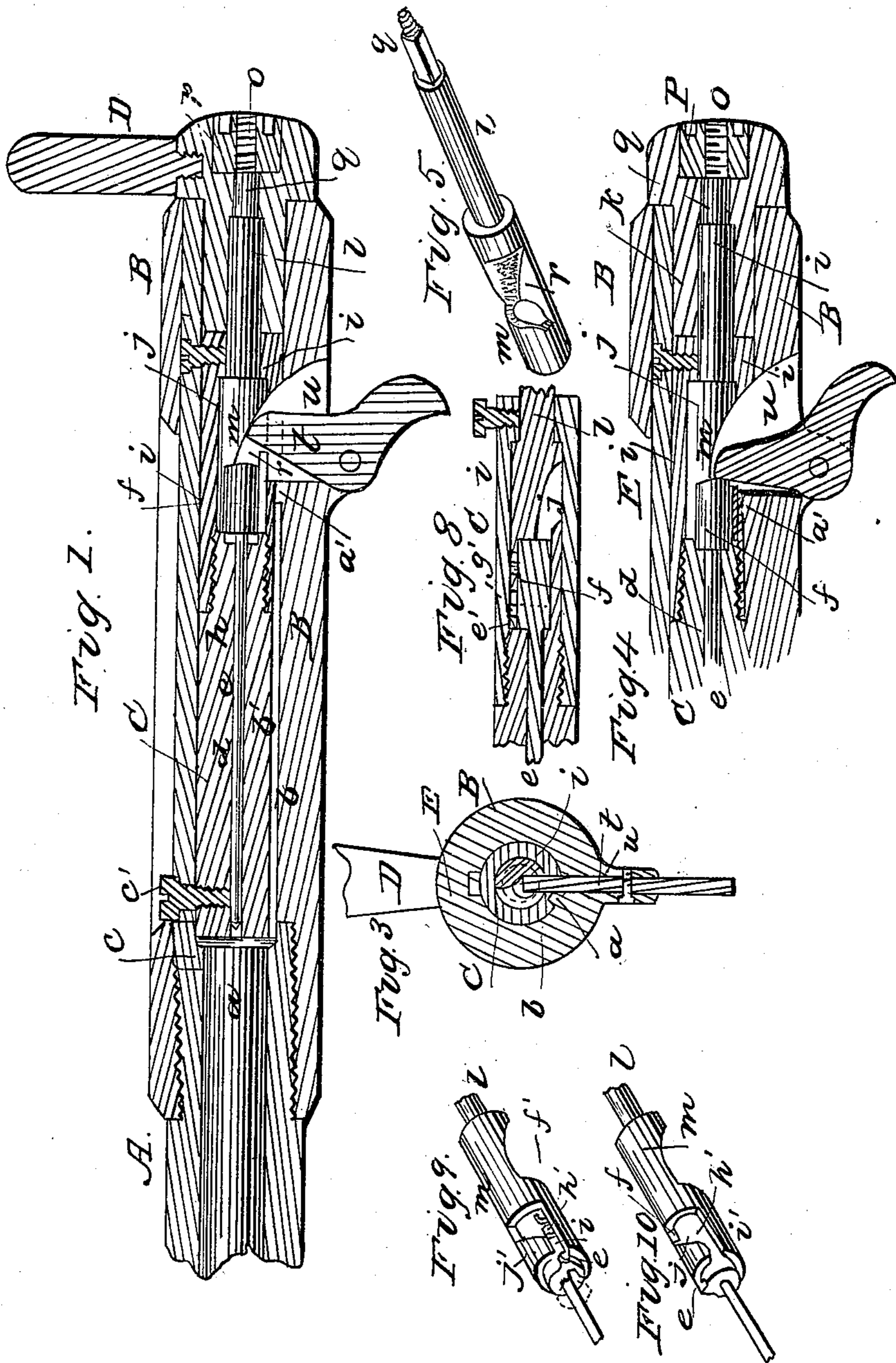


S. F. VAN CHOATE.
Breech-Loading Fire-Arm.

2 Sheets—Sheet 1.

No. 94,047.

Patented Aug. 24, 1869.



