W. H. ELLIOT.

Breech-Loading Fire-Arm.

No. 110,024. Patented Dec. 13, 1870.

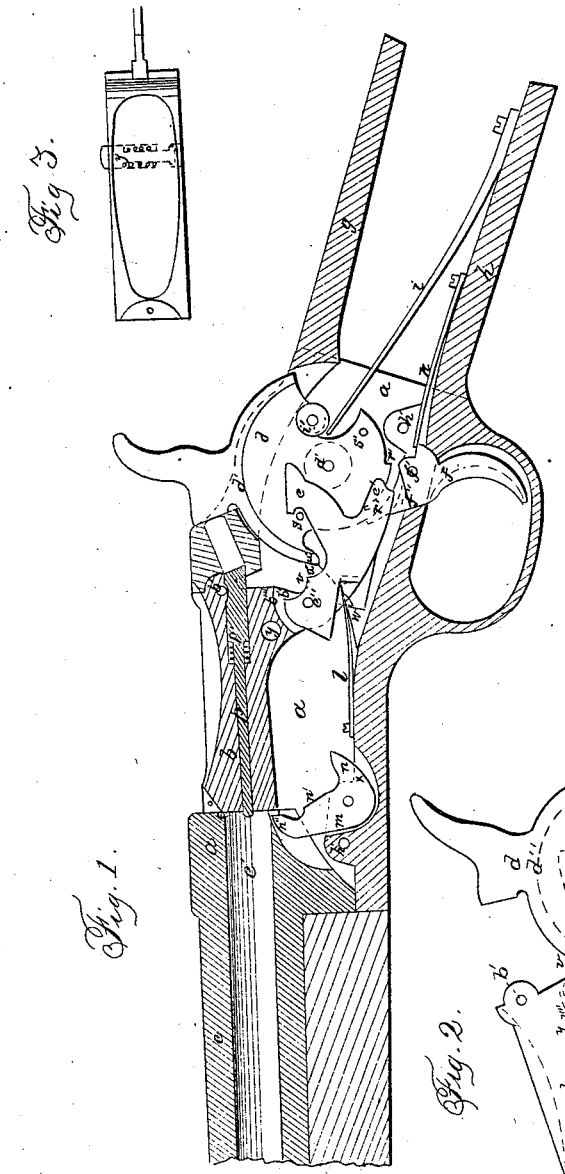

Fig. 3.

Fig. 1.

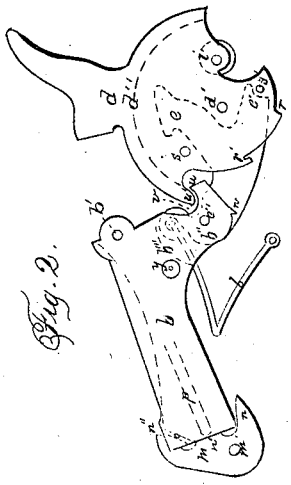

Fig. 2.

Wm. H. Elliot

Witnesses

Jefferson M. Clough

D. Lewis

United States Patent Office.

WILLIAM H. ELLIOT, OF NEW YORK, N. Y.

Letters Patent No. 110,024, dated December 13, 1870.

IMPROVEMENT IN BREECH-LOADING FIRE-ARMS.

The Schedule referred to in these Letters Patent and making part of the same.

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 a combination of mechanism whereby the breech-block is moved back and forth to open and close the chamber by each alternate backward movement of the hammer, while the hammer is making backward and forward movements in the manipulation of the arm. The principal device which communicates the force given to the hammer to the breech-block is a connecting-link having two points of attachment or connection at one end and one or more points of connection at the other end. This connecting-link may be properly called a pawl, as it is alternately connected and disconnected with its points of attachment or notches. This pawl is operated to change from one point of attachment to the other by a spring, which is fastened to a fixed point upon the arm, and consequently changes the direction of its force upon the pawl as that device is moved back and forth by the hammer, while the spring, by its action upon the breech-block through the pawl, serves to hold both of these devices in place.

Figure 1 is a vertical section of my improved arm through the center, showing the parts in the position they are in at the moment of discharge.

Figure 2 is a side elevation of the principal moving parts, showing another method of applying a pawl-spring.

Figure 3 is a top view of the breech-block and double pawl, showing the friction-bolt and spring.

