

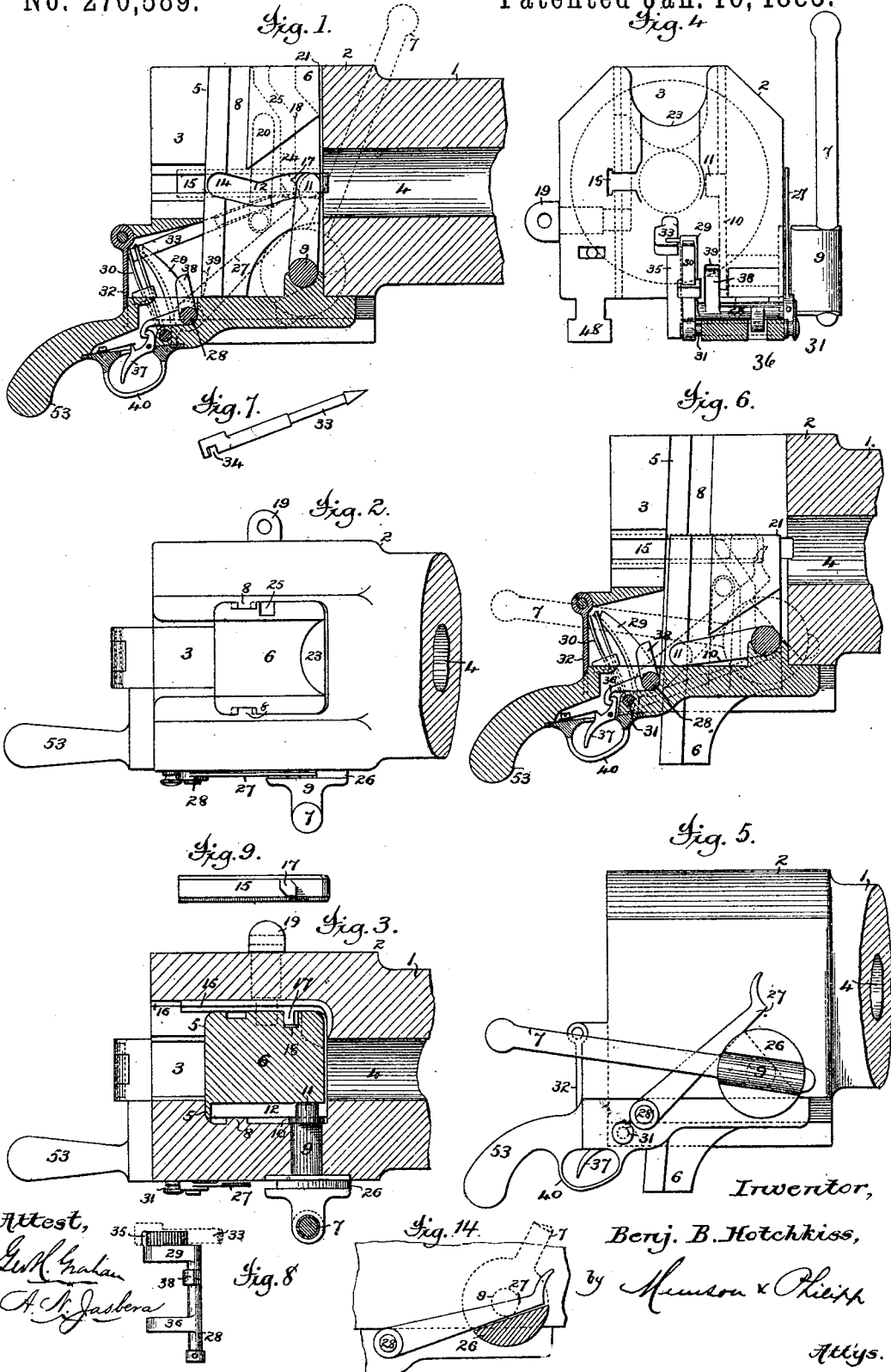
(No Model.)