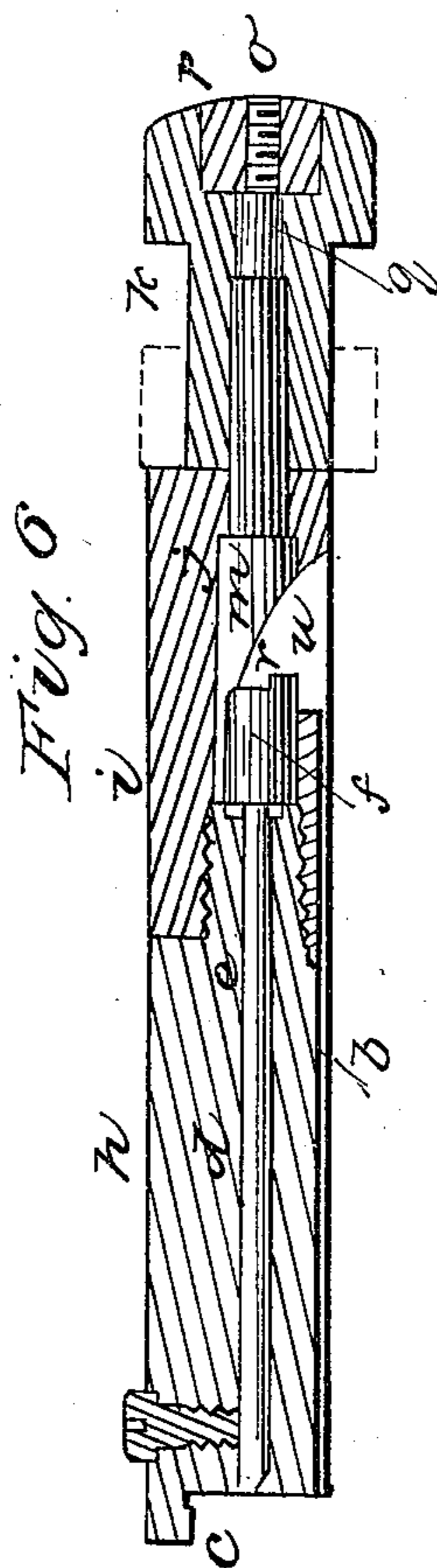
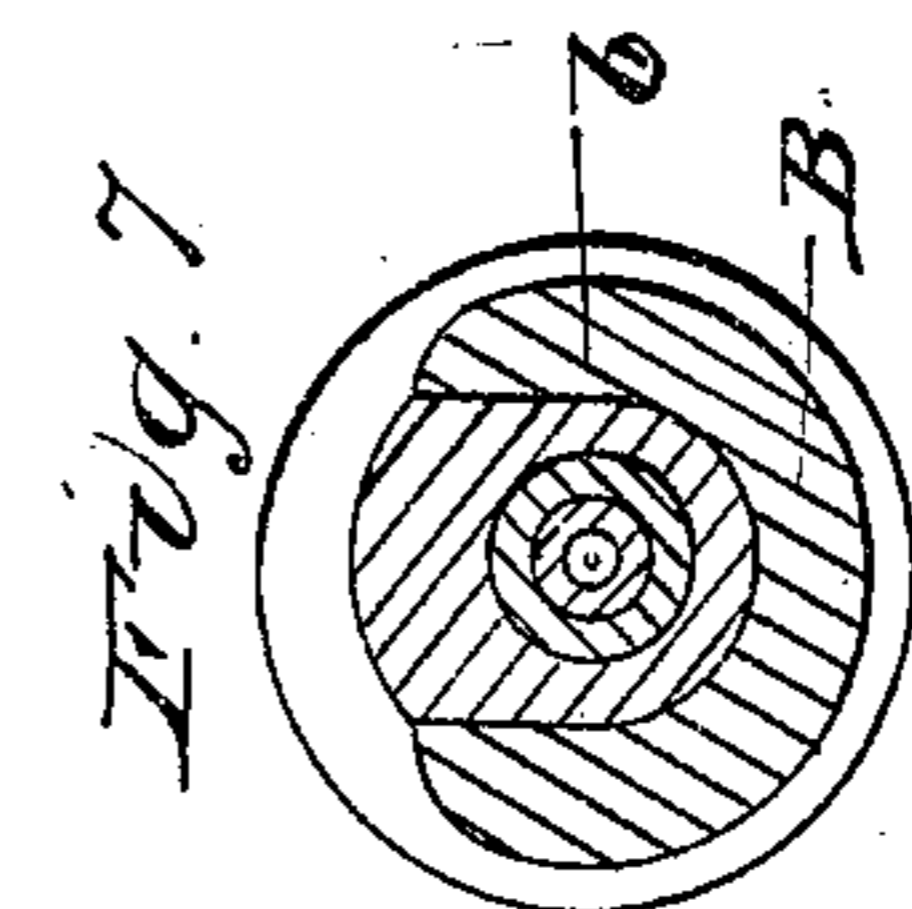
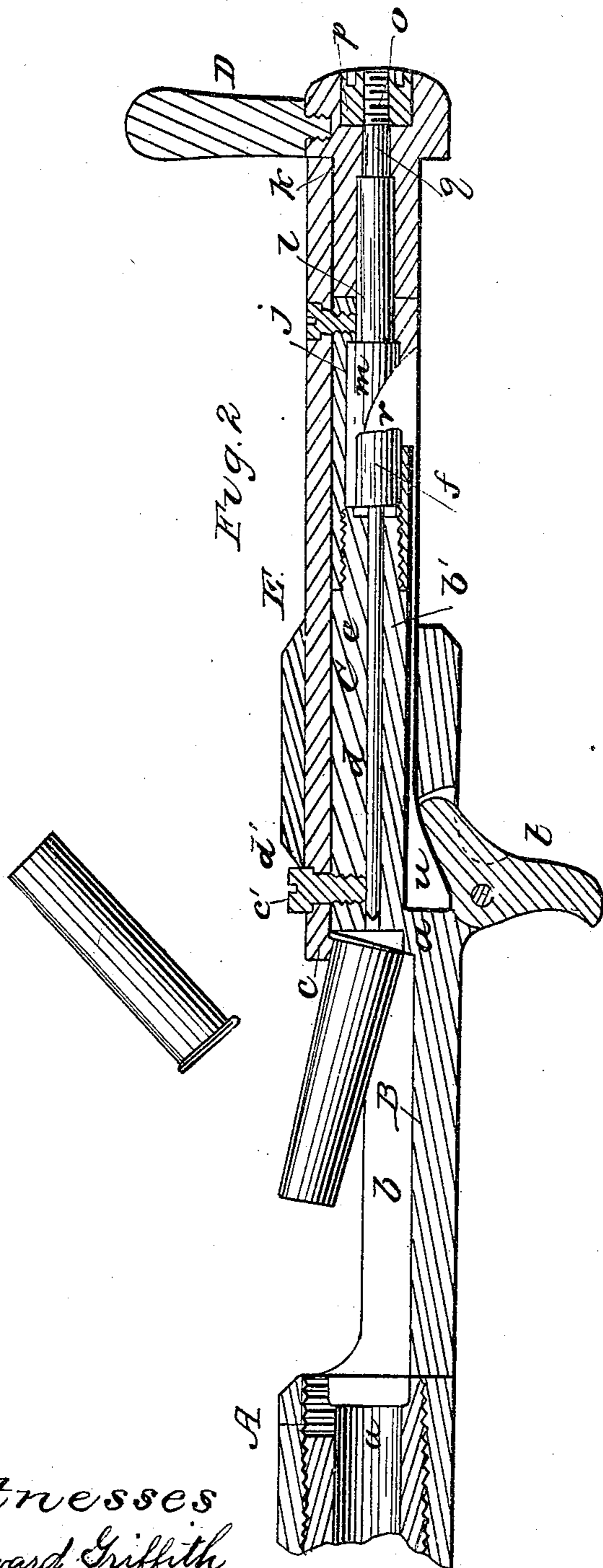
Witnesses
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by his Attorney
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United States Patent Office.

