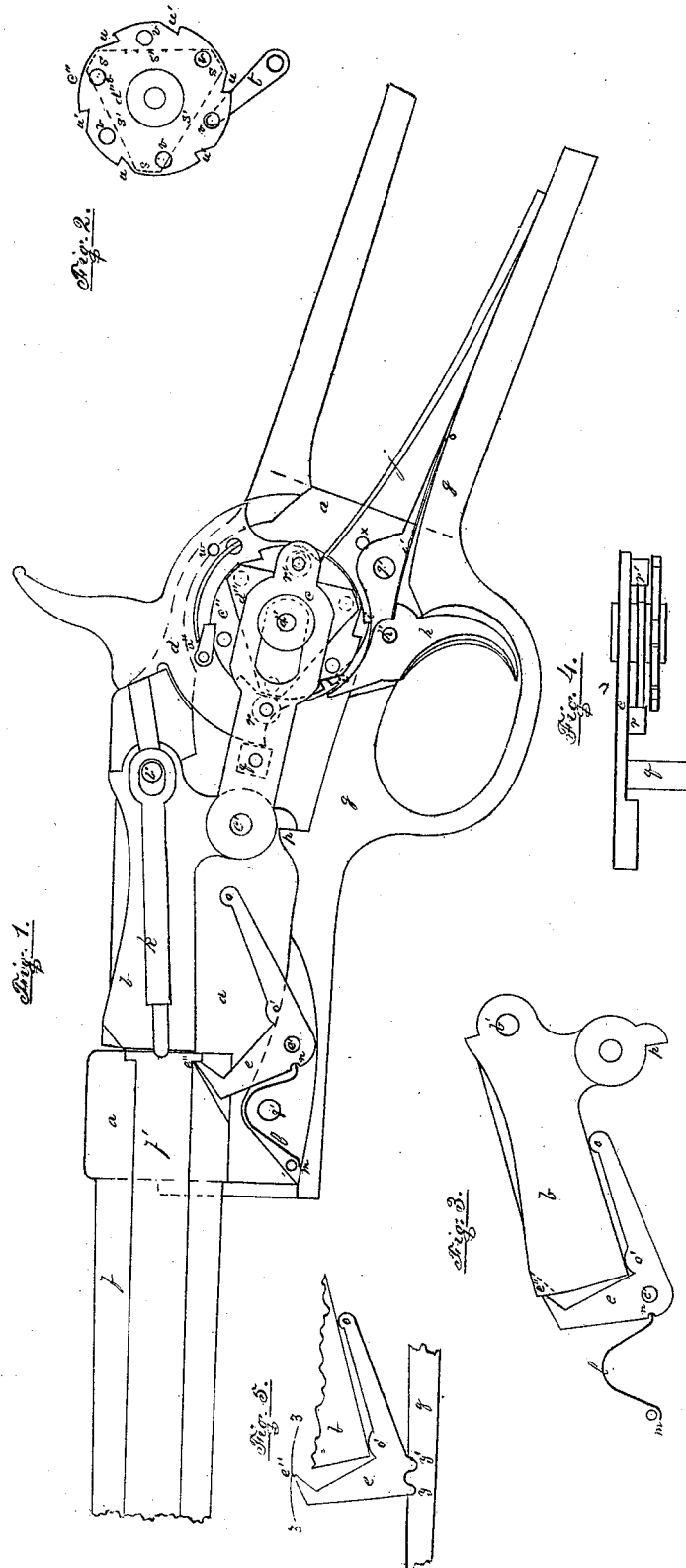


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 Improvement in Breech-Loading Fire-Arms.
 No. 114,540. Patented May 9, 1871.



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IMPROVEMENT IN BREECH-LOADING FIRE-ARMS.

Specification forming part of Letters Patent No. 114,540, dated May 9, 1871.

To all whom it may concern:

Be it known that I, WILLIAM H. ELLIOT, of the city, county, and State of New York, have invented a new and Improved Breech-Loading Fire-Arm; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

Similar letters of reference indicate the same devices in all the figures.

