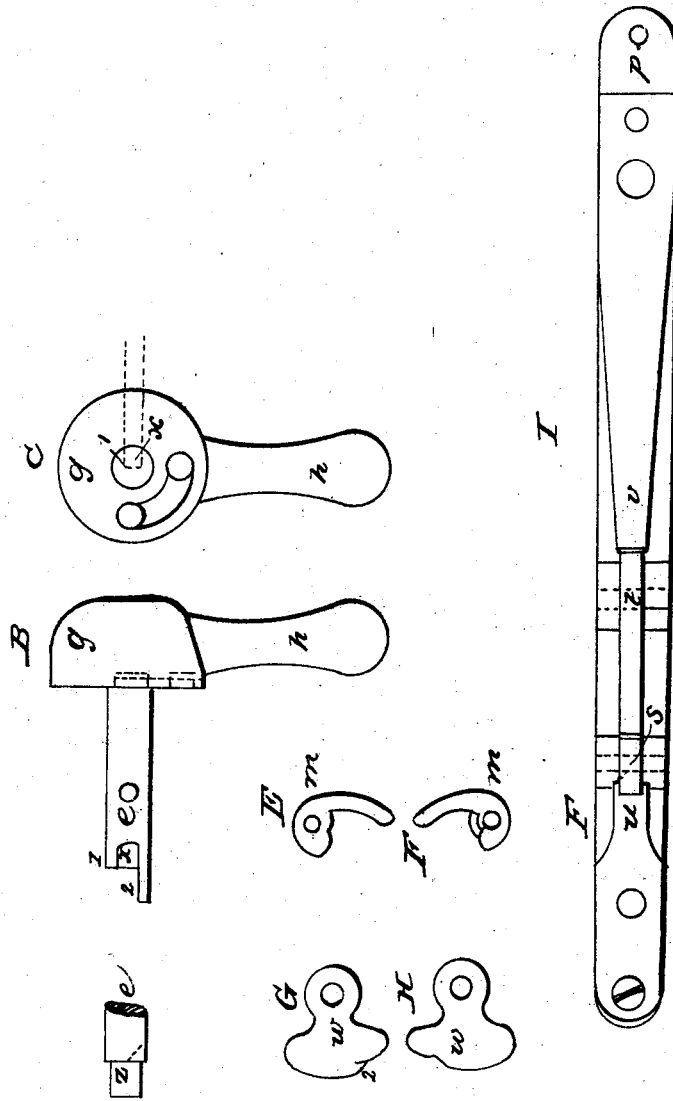


S. F. VAN CHOATE.
Breech-Loading Fire-Arm.

No. 89,902.

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Letters Patent No. 89,902, dated May 11, 1869.

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, SILVANUS FREDERICK VAN CHOATE, of Boston, in the county of Suffolk, and State of Massachusetts, have invented certain new and useful Improvements in Breech-Loading Fire-Arms; and I do hereby declare that the following, taken in connection with the drawings, which accompany and form part of this specification, is a description of my invention, sufficient to enable those skilled in the art to practise it.

This invention relates to the construction, combination, and arrangement of those parts of small-arms which are connected with the breech and with the lock of such arms as receive a loaded cartridge at and discharge its empty shell from the breech.

In the Prussian needle-gun, and in the Chassepot, and others of a similar type, the breech-piece, or piece which slides in the breech-frame, to open and close at the rear the cartridge-chamber, and which operates to thrust into said chamber loaded cartridges, and to extract therefrom the empty shells, is made cylindrical, so as to be turned to lock and unlock in the breech-frame, and contains all the lock-mechanism except the trigger and trigger-spring.

In my fire-arm, the breech-frame may be made integral with the barrel, though, for obvious reasons of economy and convenience of construction, I prefer to make it separate from the barrel, which is then screwed into the front end of the breech-frame.

From the end of the barrel, which is properly bored to receive flanged metallic cartridge-shells, the breech-frame is slotted to its rear, the slot opening at the top of the frame, and having straight parallel vertical sides and a concave bottom, concentric with the axis of the barrel.

At the rear of the frame, the bottom of the slot is formed with a larger radius, to receive the recoil-block, or cam, by which the breech-piece is locked and unlocked, said breech-piece being of such shape as to fill the described slot in the breech-frame, except only certain minor slots, mortises, and recesses connected therewith, which have functions which will be described beyond.