3 Sheets—Sheet 1.

B. B. HOTCHKISS. BREECH LOADING CANNON.

No. 270,589.

Patented Jan. 16, 1883.



Attest,
G. M. Nathan
A. S. Jasbera

Inventor,
 Berj. B. Hotchkiss,
 by *Munson & Phillips*
 Attys.

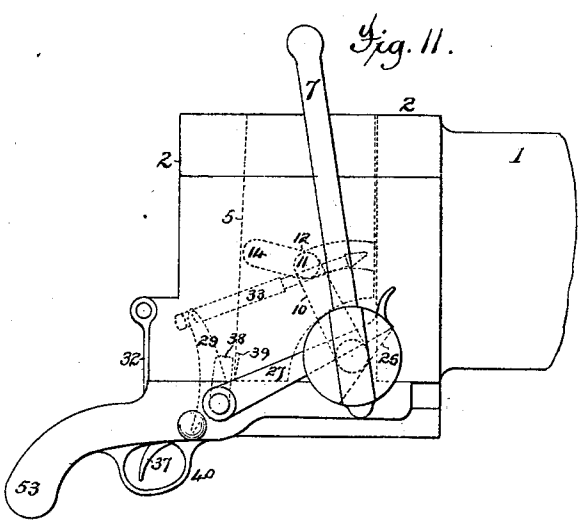
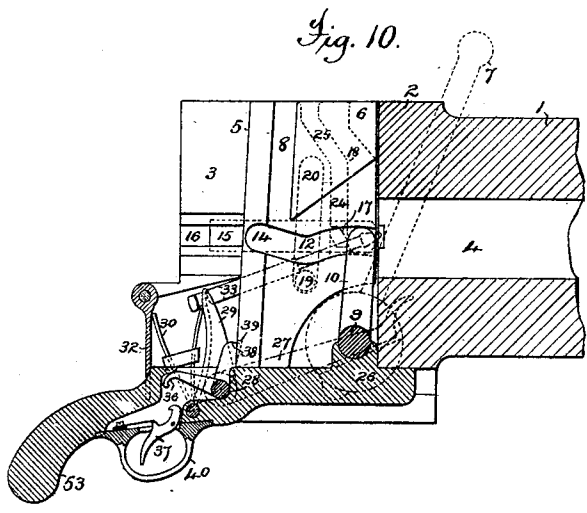
(No Model.)

3 Sheets—Sheet 2.

B. B. HOTCHKISS. BREECH LOADING CANNON.

No. 270,589.

Patented Jan. 16, 1883.



Attest:
Geo. N. Graham
A. T. Jasbera

Inventor,
Benj. B. Hotchkiss,
 by *Munson & Philipp*
Atlys.

