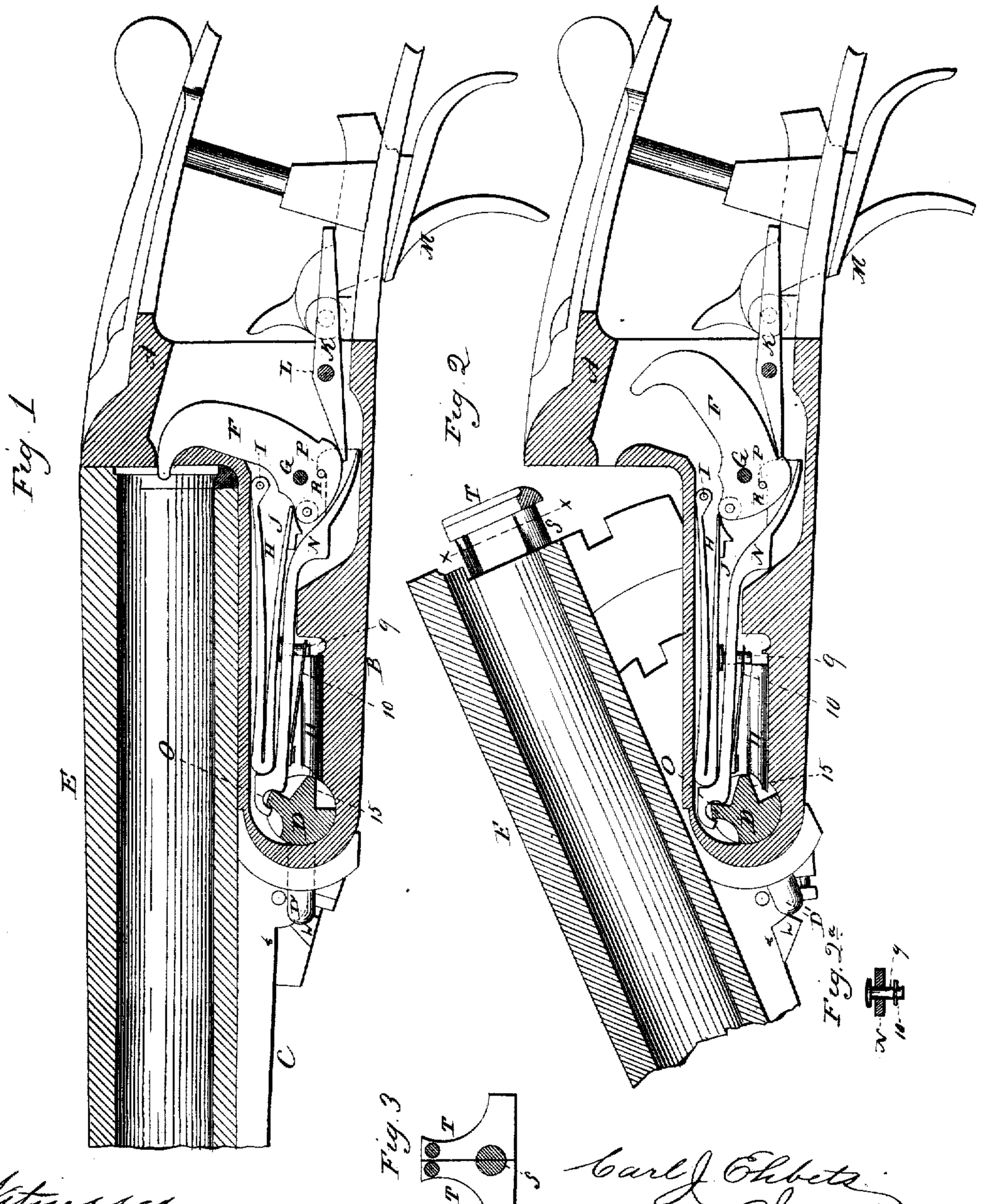
(No Model.) 8 Sheets—Sheet 1.

C. J. EHBETS.

BREECH LOADING FIRE ARM.

No. 415,451. Patented Nov. 19, 1889.