Referring now to the drawings—

Figure 1 represents a longitudinal section taken in a vertical plane through the axis of the barrel, when the arm is held in position for firing, the figure embracing only such a portion of the arm as embodies my invention, and representing the breech-piece *a* as drawn fully to the rear, ready to receive in the slot of the breech-frame *b* a loaded cartridge.

Figure 2 shows a horizontal section taken in the plane of the axis of the barrel *c*, and exhibits the breech-piece as closing the barrel, confining the cartridge therein, and ready for the lock to force the firing-pin *d* against the cartridge, to explode it.

The breech-piece *a* is, at its front end, made with a

slight cylindrical projection, of such diameter as to enter the counterbored rear end of the barrel, which receives the cartridge-flange, and the breech-piece *a* is bored on a line with the axis of the barrel, so as to receive the headed cylindrical firing-pin *d*, which is entered into its place from the rear of the breech-piece, the end of the shaft *e*, of the recoil-cam *f*, keeping the firing-pin from undue retraction.

The end of the shaft *e* is provided with a head, *g*, of the diameter of the breech-frame, to the rear end of which said head gives a smooth, rounded finish, said head being provided with a lever, *h*, used to turn the recoil-cam, to lock and to unlock the breech-piece, and to push the same forward, and to draw it back.

The recoil-cam *f* is shown in the detail A, and the shaft *e*, its head *g*, and lever *h*, are shown in the details B and C, as well as in the general drawings.

To lock or unlock the breech-piece, rotation of the shaft *e* is required to the extent of ninety degrees, and a slot, in the form of a quadrant, is formed in the plain-surfaced face of the head *g*, terminated at each end by a deeper indentation.

In rear of the breech-piece, is arranged a headed pin, *i*, forced outward by the spring *j*, so as to act as a spring-catch in the indentations formed at the ends of the quadrant-slot, to prevent too great movement of the recoil-cam, or any accidental change in its position, said spring and pin also acting on the bottom of the quadrant as a kind of friction-brake.

The end of shaft *e* is peculiarly formed, as and for reasons to be explained beyond, in connection with the construction and operation of the lock.

In the right-hand surface of the breech-piece *a*, a groove is formed, which, in the movements of the breech-piece, traverses the screw-pin *k*, which serves as a stop, to determine the movement, and to prevent accidental withdrawal of the breech-piece.

On the left-hand side of the breech-piece is attached the shell-extractor *l*, which is made as a spring-catch, with its front end bevelled, and shaped as shown, so that it can, when a cartridge is forced home ahead of the extractor-end, spring aside by contact with the rear of the cartridge-shell, and spring back after passing the flange of the shell, and catch upon its front side.

The extractor projects like a spline beyond the surface of the breech-piece, and traverses, in the movements of the breech-piece, in a channel made in the breech-frame, which channel extends into the barrel for a short distance, it being cut away to the extent necessary to allow the bevelled end of the extractor to seize upon the cartridge-flange, when forced home into the barrel.

The rear end of the shell-extractor is set into a recess formed for the purpose in the breech-piece, and is kept in place by screws, or steady-pins, the sides of the recess into which the extractor is set holding the

extractor firmly, and resisting the various strains brought upon the breech-piece in drawing and pushing, and in locking and unlocking it.

The detail D is a reversed plan of the breech-piece, with the recoil-cam and cam-shaft removed.

In the lower, or convex surface of the breech-piece, and at its left-hand side, is a groove, which traverses the bent lever *m*, which is the shell-ejector, said ejector having elevations of its two sides, shown in the details E and F, and it is also seen in red lines in fig. 1.

The arms of the bent lever are of unequal length, the front arm being longest, and arranged so that by gravity it may incline to fall downward, which brings the short arm into the channel marked *n*, in detail D.

The front end of channel *n* terminates in an incline between the convex surface of the breech-piece and the bottom of the groove *n* therein, so that, at the last part of the rearward motion of the breech-piece, the short arm of *m* is depressed, and the long arm is elevated, thus throwing the withdrawn and empty shell out of the space left in the breech-frame by the withdrawal of the breech-piece.

The greater the disproportion of length between the two arms of the ejector, the more forcible will be the expulsion of the empty shell, which will be thrown to the right if the ejector be located at the left of the central vertical plane of the gun, and *vice versa*, and the throw to the right or left can also be somewhat modified by the shape given the long arm of the lever. This ejector is pivoted in a recess formed in the breech-frame.