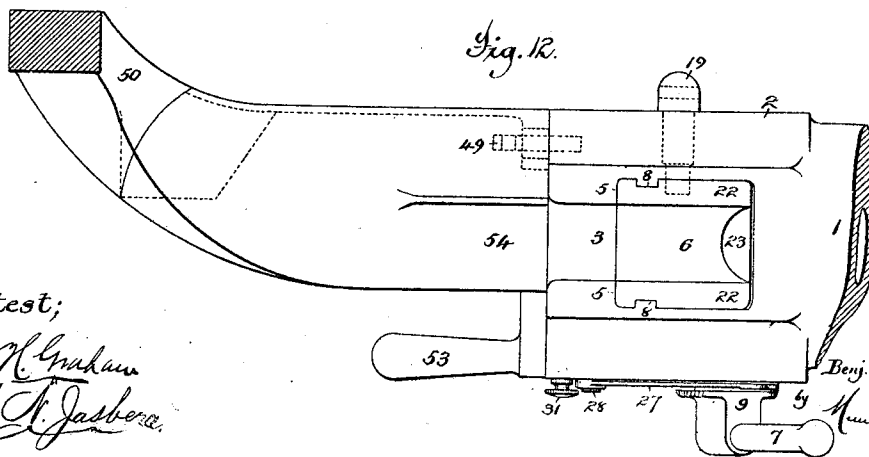
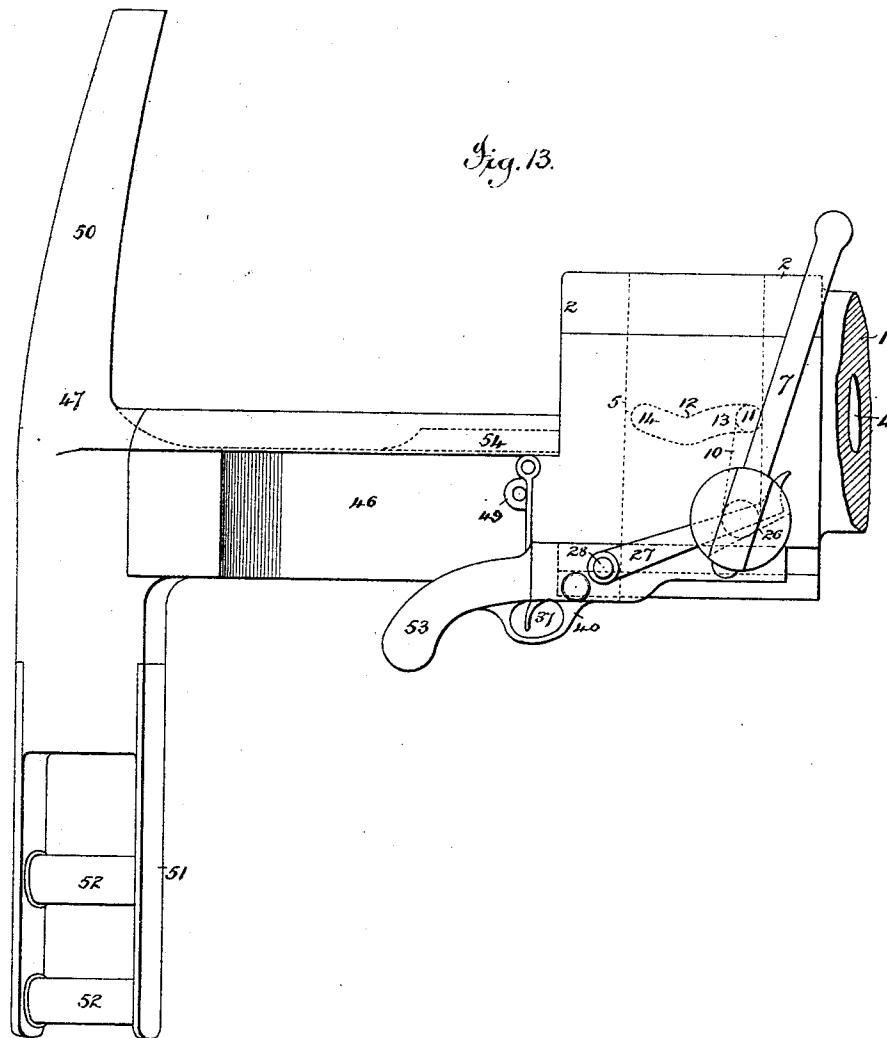
(No Model.)

3 Sheets—Sheet 3

B. B. HOTCHKISS.
BREACH LOADING CANNON.

No. 270,589.

Patented Jan. 16, 1883.



Attest;
Geo. M. Graham
A. J. Jastrow.

Inventor,
Benj. B. Hotchkiss,
by Munson & Phelps,
Attys.

UNITED STATES PATENT OFFICE.

BENJAMIN B. HOTCHKISS, OF PARIS, FRANCE.

BREECH-LOADING CANNON.

SPECIFICATION forming part of Letters Patent No. 270,589, dated January 16, 1883.

Application filed April 28, 1882. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN B. HOTCHKISS, a citizen of the United States, residing in the city of Paris, Republic of France, have invented certain new and useful Improvements in Ordnance, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to breech-loading ordnance, and has for its object the production of a cannon in which the opening of the breech, extracting the empty shell, and the cocking of the firing instrumentality shall be accomplished simultaneously by a single movement in one direction of an actuating-lever, and in which the breech is closed and the cannon made ready for firing by another single movement of the lever.