Witnesses.
L. M. Shumway
Fred C. Earle.

Inventor
Carl J. Ehbets.
By atty.
Wm. Ennis.

(No Model.) 8 Sheets—Sheet 2.

C. J. EHBETS.

BREECH LOADING FIRE ARM.

No. 415,451. Patented Nov. 19, 1889.

Fig. 4

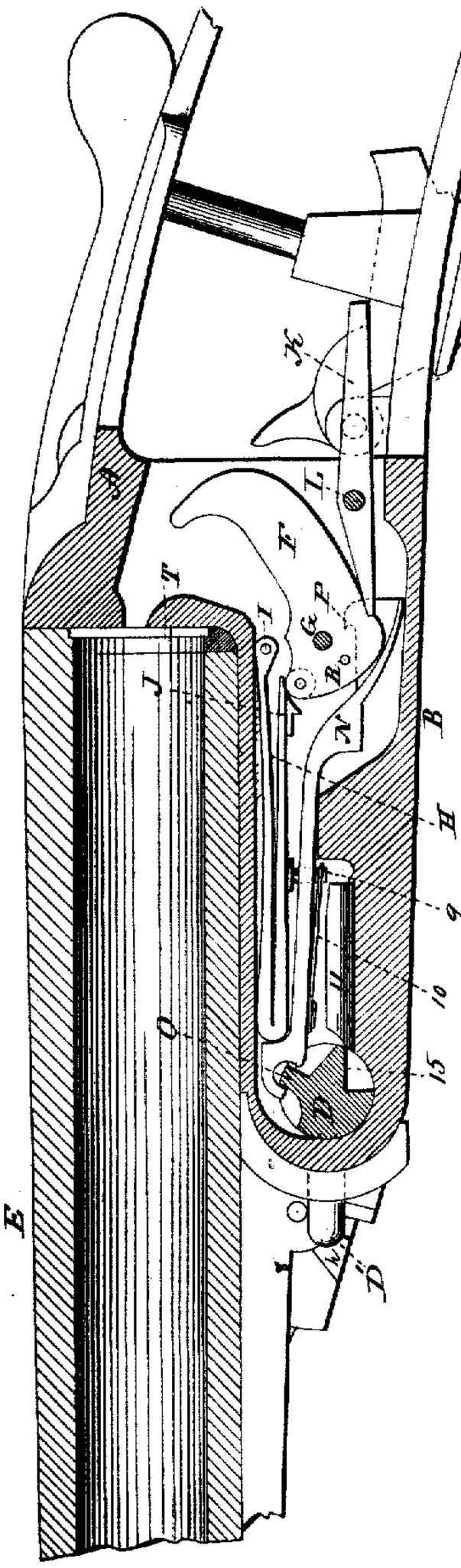
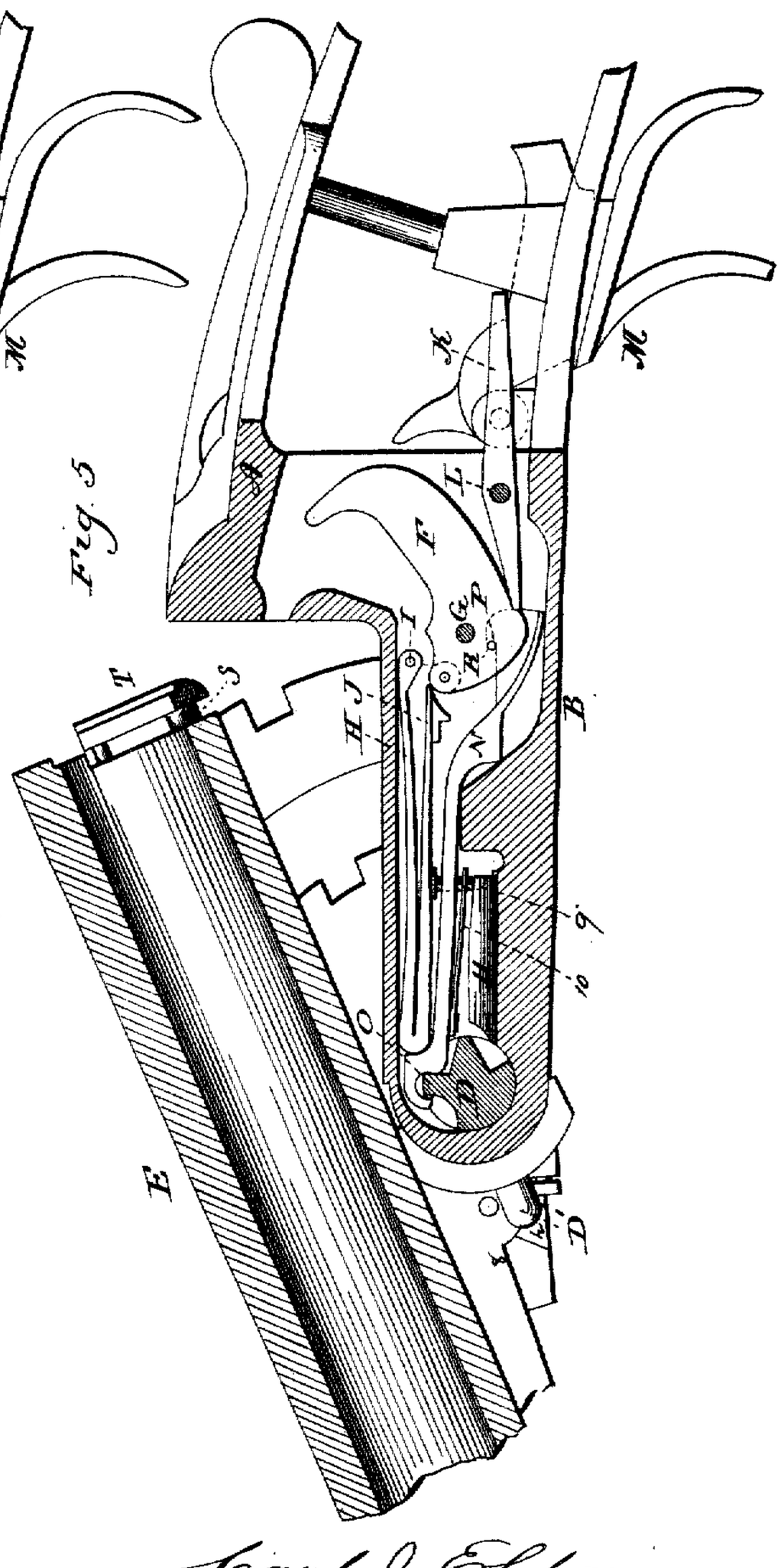