To enable others skilled in the arts to comprehend, make, and use my invention, I will proceed to describe its nature, construction, and operation.

The nature of my invention consists in combining, with a breech-block and hammer, a cam and ratchet for forcing the breech-block back and forth to open and close the chamber by the backward movement of the hammer; in providing certain stops for the hammer, in connection with a ratchet having upon it notches cut at irregular distances, so that while the hammer makes sweeps of various lengths, the movements of the cam which gives motion to the breech-block shall be uniform; in the employment of certain stops, in combination with a cam for holding the breech-block in the open and closed position; in so constructing the retractor, in connection with the breech-block, that the latter shall act upon the former at two points at the same time—first at the extreme end of the arm of the retractor, and then at a point near the pivot of the same; in the employment of a spring, in combination with a retractor having upon it two points of bearing for the breech-block; and, in combination with the connecting-link which conveys force from the hammer to the breech-block, a stop which serves the purpose of stopping the first forward movement of the hammer, and also of locking the breech-block while firing.

Figure 1 is a vertical section of my improved arm, showing some of the moving parts in elevation. Fig. 2 is an elevation of the ratchet, showing the irregular notches for revolving the cam, and the regular notches for stopping its backward movement. Fig. 3 is an elevation of the breech-block retractor and retractor-spring. Fig. 4 is a plan of the con-

necting-links, cam, and ratchet, showing one of the stops and the shoulders upon which the cam operates. Fig. 5 is an elevation of the retractor, showing two points of bearing upon the tang.

a, breech-piece or frame of the arm; *b*, breech-block; *b'*, pivot of the same; *c*, connecting-link; *c'*, pivot of the same; *c''*, ratchet; *d*, hammer; *d'*, pivot of the same; *d''*, cam; *e*, retractor; *e'*, pivot of the same; *e''*, point of the retractor; *f*, barrel; *f'*, chamber; *g*, tang and guard; *g'*, tang-screws; *h*, trigger; *h'*, pivot of the same; *i*, notches for the sear or trigger; *i'*, trigger-spring; *j*, mainspring; *k*, firing-pin; *l*, spring of the retractor; *m*, its point of bearing upon the tang; *n*, its point of bearing upon the retractor; *o*, first point of bearing of the breech-block upon the retractor; *o'*, second point of bearing of the same; *p*, stop of the breech-block in its upward movement; *q*, stop of the hammer in its forward movement, and also a lock to prevent the displacement of the breech-block by recoil; *r* and *r'*, shoulders on the connecting-link; *s*, high points upon the cam; *s'*, low points on the same; *t*, stop-spring and pawl; *u* and *u'*, irregular notches on the ratchet for giving motion to the cam; *u''*, revolving pawl and spring; *v*, regular stop-notches on the ratchet; *w*, stop upon the hammer to limit its first backward movement for opening the chamber; *x*, stop to limit the second backward movement of the hammer; *y* and *y'*, Fig. 5, two points of bearing of the retractor on tang *g*; *z z*, double-curved line, in which the point of the retractor moves, resulting from the two points of bearing.

My invention relates to that kind of breech-loading arm having a breech-block pivoted at its rear end and swinging in a vertical direction, and is an improvement on my arm patented on the 13th of December, 1870; and the object of my invention is to provide a more positive method of moving the breech-block and a more effectual method of throwing the empty shell out of the chamber.

My improved arm is similar in its general construction and manipulation to the one described in the above-mentioned patent. It has its breech-block *b* pivoted at *b'*. The hammer *d* is pivoted at *d'*. It has notches *i* for the trigger, and a mainspring, *j*.

On the side of the hammer is placed the ratchet c'' and cam d'' . These are made in one piece and revolve upon the hammer-pivot. The revolving pawl u'' , with its spring, is also attached to the hammer and works in their regular notches u and u' . The stop-spring and pawl t are attached to the frame of the arm and work in the regular notches v .