To these ends the improvements consist in a new construction and combination of a sliding breech-block, to which the movements are imparted by a crank moved by an actuating-lever, which block carries a firing-pin that is mounted in the block so as to travel with it, and yet be cocked by a cocking-lever, while said lever, together with its operating-cam and the actuating-lever, are all supported by the breech-piece. In connection with these devices is a slot in the block for the crank to work in, which slot is made with one part coinciding with the arc in which the crank moves during a portion of its movement, so that the firing-pin may be withdrawn before the block is moved, and with a cam part to enable the crank to move the block; in a structure enabling the firing-pin to slide upon the hammer without being disengaged from it; in a structure of devices limiting the vertical movements of the block; in a stop-arm working in connection with a recess in the breech-block and constituting a safety device, preventing premature discharge; in a new means of operating the extractor and structure of breech-block co-operating therewith; in details of construction and combinations of parts.

All of the improvements are fully hereinafter explained, and specifically pointed out in the claims.

In the drawings, Figure 1 is a longitudinal vertical sectional elevation of the rear part of a breech-loading machine-gun, showing the

breech as closed and the firing mechanism cocked ready to fire. Fig. 2 is a plan view of the same. Fig. 3 is a horizontal section of the same. Fig. 4 is a rear elevation of the same, the pistol-grip and trigger being omitted. Fig. 5 is a side elevation of the same, the breech being shown as open and the cocking as effected by an upward rearward movement of the actuating-lever. Fig. 6 is a longitudinal vertical section with the parts as shown in Fig. 5. Fig. 7 is a plan view of the firing-pin. Fig. 8 is a plan view of the cocking-shaft. Fig. 9 is an elevation of the extractor. Fig. 10 is a sectional elevation, showing the position of the cocking-lever, hammer, and other parts immediately after the firing of the gun. Fig. 11 is a side elevation, showing the lost motion when the actuating-lever acts to withdraw the firing-pin. Fig. 12 is a plan view, showing the rear part of the gun to be provided with a shoulder-rest or stock and pistol-grip. Fig. 13 is a side elevation of the same, but showing the hammer as tripped and in the position it has after the gun has been discharged; and Fig. 14, an elevation of the cocking-lever, with its cam in section.

The barrel 1 of the cannon, which may be of any ordinary form, is, as is usual, provided at its rear end with an enlargement or reinforcement, 2, constituting the breech, through which extends a vertical recess in which the sliding breech-block 6 reciprocates. This recess extends rearwardly through the breech, its walls being contracted to permit the passage of cartridges and cartridge-shells, to form a chamber to accommodate the firing mechanism, and to provide vertically-elongated shoulders 5, against which the rear-portions at each side of the sliding breech-block 6 bears in its movements up and down to close or open the breech of the gun, said shoulders forming a solid abutment, sustaining the breech-block against the shock of discharge when the gun is fired. The breech-block 6 is guided in its vertical movements by the bearers 8, that project inward from the side walls of the recess and enter grooves in the sides of the breech-block 6.

It will be observed that the breech-block 6 is slightly tapered or wedge-shaped, and that the shoulders 5 are correspondingly inclined; also, that the guiding-bearers 8 are arranged