Fig. 5



Witnesses.
L. F. C. Hennaway
Fred C. Earle

Carl J. Ehbets.
By atty Inventor.
John C. Earle

(No Model.) 8 Sheets—Sheet 3.

C. J. EHBETS.

BREECH LOADING FIRE ARM.

No. 415,451. Patented Nov. 19, 1889.

Fig. 6

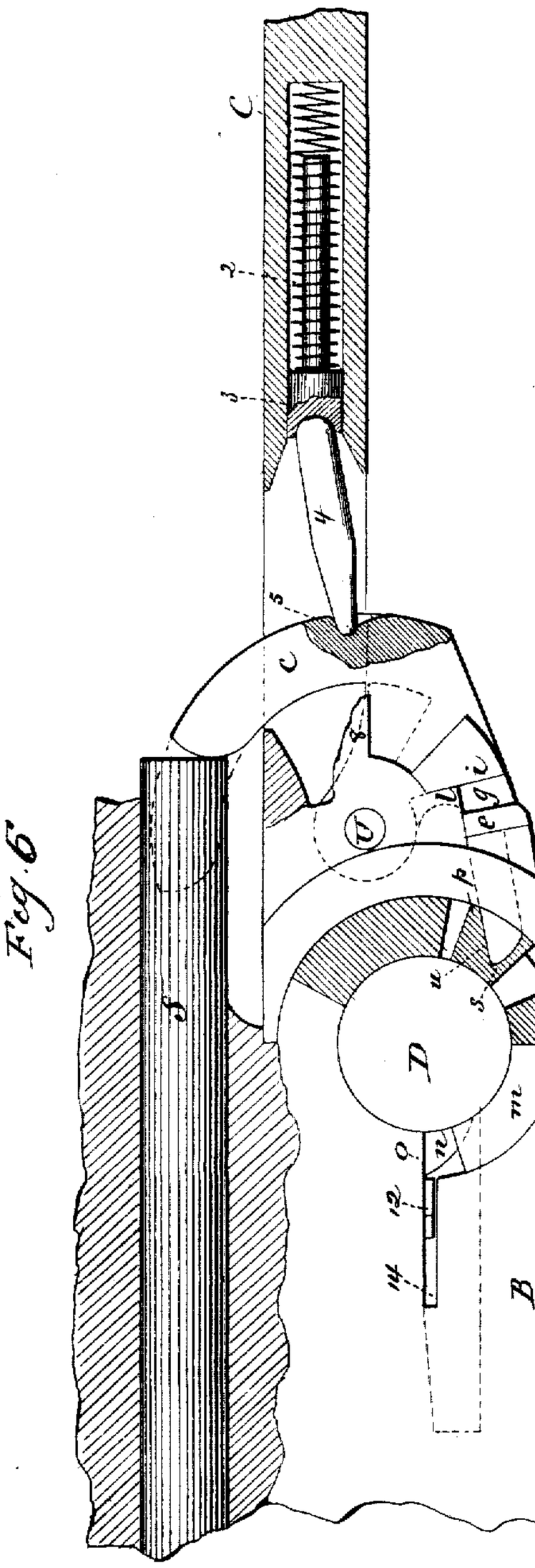
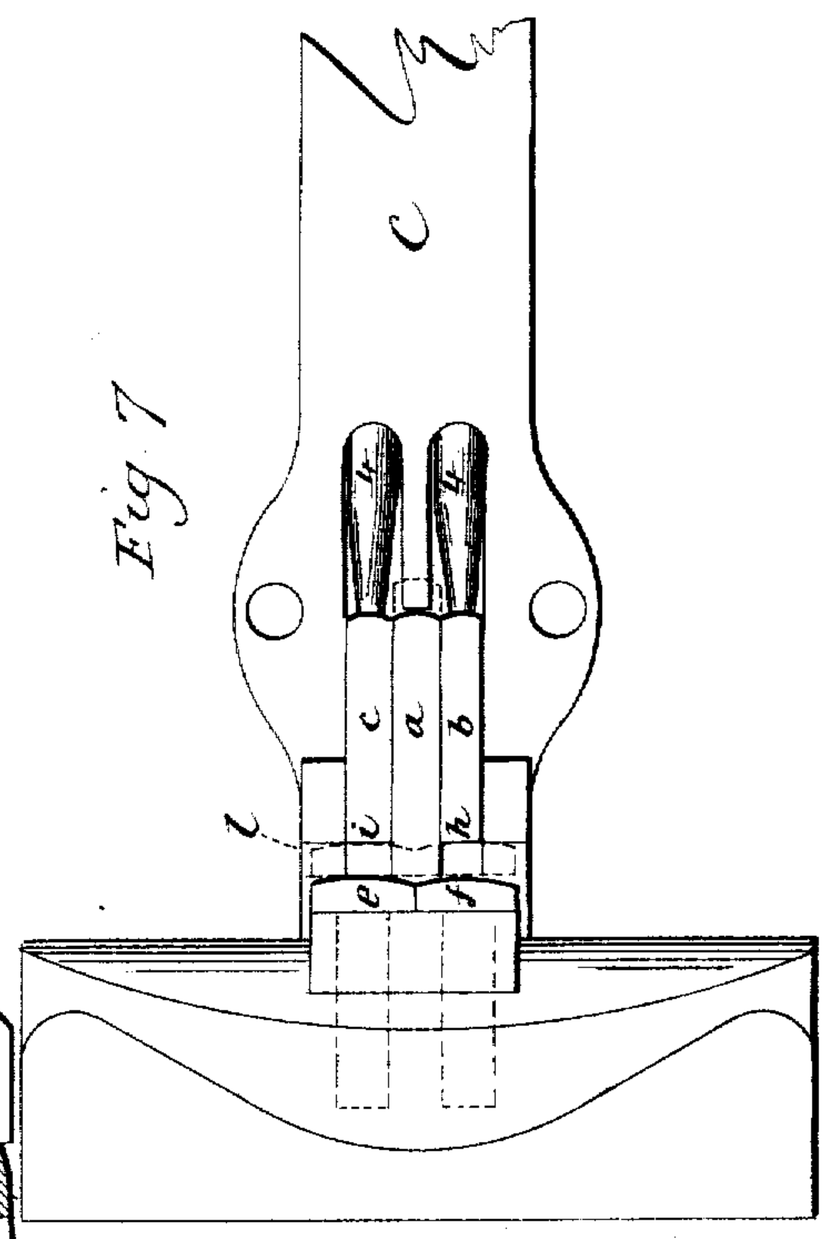