The connecting-link e , which communicates force from the hammer to the breech-block, is pivoted to the latter at e' . This link has on its under side shoulders r and r' , between which the cam works, and thus gives motion to the link and breech-block. It also has stop q on its under side, behind which the hammer falls, as shown in Fig. 1, and so prevents the breech-block from being displaced at the moment of firing. This stop serves as a rest for the hammer while loading, and also prevents the hammer from striking the firing-pin in case the breech-block has been displaced by accident.

The firing-pin is in two parts, and the pivot b' passes through the rear end of that portion of it which is in the breech-block.

The retractor e is constructed in the usual way, except that it has two separate points for the breech-block to impinge upon when it falls—one at o , and the other at o' . It also has a spring, l , which, in connection with the two points o and o' , produces peculiar results.

The cam d'' is of triangular shape, having three high points, s , and three low points, s' .

By each backward and forward movement of the hammer the cam is revolved one-sixth of a revolution. Each alternate backward movement of the hammer brings one of the high points forward against the shoulder, carrying the link e forward and the breech-block upward to close the chamber and cock the arm. Each other alternate movement of the hammer brings one of the high points back against the shoulder-screw r' , carrying the link backward and the breech-block downward to open the chamber and throw out the shell.

In manipulating the arm the hammer makes two backward and two forward sweeps for each shot fired. The first backward sweep, for opening the chamber, is limited by the stop w coming in contact with the shoulder r' on the link. The first sweep forward is limited by the hammer coming in contact with the stop q . The second sweep backward, for closing the chamber, is limited at full-cock by the hammer coming in contact with the pin or stop x . The second sweep forward, for firing the arm, is from full-cock to the firing-pin.

The first sweep backward brings the link, with its stop q and shoulder r' , backward, so that the stop w , striking the shoulder r' , prevents the hammer from reaching full-cock, and as the hammer falls the stop q prevents it from reaching the half-cock position, offering a firm rest for the hammer while loading, and making it impossible for the hammer to reach

the firing-piece until it has been brought to full-cock after loading.

The irregularity in the backward and forward movements of the hammer makes it necessary to have a corresponding irregularity in the distances between the revolving notches on the ratchet, so as to give to the cam the necessary regular movement.

As the hammer stops farther back in its sweep for closing the chamber than its sweep for opening it, it is necessary to cut the notches for closing the chamber correspondingly farther back on the ratchet than the notches for opening it, so that the ratchet and cam may make equal and regular movements.

During the short sweep of the hammer forward the pawl u'' is carried over the short space on the ratchet from u' to u , and during the long sweep forward the pawl is carried over the long space from u to u' .

The stop-notches v are placed at equal distances around the ratchet, so that the stop-pawl and spring may stop the cam at regular intervals.

The retractor is operated upon by the breech-block at two separate points, at o and o' .

As the breech-block falls in opening the chamber the point o touches it about midway between its forward end and its pivot b' .

At this stage of the operation the retractor operates as a powerful lever for starting the cartridge. At the moment this is effected the forward end of the breech-block comes in contact with the retractor at o' , near the fulcrum e' , giving to the cartridge a sharp, quick blow, like that of a light hammer, sending the cartridge out of the chamber. In some instances, however, where fouling of the chamber has taken place, it requires something more than the blow from the forward end of the breech-block to send the cartridge free of the arm, and this is effected by spring l .

When the chamber is closed with a cartridge in it the bearing of spring l on the retractor at n is below a line drawn from its bearing on the tang at m to the center of pivot e' ; consequently the tendency of the spring is to hold the point of the retractor back from the cartridge-head; but at the moment the forward end of the breech-block comes in contact with the point o' the spring l stands upon the center; but as the point o' is depressed by a blow from the breech-block the bearing of the spring at n passes above the center, and throws the point e' of the retractor back with great rapidity, sending the cartridge-shell out of the chamber. The blow is received at o' while the breech-block is still acting upon the retractor at o as a lever. The operation is peculiar and exactly adapted to the necessity of the case.

While the cartridge is being acted upon by a powerful lever it receives a sharp blow, as from a hammer; and to make the operation still more complete, the spring l is applied to

keep up the effect that has been produced by the blow upon the point *o'*.