parallel with the shoulders 5 and the rear face of the block, so that while said rear face of the block will always move in contact with the shoulders 5 its front face, 21, which may rest snugly, or nearly so, against the breech of the gun only when the block is elevated, as in Fig. 1, will, as the block descends, be gradually withdrawn until in its lowermost position it stands a short distance from the breech, as in Fig. 6. This breech-block is moved up and down to close and open the breech by means of a hand-operated actuating-lever, 7, fast to the end of a short shaft, 9, which extends through one of the walls of the breech and into the recess, (see Fig. 3,) which shaft carries upon its inner end a crank-arm, 10, that plays in a siderecess cut into the block 6, which arm is provided with a roll or stud, 11, that travels in a cam-groove, 12, that is cut transversely in the side of the block. The rearward part, 14, of this cam-groove 12 forms the cam proper, while the forward part, 13, is made in such a curve that it will be concentric with the shaft 9 when the breech-block is in its uppermost position, (see Fig. 1,) from which it results that as the actuating-lever 7 is drawn backward the stud 11 will for a time idly follow the groove 12, thus permitting a lost motion, which will take place without moving the breech-block. As soon, however, as the stud 11 passes into the rearward part, 14, of the groove 12, the cam action will be accomplished, and the breech-block will be quickly moved downward, and the breech of the gun be opened, as in Fig. 6. When the movement of the actuating-lever 7 is reversed the breech-block will be quickly moved upward and the breech closed as the stud 11 travels in the cam part 14, after which the stud 11 will again pass into and move idly in the part 13 of the groove 12, during which the actuating-lever 7 moves forward some distance, for a purpose yet to be explained. The range both upward and downward of the vertical movements of the breech-block is limited by a keep-screw, 19, which passes through the side of the breech and enters a recess, 20, in the side of the block. (See Figs. 1, 3, 4, and 6.)

As hereinbefore stated, the downward movement of the breech-block to open the breech of the gun operates to eject the empty shell. This is accomplished by means of the extractor 15, that is guided in a groove, 16, in the breech and reciprocated by a lug, 17, which projects into the vertical and inclined cam-groove 18 in the side of the breech-block. This groove 18, which controls the movements of the extractor, is so formed that its lower part, 24, lies parallel, or nearly so, with the front face of the block-bearers, while its upper part, 25, inclines backward at quite an abrupt angle.

For proper coaction with the extractor, the breech-block is hollowed out upon its upper side, so as to form a forwardly-inclined trough, as 23, so that while the front sides, 22, of its top (when the block is elevated) are flush with the top of the breech the bottom of the trough

will be but a short distance above the upper side of the chamber 4. (See Fig. 4.) From this construction it results that during the first part of the downward movement of the block 6, while the lug 17 of the extractor is controlled by the part 24 of the groove 18, the empty shell will only be started or drawn slightly out of the chamber, but by a movement of great power, while when the forward end of the bottom of the trough 23 has reached the level of the bottom of the chamber 4 the part 25 of the groove 18 will act upon the lug 17 so as to draw the extractor rapidly backward, and thus operate to quickly throw the shell rearwardly out of the chamber 4, the same being directed rearwardly by the inclined trough 23 into the level trough 3, formed in the top of the breech-block, and which then lies in a plane coinciding with that of a trough, 54, formed in the shank 46 of the shoulder-piece.

It has also been stated that the gun is automatically cocked in opening the breech. This is accomplished by means of the eccentric or cam 26, formed on the shaft 9, upon which cam the cocking-lever rests when the firing has taken place. (See Fig. 10.) This lever 27 is secured rigidly to the outer end of a short shaft, 28, which extends through one side of the breech of the gun, (see Figs. 6 to 8, inclusive,) and carries on its inner end the hammer 29. The hammer is actuated to fire the gun by means of a spring, 30, which is bent around a pin, 31, and confined between the said hammer and a hinged door, 32. The firing-pin 33, which reciprocates in an aperture formed in the breech-block, and thus travels vertically with said block, is provided near its rear end with a recess, 34, which embraces a longitudinal flange, 35, projecting from one side of the hammer. By this arrangement the firing-pin is positively advanced and withdrawn by like movements of the hammer, while at the same time it is permitted to move freely up and down along the flange of the hammer as the breech-block is raised and lowered. While the actuating-lever 7 is being drawn back in the act of opening the breech, and while the stud 11 of the crank 10 moves idly in the part 13 of the groove 12, and consequently before the breech-block has commenced its downward movement, the eccentric or cam 26, acting upon the cocking-lever 27, will, through shaft 28, move the hammer backward and withdraw the firing-pin 33 from contact with the shell, so that when the breech-block commences its downward movement it will not be obstructed by any forward projection of the firing-pin. As the actuating-lever 7 continues to move backward the breech-block will be lowered by the action of the stud 11 on the crank 10 in the cam part 14 of the groove 12, and the cam or eccentric 26 will continue to force back the cocking-lever 27 until it is brought to the position shown in Fig. 5, at which time the hammer will be fully cocked, or in the position shown in Fig. 6, with its mainspring 30 compressed between the hammer and the hinged door 32, at which time the

firing-pin will be at its lowest point of descent upon the flange of the hammer.