S. F. VAN CHOATE, OF BOSTON, MASSACHUSETTS.

Letters Patent No. 94,047, dated August 24, 1869.

IMPROVEMENT IN BREECH-LOADING FIRE-ARMS.

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

To all to whom these presents shall come:

Be it known that I, S. F. VAN CHOATE, of Boston, in the county of Suffolk, and Commonwealth of Massachusetts, have made an invention of certain new and useful Improvements in Breech-Loading Fire-Arms; and do hereby declare the following to be a full, clear, and exact description thereof, due reference being had to the accompanying drawings, making part of this specification, and in which—

Figures 1 and 2 are vertical and longitudinal sections, and

Figure 3, a vertical and transverse section of the working-parts of a fire-arm, in which my improvements are incorporated,

Figure 4, a vertical and longitudinal section of a small portion of the arm, exhibiting the firing-pin, as driven forward to its extreme limit by the action of exploding-trigger.

Figure 5, a perspective representation of the recessed and notched rod, for determining the movements of the trigger and fire-pin, the same to be hereinafter explained.

Figure 6, a longitudinal section, and

Figure 7, a transverse section of a modified construction of the arm, which will be hereinafter duly referred to and explained.

The improvements in fire-arms, which constitute the subject-matter of this patent, have for their basis a class of arm, of which an instance is shown in Letters Patent of the United States, numbered 89,902, and issued to me on the 11th day of May, A. D. 1869.

Although the production of the arm shown in Letters Patent last mentioned, naturally gave rise to my present improvements, such improvements are not of necessity to be employed in connection with, or to be dependent upon such patent, but possess individual and characteristic features, which may, in practice, be found valuable in their application to other arms.

The primary object in making the experiments, which have terminated in the invention herein described, has been to secure almost absolute simplicity of parts, throwing away all superfluous details, and retaining only those necessary to secure perfect action of the arm, the result being, low cost, extreme simplicity of manipulation, and non-liability of derangement.

Having thus prefaced the description of my present invention, by stating its main object, I will now consider in what respect it differs from, and is preferable to other arms of its class, or, in fact, to any simple "breech-loading" arm, carrying a metallic-cased cartridge.

First, these improvements consist in dispensing with the plurality of parts which were employed in my former patent, as a means of exploding the fulminate of

the cartridge, and adopting, in lieu thereof, a single trigger, without, necessarily, a single spring or adjunct, such trigger being impelled directly against the firing-pin, which explodes the fulminate without intermediate device of any nature, except, as hereinafter explained, a means of securing such trigger from possibility of prematurely actuating the firing-pin when the parts are not in firing-position.

A second feature in these improvements, consists in a peculiar and advantageous mode of connecting the actuating-handle and the locking-cam to the breech-bolt, whereby the friction upon such handle, in describing the arc of a circle, requisite in locking and unlocking such bolt, may be varied at pleasure, by the turning of a screw-nut, the arrangement of parts being such that the liability of the cam-portion to become either fixed to the bolt, or loosened upon it to an injurious extent, is avoided, thus obviating, in a very simple manner, the objections heretofore existing to the employment of friction-bearings or connections.

The drawings before alluded to as accompanying this specification, exhibit a portion of a fire-arm containing my improvements, such drawings being limited to the breech-loading portions of the arm, as containing all that is considered essential to a good understanding of the invention.

In such drawings—

A denotes the barrel, and *a* the bore thereof, B being the frame or receiver, the breech-chamber of which is shown at *b*.

C denotes a cylindrical bolt, which forms the movable breech, such playing longitudinally within the breech-chamber *b*, the bottom of which is semicircular or concave, to receive such bolt.

The breech-bolt passes entirely through the receiver B, and is provided at its rear extremity with a handle, D, for rotating it through the arc of a circle, the bolt, in practice, having a locking-cam affixed to it, to enter a corresponding recess made within the receiver, and lock the bolt in position.

The upper part of the breech-bolt is provided with a bar, E, properly secured to it, this bar extending beyond the front end of the bolt, and being formed into a depending hook, *e*, for hooking upon the flange of the cartridge-shell.

The breech-bolt is bored axially, as shown at *d*, to receive an attenuated cylindrical firing-pin, *e*, such pin being provided at rear with a head, *f*, to prevent displacement.

The above-described parts are portions of the arm shown in my former patent, which I have embodied in my present application.

In such patent, the rear end of the firing-pin abutted against the front end of a rod, contained within the rear part of the bore of the breech-bolt, and which

was a part of the handle which actuates such breech-bolt, the breech-bolt in this instance being one homogeneous piece of metal.

In carrying out my present improvement, I form the breech-bolt in two sections, *h* and *i*, screwed together at their abutting-ends, as represented, a chamber, *j*, being formed in the front end of the latter, to receive loosely the head of a rod, *l*.

The locking-cam of the arm, shown in dotted lines in the drawings, is formed upon a short piece or block of metal, *K*, of like size and shape with the breech-bolt, to the rear end of which it is secured by means of a cylindrical rod, *l*, before mentioned, the head *m* of such rod receiving and enclosing the head *f* of the firing-pin.

The rod *l* extends through the cam-block *K*, to which it is secured against longitudinal displacement by a screw and nut, *o p*, and prevented from revolving therein by a square or polygonal shoulder, *q*, as shown in figs. 1 and 5 of the accompanying drawings.