The incline, or bevel given to the termination of channel *n*, at the front end of the breech-piece, is made to perform another important function in connection with the ejecting-lever *m*, besides operating said lever to eject the shell. If the weapon should be held in a position so that the long arm of lever *m* would drop into the channel, and if the channel *n* terminated abruptly at its front end, so as to form a square shoulder, then, upon drawing the breech-piece back, the long arm of the lever *m* would catch against such shoulder, and would thus prevent the further withdrawal of the breech-piece; but, by means of the incline, or bevel of the front termination of the channel, the front, or long arm of the ejector-lever *m* is forced out of the channel, thus preventing any obstruction to the movement of the breech-piece.

When the long arm of the ejector *m* has been made to assume a perpendicular position immediately in front of the chamber, or front end of the breech-piece, it is out of the way, so that a cartridge may be dropped into the opening in the frame in front of the ejector, beyond the front end of the breech-piece, and, by the forward movement of the latter, the long arm of the ejector is forced down into its recess, and the cartridge is shoved forward into the chamber of the barrel.

It will be observed, that by the backward movement of the breech-piece, the cartridge-shell, by the aid of the extractor, is drawn back its whole length, and nearly the whole length of the movement of the breech-piece, and that the head, or flange part of the shell is deposited upon or over the forward or long arm of the ejector *m* before the short arm of the ejector is operated upon by the cam formed by the bevelled front termination of the channel *n*.

The cross-cut, or recoil-seat made in the breech-piece, and seen most clearly in detail D, is the space provided for reception of the recoil-cam, there being formed in the breech-frame, opposite the space occupied by the cam *f* when the breech-piece is closed, spaces, into which the cam can be turned, to lock the breech-piece securely against recoil upon explosion of the charge.

The recoil-cam being held in place on its shaft by a simple pin, it will be observed, that on removal of said pin, the shaft *e* and firing-pin may be withdrawn

from the breech-piece, after that is withdrawn from the breech-frame, subsequent to the removal of pin *k*, when the interior of the barrel will be exposed to view, and may be swabbed-throughout.

The rear part of the barrel is held in place in the stock by a long screw, *a*, passing through the guard and lock-strap *p*, the stock *q*, into a tapped hole in the breech-frame, said screw operating to hold the guard and lock-strap, as well as the barrel, while the rear of the frame is steadied by a dowel-pin, *r*, fitting a washer let into the stock, which washer, in practice, could, when desired, be provided with a strap, made to extend down the grip part of the stock, on its upper side.

The lock may be described as consisting of the sere-trigger *s*, the hammer-trigger *t*, the sere-spring *u*, and the hammer, or main-spring *v*, all attached to the guard and lock-strap *p*, both triggers being protected by an ordinary guard. The springs are both flat pieces of steel, and the triggers are pivoted on pins in the guard and lock-strap.

There is an intermediate piece, *w*, introduced between the hammer-trigger and the firing-pin, said piece acting to transmit to the firing-pin the blow given by the hammer-trigger, and also operating, in connection with the peculiar shape given the end of shaft *e*, to form a safety-apparatus to prevent explosion of the cartridge, except when the breech-piece is both closed and locked.

This intermediate piece *w* has elevations of both of its sides, shown in details G and H, and it is pivoted to an ear formed on the breech-frame, and moves in an opening cut through the material of the frame.

In the breech-piece, just in front of the space for the recoil-cam, is cut a mortise, communicating with the space containing the head of the firing-pin and the end of the cam-shaft, so that, when lever *h* is horizontal, as in fig. 2, then the groove *x*, in the end of shaft *e*, is in line with the mortise in which the piece *w* moves, so that the piece *w* can be forced by the trigger, or trigger-hammer against the firing-pin head.

One side of the groove in the end of the shaft *e*, past which the piece *w* moves in acting on the firing-pin, is marked 1 in details B and C, and in C the sides of the piece *w*, or of the planes in which its sides move, are indicated by dotted lines.

But, as it is only when the lever *h* is in the position in which the breech-piece is fully locked, that the path of movement of piece *w* is clear from obstruction by the part 1 of shaft *e*, it follows that the piece *w*, if operated by the action of the trigger, or lock, when the lever *h* was not quite horizontal, would strike upon the part 1 of shaft *e*, and not on the firing-pin, and so the cartridge would not be exploded.