For securing the hammer in its cocked position, the shaft 28 is provided, in addition to the parts already mentioned, with the tumbler 36, which, just before the actuating-lever 7 reaches the limit of its backward movement, catches over the sear of the trigger 37, which is spring-seated, and thus securely holds the hammer in its cocked position, as shown in Fig. 6. The breech is then open and the gun in condition to receive a cartridge, which being introduced into the firing-chamber 4 over the guideways 54, 3, 23, the breech is closed by reversing the movement of the actuating-lever 7, which, as it moves upward and forward, quickly raises the breech-block through the action of the stud 11 of the crank 10 while it travels in the part 14 of the cam-groove, and while the stud 11 is moving forward in the part 13 of said cam-groove, during which time the actuating-lever 7 moves into its forward position, the cam 26 is carried away from the cocking-lever 27, which remains raised, (see dotted lines, Fig. 1,) and thus clears a space beneath the cocking-lever, through which it may have an unobstructed descent as the gun is fired. In this closing movement of the breech-block the firing-pin travels upward over the flange 35 of the trigger, and is so far withdrawn as to give it proper range of motion in discharging the gun, which is then in condition for firing. By pressing the trigger 37 the tumbler 36 will be released and the spring 30 will throw the hammer and firing-pin forward and explode the charge, which movement of them is limited by contact of the hammer with the rear face of the breech-block.

The possibility of discharging the gun by an accidental pull of the trigger or otherwise before the breech-block is fully raised so as to entirely close the breech is prevented by a stop-arm, 38, on the shaft 28, which, when the piece is in proper condition to be fired, passes into a recess, 39, in the rear face of the breech-block. (See Fig. 1.) If the hammer is released before the breech-block is entirely raised, the stop-arm 38 will, instead of entering the recess 39, strike against the rear face of the block and arrest the hammer before the firing-pin has reached the cartridge.

The cam 26 on the shaft 9 prevents the possibility of firing by an accidental pull of the trigger until the actuating-lever 7 is forced home in its forward position, since in any other position the cocking-lever 27 will not have the necessary run to allow the firing-pin 33 to reach the cartridge.

The hinged door 32, which is fastened down by any suitable form of catch, not only serves to hold the mainspring in place, but affords a means for obtaining ready access to all the parts of the percussion mechanism for oiling, taking apart, &c.

To facilitate the management of the gun, which is designed to be of large caliber, and

therefore to be heavy and ponderous, it is mounted by its trunnions in a pivotal mounting, as in United States Patent No. 211,849, and is provided with a shoulder-rest or stock having handles; and with a pistol-grip, which devices afford a bearing for the left shoulder, a handle on the stock for the left hand, and a handle—as the pistol-grip—for the right hand, whereby the gunner obtains a perfect control of the gun, and may conveniently impart to it any movement necessary to its training.

The shoulder-rest or stock consists of a horizontal shank, 46, provided with a vertical cross or T piece, 47. These parts are preferably made of metal, and the shank 46 is secured to the breech of the gun by means of a guide-piece, 48, depending from the lower left side of the breech, which enters a dovetail groove in the shank, and by a bolt, 49, passing through a web-like part of the shank and entering the rear part of the breech. The vertical cross-piece consists of an upper part or horn, 50, against which the gunner applies his shoulder, and a lower part, 51, provided with one or more hand-grasps, 52, which can be seized by the left hand of the gunner. Upon the opposite side of the lower part of the breech of the gun, and just in rear of the trigger, is secured an ordinary pistol-grip, 53, (that is provided with the usual trigger-guard, 40,) which can be grasped by the right hand of the gunner. These three (the shoulder-piece 50, left-hand grasp 52, and pistol-grip 53) furnish means by which the gunner can readily apply his whole strength in pointing and steadying the gun, while with one finger of his right hand he can at all times and in all positions readily pull the trigger and fire the piece with the same precision as an ordinary rifle. By the provision of the actuating-lever, by which the loading and firing mechanisms are operated, at the same side of the gun to which the training-handle is attached, the free hand of the gunner may conveniently operate said lever to load and cock the gun, and then grasp the training-handle to secure the aim, all the devices for loading, training, and firing being thus brought within the convenient manipulation of one operator.