It will be at once apparent, that by tightening the nut *p*, the head of the rod *l* will be drawn tightly against the portion *i* of the breech-bolt, and, as a consequence, bind the cam-block thereto with sufficient friction to prevent rattling of the latter, and to secure it firmly to the breech-bolt, of which it is thus forced to become a part.

A groove, *r*, is made in the lower part of the head of the rod *l*, and in rear of the head of the firing-pin, this groove being of such shape and disposition as to leave a free path for the trigger to strike the firing-pin, when the breech-block is locked in firing-position, and to present a barrier between such pin and trigger, when the bolt is not secured in position.

The nature and operation of this groove are explained substantially in my former patent.

The trigger of the arm is represented at *t*, in the accompanying drawings, as fulcrumed within a slot, *u*, made through the under side of the receiver at its rear part, and opening into its breech-chamber, the situation of this groove, with respect to the breech-bolt, being such, that when the latter is at its extreme forward position, the firing-pin shall present its head immediately in front of the trigger.

The cartridge is exploded by simple pressure of the finger upon the firing-pin.

It will be seen that the trigger is in direct contact with the head of the firing-pin, thus dispensing with any intermediate lock-mechanism; the trigger performing the functions of a lock.

a in the drawings represents a short post or stop, fixed to, and slightly rising above the bed of the breech-chamber, and at the rear part thereof, this pin being placed in such locality that the cartridge-shell, on being withdrawn by the retrograde movement of the breech-bolt, shall strike it, the effect of which is, first, to tilt the shell, and then to impel it from the breech-chamber, the stop being preferably located at the left of the centre of the breech-chamber, in order to throw the shell to the right side of the arm.

The bottom of the breech-bolt is grooved longitudinally, as shown at *b*, to form a free passage to the stop *a*.

A screw or stud is fixed to the forward part of the breech-bolt, the purpose of which is, by abutting against the rear upper part of the receiver, as shown at *d* in fig. 2 of the drawings, to limit the extent of movement of the bolt during its retraction.

It might be urged as an objection to the disposition of the fire-pin last above explained, that the corrosion which might ensue in exceptional cases, would fix the pin within its recess, in the position in which it was left, after discharging the piece, and that upon pushing forward the breech-bolt, the point of the pin, which was left protruding, would strike and explode the fulminate of the cartridge.

In anticipation of this objection, and to guard against such a serious result, I have provided a means of insuring a retraction of the firing-pin within its recess, by one unlocking of the cam, which secures such breech-bolt in place, so that in opening the breech after firing, the pin will be forced back to its extreme limit, and held in this position until the breech is again advanced and locked in position.

The plan which I have contemplated for effecting this last-mentioned result, is to prolong the head of the firing-pin, and that of the rod *l*, which receives it, (the trigger receiving and controlling groove *u* remaining the same as at present,) and to affix to the circumference of the head of the pin two studs, one at its forward end, being to slide in a slot made in the rear end of the forward section of the breech-bolt, and to prevent the fire-pin from rotating within the bolt, but allow it to slide freely therein, and the rear stud being disposed within a groove cut in the forward end of the head of the rod *l*, and which is substantially in form like the groove *u*, before mentioned, the arrangement of the stud and groove being such, that upon turning the cam-block, and consequently the rod *l*, through the arc of a circle necessary to unlock the breech-bolt, the cam-grade of the groove shall impinge against the stud, and retract the firing-pin to the fullest extent, and retain it in such position until the cam-block is returned to its original or locked position, when such cam-grade retreats from before the firing-pin head, and leaves a free space for it to be driven forward by the action of the trigger, or its equivalent.

The reader, by referring to figs. 8, 9, and 10, of the accompanying drawings, the former of which is a section of the breech-bolt and firing-pin and adjuncts, and the latter two, perspective representations of the rod *l* and firing-pin, will see that the head *f* of the firing-pin is, in this instance, considerably prolonged, and is provided, upon its circumference, with two slightly-projecting studs *e f*, fixed permanently to it, and placed preferably in axial alignment, the former being placed at the extreme forward end of the head *f*, and the latter about midway between the two ends, or nearing the rear end.

The advance stud slides easily in a slot, *g*, cut in the periphery of the rear end of the forward section of the breech-bolt, such slot and pin, as will be at once apparent, serving to prevent the firing-pin from revolving within the breech-bolt, but allowing of short longitudinal movements of it therein.