Fig. 7



Witnesses.
L. W. Shumway.
Fred C. Earle.

Carl J. Ehbets
Inventor
By atty
Wm. C. Ennis.

(No Model.) 8 Sheets—Sheet 4.

C. J. EHBETS.

BREECH LOADING FIRE ARM.

No. 415,451. Patented Nov. 19, 1889.

Fig. 13

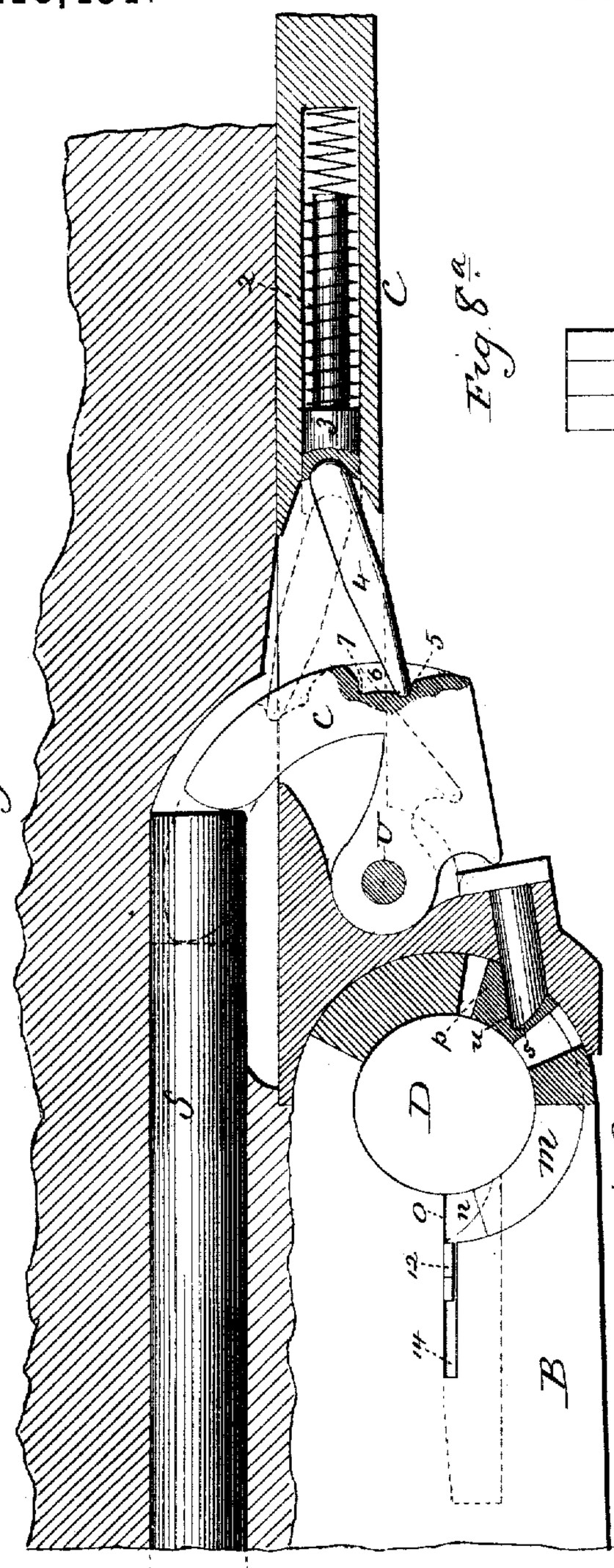


Fig. 8a.