Many of the improvements herein claimed will be found embodied in the mechanisms embraced in my two applications filed respectively October 11 and October 14, 1882.

What I claim is—

1. A breech mechanism consisting of a sliding breech-block, a crank and actuating-lever for moving the same, a firing-pin reciprocating with the block, a hammer and a cocking-lever, 27, supported by the breech, and a cocking-cam, 26, operated by the actuating-lever, substantially as described.

2. The combination, with a sliding breech-block provided with a cam-groove having concentric and cam parts in which the crank effecting its vertical movements travels, and the actuating-lever attached to said crank, of a

cocking-lever and a cam carried by the actuating-lever and operating upon the cocking-lever, the construction being such that a lost motion of the crank takes place while the cocking-lever is moved rearward to withdraw the firing-pin and clear the same from the shell before the block begins to move downward, substantially as described.

3. The combination, with the vibrating actuating-lever 7, its shaft 9, and crank 10, having stud 11, of the vertically-sliding breech-block provided with a transverse groove, 12, one part of which forms the cam, causing the block to reciprocate while the other part, 13, is made concentric with the shaft 9, and thus, in connection with the lever 7, provides a positive support, holding the block in its raised position during the period when the hammer is being cocked and may be tripped, substantially as described.

4. The combination, with the breech-block having the two-part groove, as 12, of the actuating-lever, as 7, shaft, as 9, crank, as 10, cam, as 26, and a cocking-lever, as 27, connected with and operating the hammer, substantially as described.

5. The combination, with the sliding breech-block and firing-pin carried thereby, of a hammer supported in the breech, and means, substantially such as the recess 34 and flange 35, connecting said firing-pin and hammer, so that the one may slide upon the other during the movements of the breech-block.

6. The combination, with the hammer carrying a stop-arm, 38, of a reciprocating breech-block having a recess, 39, arranged in its rear face, so as to coincide in position with said stop-arm when the breech-block is raised to the firing position and closes the breech, substantially as described.

7. The combination of the reciprocating extractor having a lug, 17, with the vertically-sliding breech-block provided with the groove 24, constructed to operate with a pulling action

upon the extractor, whereby the initial movement of the block to open the breech actuates the extractor to slowly start the empty shell rearward, all substantially as described.

8. The combination of the reciprocating extractor having a lug, 17, with the vertically-sliding rearwardly-moving breech-block provided with the grooves 24 and 25, whereby the initial movement of the block to open the breech actuates the extractor to slowly start the empty shell a slight distance rearward, and the movement of said block, completing the opening of the breech, imparts a rapid movement of considerable extent to the ejector and causes the rearward discharge of the empty shell, all substantially as described.

9. The combination, with the sliding breech-block mounted to move rearwardly in its descent, and having the groove 24, of the reciprocating extractor provided with the lug 17, substantially as described.

10. The combination, with the sliding breech-block mounted to move rearwardly in its descent and provided with a groove operating to draw the extractor rearward during the whole of its vertical movements, of the actuating-lever, as 7, operating to cock the gun while opening the breech, substantially as described.

11. A pivoted gun having a shoulder-piece at one side of its breech, and a handle, as 53, at the opposite side thereof, and a lever, as 7, for actuating the loading and firing mechanisms arranged at the side of the breech within convenient reach of the hand that grasps the handle 53 in training the gun, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

B. B. HOTCHKISS.

Witnesses:

ROBT. M. HOOPER,
DAVID T. S. TUBLER.