The rear stud *f* extends into a groove, *h*, cut through the periphery of the tubular head of the rod *l*, such groove running at right angles to the bore of the rod, and having its outer boundary, *j*, inclined thereto, at an angle of thirty degrees or thereabout, the length of the groove being about a quadrant of a circle, or in excess of this measure to the extent of the diameter of the stud *f*.

An opening, *i*, leads from the larger end of the slot *h* to the end of the head of the rod *l*, in order that the stud *f* may be entirely introduced into such slot.

When the locking-cam is turned up into the proper position to lock the breech-bolt against a discharge of the piece, the stud *f* lies within the largest area of the slot *h*, and against its rear boundary, as shown in fig. 9 of the drawings, ample roadway being thus provided, consequent upon the widening of the slot, to allow of the necessary advance of the firing-pin in exploding the cartridge.

The turning of the cam-block through an arc of ninety degrees, after the firing-pin has been driven forward into the position shown in red lines in fig. 9, produces a like semi-rotation of the head of the rod *l*.

The cam-grade *j*, by the semi-rotation of the rod *l*, impinges against the stud *f*, and, as a necessary result, retracts the firing-pin into the position shown in fig. 10 of the drawings, within the contracted portion

of the slot *h'*, which it about fills, the stud remaining in this position against the rear boundary of the slot, until the firing-pin, which carries it, is driven forward by the trigger, or its equivalent, the return of the locking-cam and breech-bolt into firing-position, as before observed, leaving a space in front of the stud, to permit of its advance, it being understood that the angle of recession of the cam-grade is such as to increase the length of the two extremes of the slot to an extent equal to the distance which is required for the advance of the firing-pin.

The forward stop *e'* and the roadway *g'* prevent rotation of the head of the firing-pin within its recess by the action of the cam-grade, which, but for a like or analogous device, would ensue.

I am aware that heretofore, in some arms in which an attenuated firing-pin is employed, a coiled spring has been adopted for retracting the pin, as a protection against corrosion, &c. In many instances, however, the power of a spring is inadequate to retract the firing-pin, is itself liable to corrosion and failure, and is, at best, a defective agent.

The adoption of the cam-slot and the stop *f'*, or its equivalent, as last above described, forms a simple and positive mechanical means of retracting the firing-pin, the leverage of the cam-grade *j'*, exerted through the medium of the handle of the cam-block, supplying much more power than will be ever required.

Figs. 6 and 7, of the accompanying drawings, represent a modified as well as simplified construction of the breech and of the receiver of the arm.

In this instance, the bar carrying the cartridge-hook, which has been before described as an independent piece secured to the breech-bolt, is made homogeneous with the two portions of such bolt, as shown at *k' l'*, the cam-block being unprovided with such bar.

Furthermore, the width of this integral bar is equal to the diameter of the breech-bolt, which thus becomes oblong in vertical section, as shown in fig. 7, instead of cylindrical, as before explained.

The walls of the receiver are prolonged, to corre-

spond to the increased height of the breech-bolt, a resulting advantage of which is, that less surface of the breech is exposed, and a less number of joints is accessible to the injurious action of dust, or dirt, or other extraneous matter.

A more finished appearance is also imparted to the arm by the adoption of this last-mentioned modification.

Claims.

Having thus described the constituent parts of my present invention, as well as its operation and advantages, what I believe to be novel and original with myself, and desire to secure by Letters Patent of the United States, is as follows:

1. The combination of a firing-pin and a trigger of a fire-arm, whereby the latter actuates the former directly without the aid of other lock-mechanism, for the purpose of exploding the cartridge by direct pressure rather than by the ordinary system of percussion.
2. As a positive mechanical movement, the employment of the cam-grade of the rod *l*, in combination with the studs *e' f'* on the firing-pin *e*, for the purpose before explained.
3. The combination and arrangement of the cam-block *k* and the rod *l*, the latter being prevented from revolving within the former, and provided with means of varying the friction or hold between it and the breech-bolt, for the purpose substantially as herein explained.
4. An improved fire-arm, composed of a breech-bolt, provided with a fixed or unyielding cartridge-retractor, a receiver, furnished with the permanent or immovable stop *a'*, and a recoil cam-block, provided with a variable friction-device to regulate the degree of friction between the two, the whole being combined substantially in manner set forth.

S. F. VAN CHOATE.

Witnesses:

FRED. CURTIS,
EDWARD GRIFFITH.