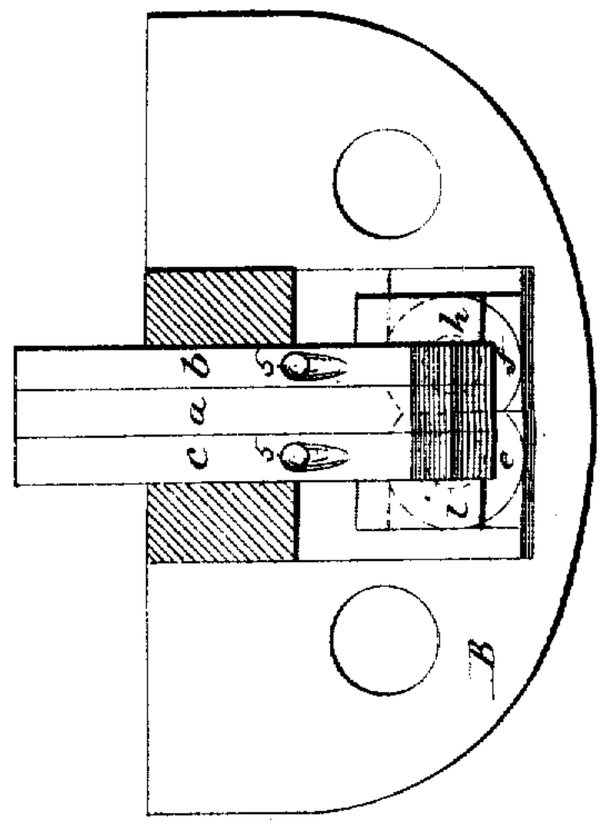


Fig. 8.

Witnesses.
J. H. Shumway
Fred C. Clarke.

Carl J. Ehbets
Inventor
By atty.
Wm. C. Linle

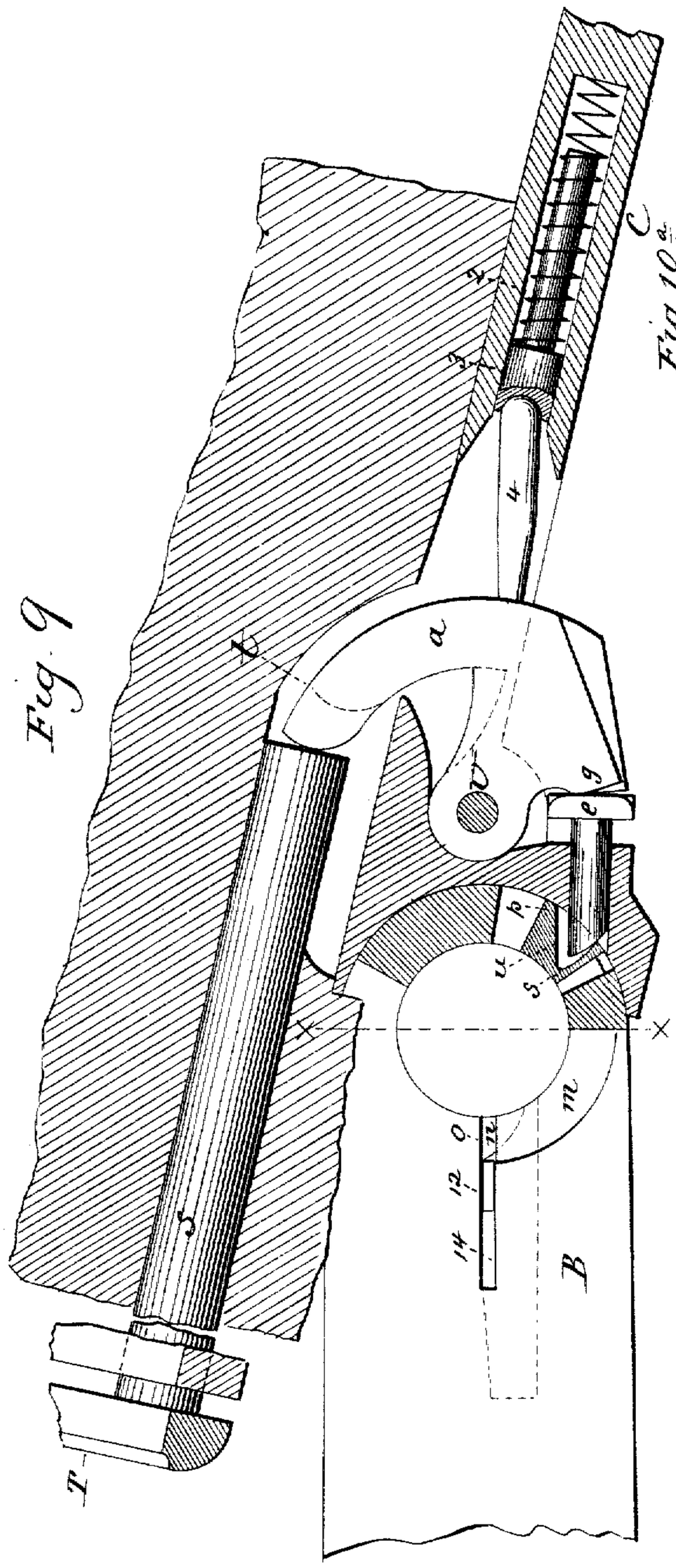
(No Model.)