a, receiver or frame of the arm.
b, breech-block.
b', pivot and joint of the same.
c, barrel.
c', cartridge-chamber.
d, hammer.
d', pivot of the same.
e and *e'*, double pawl.
e'', pivot of the same, joining it to *b''*, the arm of the breech-block.
f, trigger.
f', pivot of the same.
g, upper tang.
h, lower tang.
h', tang-screws, for fastening it to the sides of the receiver.
i, main-spring.
i', roller of the same.
k, trigger-spring.
l, pawl-spring.
m, retractor.
m', pivot of the same.
n, arm of the retractor.
n', part of the retractor, which forces back the firing-pin.
n'', point of the retractor, which acts upon the cartridge to throw it out of the chamber when the breech-block, in its downward movement, strikes the arm *n*.
o, bevel cut on the forward end of the breech-block for the purpose of giving room for the cartridge and retractor to move back a little before the chamber is completely open, and also to force the cartridge into the chamber, should it be carelessly left projecting a little when inserted by the hand.
p, firing-pin in two parts, being cut in two at the joint of the breech-block.
p', spring of the same.
r, full-cock notch.
r', safety-notch or half-cock notch.
s, ratchet or notch for opening the chamber.
s', notch for closing the same.
u, point on the breech-block for catching the point *u'* of the hammer, so as to prevent the hammer from striking the firing-pin in case the breech-block be not in place.
v, depression in the arm of the breech-block, in which the point *u'* of the hammer rests while loading. This may be so formed as to act as a cam and raise the forward end of the breech-block, if necessary, to facilitate loading.
w, stop, which limits the upward movement of the breech-block, and also the backward movement of the hammer when it closes the chamber.
x, stop which limits the downward movement of the breech-block and also the backward movement of the hammer when it opens the chamber.
y, friction-bolt and spring to assist in holding the breech-block in any position.

My improvement refers to all arms having a swinging breech-block; but in this specification I have shown it applied to a breech-block which is pivoted at its rear end and swings vertically with its plane in the center line of the barrel; and

The object of my invention is to dispense with all levers for operating the arm except the hammer, and also to load and fire the arm by the fewest possible motions.

The operation of loading and firing my arm is as follows:

Suposing it has just been fired and has an empty cartridge-case in the chamber, by drawing the hammer back the pawl *e* catches on notch *s*, bringing the forward end of the breech-block down upon the arm *n* of the retractor, giving the point of the same a rapid movement backward, and throwing out the empty case. The hammer is then allowed to fall till its point *u'* rests in depression *v*, as seen in fig. 2. By this operation the notch *s'* is carried back till the end of the pawl *e'* falls in front of it. A fresh cartridge is now inserted, and, as it is pushed into the chamber the rim or head catches the point *n''* of the retractor, carrying it forward and causing the breech-block to rise a little so as to partly close the chamber.

The hammer is now brought to full cock, during which operation the notch *s'* strikes pawl *e'*, carrying the breech-block to the position for firing, when the arm may be fired in the usual way.

In case the cartridge has not been completely pushed into the chamber by hand, the bevel *o* on the forward end of the breech-block when it rises strikes the rim of the cartridge and forces it to its place in the chamber.

If by accident the breech-block has been displaced after cocking the arm and before firing, the point *u'* will catch upon point *u*, and so prevent the discharge.

In thus manipulating the arm the hammer acts as a lever for opening and closing the chamber, each alternate backward movement of the hammer opening the chamber, and each other alternate backward movement of the hammer closing the chamber. Thus the chamber is alternately opened and closed by the backward movements of the hammer.

By this arrangement of devices I obtain, by means of the hammer, all the lever-power necessary for opening and closing the chamber, as the hammer makes about three-fourths of a sweep in opening the chamber, and also about the same amount of movement in closing it; but, by arranging the notches *s* and *s'* nearer the center of the hammer, it would make a longer sweep at each operation of opening and closing the chamber, and by that means its lever-power might be increased, if necessary.

Two single pawls might be used instead of the double pawl described; but these would be more complicated and more likely to get out of order.

As the pawl-spring *l* is stationary its bearing upon the pawl is sometimes in front and sometimes in the rear of pivot *e''*. When the pawl is drawn back by notch *s* the bearing of spring *l* is in front of the pivot, causing the rear end of the pawl to fall, and thus liberate catch or notch *s* and take hold upon notch *s'*, and as another backward movement of the hammer sends the pawl forward the bearing of spring *l* is changed to the rear of pivot *e''*, which causes the pawl *e'* to release notch *s'*, and pawl *e'* again to take hold upon catch *s*. While spring *l* is operating the double pawl, it at the same time acts as a friction-spring to hold the breech-block in any position.

In fig. 2 a different pawl-spring is shown, the lower end of which is pivoted to the lower tang and the upper end to the pawl over pivot *e''*, and as it is caused to swing back and forth upon its tang-pivot it tends to raise and lower the rear end of the pawls, and at the same time, by lifting up upon the pivot *e''*, it tends to hold the breech-block up when the chamber is closed, and to hold it down when the chamber is open.

At the moment the retractor acts upon the empty cartridge-case to throw it out of the chamber, the surface *n'* forces the firing-pin back so as to prevent an accidental discharge while closing the chamber.

My improved arm may be unloaded from half-cock in two ways: either by letting the hammer down till pawl *e* catches upon notch *s*, and then by the usual backward movement of the hammer upon the chamber and draw the cartridge; or it may be unloaded by pressing heavily on about the middle of the breech-block with the thumb of the left hand, and at the same time drawing the hammer a little way directly back from the half-cock position. This latter method is preferable, as by it there is no danger that the firing-pin may be brought in contact with the cartridge.

The notches *s* and *s'* are far enough apart so that when one pawl is engaged on one of them the other pawl will pass the other notch without touching it.