To partially depress the piece *w* after firing, and to bring it where its further depression will be performed by the act of drawing back the breech-piece to eject the empty shell, and afford an opportunity to enter a loaded cartridge, the part 1 of the shaft is inclined to its axis, and on the side of *w*, adjacent to the part 1, the shoulder of *w*, marked 2, is also bevelled.

When the said bevelled parts are brought into contact by the rotation of shaft *e*, which unlocks the breech-piece, and when the breech-piece is fully unlocked, piece *w* has been partially depressed, and the inclined part *y*, of the breech-piece, acting on *w* as the breech-piece is drawn to the rear, still further depresses *w*, till its operation on the hammer is such that the sere-trigger catches hold of the hammer-trigger, and the gun is thus cocked ready to be discharged as soon as the head is closed, and the projection 1 is removed from the path of *w* by turning down lever *h* ninety degrees.

The extreme tip *z* of shaft *e*, serves only to abut against the head of the firing-pin, to keep it in place.

As, in my invention, the weapon is cocked by the act of withdrawing the breech-piece preparatory to

inserting a loaded cartridge in the barrel, it may not be necessary to discharge the piece immediately. In such case, it may be desirable to uncock the gun to relieve the tension of the main-spring, this being equivalent to letting down the hammer in ordinary percussion-muskets. This is effected by pressing one finger upon the hammer-trigger, and easing, or restraining its movement, while another finger moves the sere-trigger to free the hammer.

To cock the gun, after the hammer has been let down, and without withdrawing the breech-piece, it is only necessary to pull strongly and steadily on the hammer-trigger.

The lock described is well calculated for use with cartridges which have a fulminate requiring concussion for its explosion.

I contemplate, however, making use of what I term a quick fulminate, such as the fulminate of silver, &c., which requires only pressure and not concussion to ignite it. In such case, the hammer-trigger might be dispensed with, and only a simple trigger would be needed to push forward the firing-pin. The interior end of the trigger would be modified, as to shape, so as to come into contact with the firing-pin, or a suitably-shaped intermediate piece, worked by the trigger, might be employed.

In this arrangement of the lock, the arm would be always ready for firing without cocking, the fulminate being ignited by simple pressure of the finger upon the trigger, causing the firing-pin to press upon the quick fulminate.

To prevent, with such a lock, a premature, or accidental discharge, it would be necessary to combine, with the trigger a safety-stop, or catch, which would have first to be designedly manipulated before the trigger could be pulled.

The screws and screw-pins, which are likely to require frequent removal for the purpose of cleaning the gun, are made with heads, or thumb-pieces, as shown in the drawing, to obviate the use of a screw-driver.

It will be seen that this gun consists of but comparatively few pieces, that it is remarkably free from

springs, that the parts are simple, strong, and involve but little labor in their production, that the dismemberment is easy for cleaning, and that all the parts can be readily got at, that the outside of the gun is free from objectionable protuberances, and that there are no cuts, or grooves exposed when the piece is closed, to become foul, or clogged with mud, sand, or other foreign matter.

1. I claim the breech-frame *b*, as made with a slot, having walls in vertical planes, a bottom concentric with the bore of the barrel, and an open top, one of the walls having a groove for reception of the shell-extractor, the frame having also a recess at the rear to receive the recoil-cam, which locks the breech-piece in the breech-frame.

2. Also, the breech-piece *a*, made to fill the slot in the frame, and to have its top flush with the cylindrical surface of the breech-frame, and with provision at the rear for the recoil-cam and its turning-shaft, and with the slot *n* for operating the cartridge-ejector, and the mortise, described and shown, for admitting the actuator of the firing-pin, and the slot which traverses pin *k*.

3. Also, the shaft *e*, constructed at or near its end, as described, so as to operate as a safety-device to protect the firing-pin from being struck while the breech-piece is unlocked.

4. Also, combining, with the shaft *e*, a projection, *z*, as and for the purposes described.

5. Also, in fire-arms in which the breech-piece *a* can be moved back and forth in the direction of the length of the barrel without turning, traversing in a slot in the breech-frame *b*, the employment of a cam, *f*, arranged to slide with the breech-piece, and to be turned crosswise of said piece, so as to lock into and unlock from cross-cuts, or recoil-seats made in the opposite sides of the breech-frame *b*, as and for the purposes described.

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Witnesses:

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