Fig. 5 shows a modification of the same invention. In this case the retractor has two fulcrums in the tang *g*, at *y* and *y'*.

While the breech-block is acting upon point *o* the retractor swings upon fulcrum or joint *y*; but at the moment the breech-block strikes the point *o'* the fulcrum of the retractor is changed from *y* to *y'*.

Changing the points to which force is applied and the fulcrum at the same time makes the first part of the operation of the breech-block through the retractor stronger and the latter part quicker.

It is not essential that the link *c* be pivoted to the breech-block at *c'*. It may be fastened rigidly to the breech-block, or be made a part of the same, as an arm; and by placing one shoulder on the arm above the cam and one below it, the breech-block, with its arm or extension, would be made to swing upon the center *b'* by the cam to open and close the chamber, as it now does by the longitudinal movement of the link.

The operation of my improved arm is as follows: Premising that the arm has just been fired, and all the parts in the position represented in Fig. 1, the first backward movement of the hammer causes the ratchet and cam to revolve one-sixth of a revolution. This causes one of the high points, *s*, on the cam to be brought under the shoulder *r'*, bringing the link back and the forward end of the breech-block down, throwing out the shell by means of the retractor, and also bringing the shoulder *r'* on the link back so as to meet stop *w*, and thus prevent the hammer from reaching the full-cock notch. The hammer is then allowed to move forward until it rests on the stop *q*, which is attached to the link. A new cartridge is then inserted. The next sweep, which is backward, closes the chamber by the action of the cam upon the link, bringing a high point on the cam under the shoulder *r*, and carrying the stop *q* far enough forward so that the hammer may fall behind it, and thus lock the breech-block in the position for firing. The upward movement of the breech-block is arrested by stop *p*. The arm, being cocked by the second backward sweep, may be fired in the usual way.

Without reference to the manner in which the hammer acts upon the connecting-link pivoted to the breech-block *c'*, there is a great advantage gained by placing the stop *q* upon the link or connecting device instead of upon the breech-block, as it is shown to be in my

patent of December 13, 1870; for, as the movement of the link, with its stop *q*, to the open chamber is backward and downward, while the movement of the stop, when attached to the breech-block and swinging upon pivot *b'*, is backward and upward, the first forward and the second backward sweeps of the hammer are by the latter movement shortened injuriously.

A high point of the cam, resting against the shoulder *r* and the stop *q*, both serves to lock the breech-block upward against stop *p*, and also against shoulder *r'*, resting on a low point of the cam; so at the moment of firing the breech-block is provided with two stops on either side to prevent it from being displaced by recoil.

Having described my improved arm, what I claim as my invention, and desire to have secured to me by Letters Patent of the United States, is—

1. A cam, *d''*, and ratchet *c''*, in combination with a hammer, *d*, for giving motion to the breech-block through connecting-link *c*, operating substantially as described.

2. The stops *w* and *x*, the hammer, (or operating-lever,) and the shoulder *r'*, when combined for operation substantially as and for the purpose described.

3. In a breech-loading fire-arm, the ratchet *c''*, when provided with the irregular revolving notches *u* and *u'* and regular stop-notches *v*, as described.

4. The ratchet *c''*, with its regular and irregular notches, in combination with the hammer and its stops *w* and *x*, as set forth.

5. The combination of the stop *q* and the connecting-link with the hammer and breech-block, whereby said stop serves to lock the breech-block in position while firing, and as a rest for the hammer while loading, substantially as set forth.

6. The combination of the stops *q* and *p* with the shoulders *r* and *r'* and the cam *d''*, for locking the breech-block, substantially as set forth.

7. In combination with a breech-block pivoted at its rear end, the retractor *e*, having upon it the two points *o* and *o'*, when operating together substantially as specified.

8. In combination with a breech-block pivoted at its rear end, the retractor *e*, with its two points *o* and *o'*, and spring *l*, all operating substantially as set forth.

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Witnesses:

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