All the parts of this arm are arranged centrally, the hammer being split up to line *d''* to accommodate the pawl. The trigger and breech-block are also split to lines *f'''* and *b'''* for the same purpose, and the notches *s* and *s'* are made by passing pins through the hammer from side to side.

The double pawl, with its catches *s* and *s'*, would work equally well if arranged on the side of the breech-block and hammer, and these catches may be constructed by cutting regular notches in the solid material of the hammer.

The pawl may be more properly described as a connecting-link for conveying force from the hammer to the breech-block. It may be made in one or more pieces, and of any suitable equivalent shape, and it may all be directly or indirectly between the hammer and breech-block.

The catches *s* and *s'* are points of attachment or connection of the pawl or connecting-link, and as manual force can only be conveniently applied to the hammer during its backward movement, the movement of the breech-block must, therefore, be made to occur during the backward movements of the hammer; and as the movements of the breech-block are in two directions, viz, downward to open the chamber and upward to close it, it becomes necessary that there be two points of connection for the pawl to the hammer—one arranged above the center, or on one side of it, and the other below the center, or on the other side of it, so that, while one of these points, during the backward movement of the hammer, is moving forward, or in one direction, and the other moving backward, or in the other direction, the movement of the breech-block to open or close the chamber will depend upon which point of attachment is in connection with the pawl.

Two separate pawls may be used instead of the one double pawl herein shown, and these may be attached permanently to the hammer at proper points, and engage and disengage with a catch or catches on the arm of the breech-block, or a single pawl may be attached to the hammer, and, by suitable devices, be made to act upon the breech-block at two points of connection, one below and one above the center of motion. But these would all be equivalents of the devices herein shown, as there would still be the connecting-link or pawl with its two points of connection, one of which would be moving one way and the other the other way during the backward movements of the hammer.

To make the movement of the breech-block by means of the hammer practicable, it has been found necessary to construct and operate the parts so that the hammer, in opening the chamber, shall make, as near as possible, a full sweep backward, for the purpose of obtaining by this long motion the necessary power over the breech-block in case of unusual friction. So, also, in closing the chamber, it is necessary that the hammer make as nearly as possible another full sweep backward, for the same reason; and, therefore, to accomplish these ends, the hammer, in the manipulation of the arm, must make alternate forward and backward sweeps. I mean by forward sweeps, when the thumb-piece of the hammer moves forward toward the muzzle of the arm, and by backward sweeps, when the thumb-piece of the hammer moves backward toward the butt.

The first sweep in manipulating the arm is back

ward, till the stop of the breech-block, in its movement for opening the chamber, stops also the hammer. The second sweep is forward, to effect a change in the connecting points, and, to give the greatest possible length to the third sweep, which is backward, for closing the chamber; the fourth sweep is forward, for firing the arm. Thus, in the manipulation of my improved arm, the hammer makes alternate backward and forward sweeps, opening the chamber by one alternate backward sweep of the hammer, and closing it by the other alternate backward sweep, the sweep for opening the chamber being extended considerably further back than the point at which the backward sweep for closing the chamber commences.

The principal function performed by spring *l* is to change the pawl from one catch to the other, and this is done by a change of position of the pawl in relation to the spring, so that its force is at one time applied to raise the pawl, and at another time to lower it. There are many ways of applying the spring to produce this result. I have shown two practical ways.

In this specification I have mentioned the pawls *e* and *e'* as one double pawl, but I claim them equally whether formed out of one piece of metal, as shown, or made in two separate pieces.

Having described my invention,

What I claim, and desire to secure by Letters Patent of the United States, is—

1. The combination of mechanism herein described, or its equivalent, whereby the breech-block is forced back and forth to open and close the chamber by the alternate backward movements of the hammer, as set forth.

2. The combination of the double pawl *e* and *e'* with a hammer and breech-block, for the purpose of opening and closing the chamber, substantially in the manner described.

3. The combination of pawl *e* with the hammer and breech-block, when operated by spring *l*, or its equivalent, to open the chamber at each alternate backward movement of the hammer, as specified.

4. The combination of pawl *e'* with the hammer and breech-block, when operated by spring *l*, or its equivalent, to close the chamber at each alternate backward movement of the hammer, as set forth.

5. The combination of spring *l*, pawls *e* and *e'*, hammer *d*, with its catches *s* and *s'*, when said spring operates to throw said pawl back and forth from one catch to the other, substantially as specified.

6. The combination of spring *l* with pawl *e* and *e'* and breech-block *b*, when said spring serves the double purpose of operating the pawl and holding the breech-block in position, substantially as specified.

7. The combination of parts herein described, or their equivalents, whereby the backward sweep of the hammer for opening the chamber is extended beyond the points at which the next backward sweep begins for closing the chamber, as set forth.

8. The catches *s* and *s'*, when arranged as specified in relation to the center around which they move during the manipulation of the arm, as herein set forth.

9. The combination and relative arrangement of parts by which each alternate backward movement of the hammer is limited to less than full-cock in its movement for opening the chamber, substantially as described.

W. H. ELLIOT.

Witnesses:

JEFFERSON M. CLOUGH,

D. LEWIS.