the center of which is in the same plane with the axis of the bore when the breech is in its closed position within the receiver *a*. The brace D has the transverse section of the greater portion of its length of a form to fit the receiver, and is made to fill up the whole of the space between the breech-piece C and the end *c* of the breech-pin or other equivalent recoil-bearing at the back of the receiver.

When the breech-piece is in the position for firing (shown in black outline in Fig. 1) its rear end is of a form to project upward and backward over the recoil-bearing *c*, and also to project laterally over the barrel on the right-hand side, as shown at D', Fig. 2, that it may come to a position opposite the hammer F when the latter is arranged in the position which it commonly occupies in a muzzle-loading fire-arm. The laterally-projecting portion of the said brace is furnished with a knob, G, to lay hold of it and throw the brace up from its place in front of the recoil-bearing preparatory to the opening of the breech for loading.

To open the breech the brace is pressed forward while it is thrown or swung up clear of the recoil-bearing, and when the shoulder *d*, Fig. 1, or the brace, comes to a bearing against a shoulder, *e*, of the breech-piece, the continued upward movement of the brace causes the breech-piece to swing upward and forward, as shown in red outline in Fig. 1, leaving the receiver open for the reception of the cartridge, and leaving a clear passage into the chamber of the barrel.

In order to provide for the self-adjustment of the brace D to the recoil-bearing *c*, the holes provided in the strap E of the hinge *c'* are elevated, as shown at *i i* in Fig. 1, in the direction of the length of the strap and barrel, to permit the said strap, the breech-piece, and the hinge to move longitudinally as far as desirable. The same result may be obtained by horizontally elongating the hole or holes in the hinge *c'*, which receives its joint-pin. In this movement the cylindrical projection *a* on the face of the breech-piece remains in the

chamber of the barrel, and so prevents any upward tendency of the breech-piece, and prevents any undue strain on the hinge *c'* in case of gas entering under the breech-piece. In a fire-arm for using paper cartridges this projection should be hollowed out and made with thin edges to form a gas-check.

H is the front firing-pin, fitted to slide through the breech-piece, and I is the rear firing-pin, fitted to slide through the brace D. The separation of these pins is at the back of the hinge *g*, so that they do not interfere with the movement of the brace. The front pin, H, passes through the joint-pin of the hinge *g*, and thereby secures the said pin in place without the necessity of any head, shoulder, or screw-thread on the joint-pin.

The head of the pin I protrudes from the projection D' of the brace D in such position that it may be struck by the hammer when the latter is let off for firing, but that it may be free therefrom, as shown in Fig. 3, when the hammer is locked by the entrance of the sear K into a safety-notch, *h*, Fig. 3, provided in the tumbler J in front of the half-cock notch, the hammer when thus locked overhanging the projection D' of the brace, as shown in Fig. 3, and serving, to the extent of the power of the mainspring, to prevent the accidental rising of the detached end of the brace to such a distance as to permit the opening of the breech-piece. If the brace is not quite down in the proper position to lock the breech-piece when the hammer is brought to the position above specified, or brought down upon the firing-pin, the hammer will bring it to the proper position.

Any part of the hammer-shaft may be used as an equivalent to the hammer for the purpose of operating, in combination with a suitable portion of the brace D, in the manner above described, to prevent the accidental opening of the breech-piece.

j is the spur, formed upon that part of the hinge-joint *c'* which is in the same piece with the breech-piece, for the purpose of starting the discharged cartridge-shell by the act of opening the breech-piece, the said spur acting upon a projecting portion of the shell.

k, Fig. 1, is a hook sliding in a mortise in the bottom of the receiver *a*, and projecting far enough into the receiver to catch the projecting portion of the head. This hook has applied to it a spring, *l*, for the purpose of pressing it backward. This spring allows the hook to yield to the forward pressure of the breech-piece against the cartridge in loading, but after the shell has been started by the spur *j* in the act of opening the breech-piece, which has then moved far enough upward to offer no impediment to the shell, the spring throws the hook suddenly backward and causes it to eject the cartridge from the receiver, the shell being slightly tapered, so that after it has been started it moves easily. To facilitate the ejection of the shell or cartridge

inclined guiding-surfaces *m m* are formed, as shown in Figs. 5, 6, and 7, on the sides of the rear portion of the receiver, by recessing the recoil-bearing *c*, as shown in Figs. 5 and 7, of a sufficiently less width than the receiver, and making the lower rear portion of the brace of a suitable width to enter the recess. The shell or cartridge, sliding easily up these inclined surfaces, may be ejected from the receiver while the gun is in a horizontal position.

The hook *k* and spring *l* perform another function besides that above mentioned—that is to say, by depressing back the breech-piece when closed they hold the brace against the recoil-bearing with friction enough to prevent the breech from being shaken open while the hammer is at full cock.

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

1. A jointed swinging breech-piece, when the detached end of the brace is forced or held in position by the hammer, or other suitable projection from the hammer-shaft, substantially as herein set forth, for the purpose of communicating less strain to the hammer than when an unjointed swinging breech-block is used.

2. The combination of the brace *D*, jointed to the swinging breech-piece, the hammer and the safety-notch *h* in the tumbler, substantially

as described, whereby the hammer while held back from the firing-pin is made to prevent the detached end of the brace from rising above a position in which it locks the breech-piece.

3. A firing-pin inserted through the joint-pin of the breech-piece and attached brace, and securing the said joint-pin in place, substantially as herein specified.

4. The elongated hole or holes in the strap *E*, or other part of the hinge-connection of the swinging breech-piece *C*, in combination with the circular projection *b*, provided on the face of the breech-piece to enter the chamber of the barrel, substantially as herein specified, whereby the self-adjustment of the breech-piece to the recoil-bearing is provided for, and the liability to strain the hinge by any rear or upward tendency of the breech-piece is counteracted.

5. The combination of the spur *j*, hook *k*, spring *l*, and ways *m m*, when employed in a breech-loading fire-arm having a recoil-shoulder, *c*, in line with and at right angles to the bore, to completely eject a cartridge or shell without elevating the muzzle, substantially as herein set forth.

Witnesses:

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