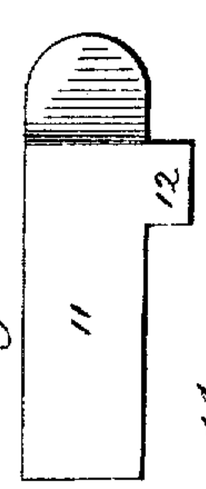
8 Sheets—Sheet 5.

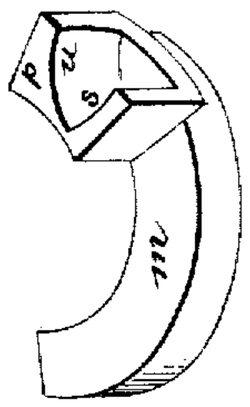
C. J. EHBETS.

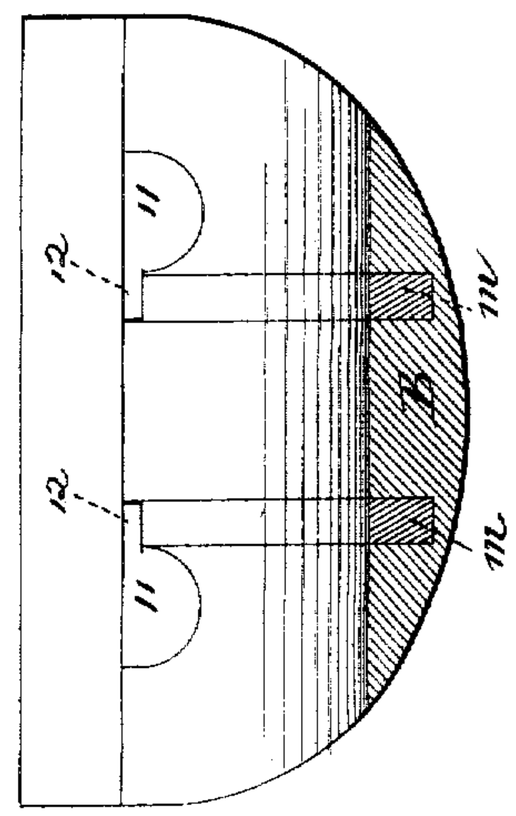
BREECH LOADING FIRE ARM.

No. 415,451. Patented Nov. 19, 1889.









Witnesses
L. C. Shumway.
Fred C. Earle.

Carl J. Ehbets
Inventor
By atty.
Thos. D. Earle.

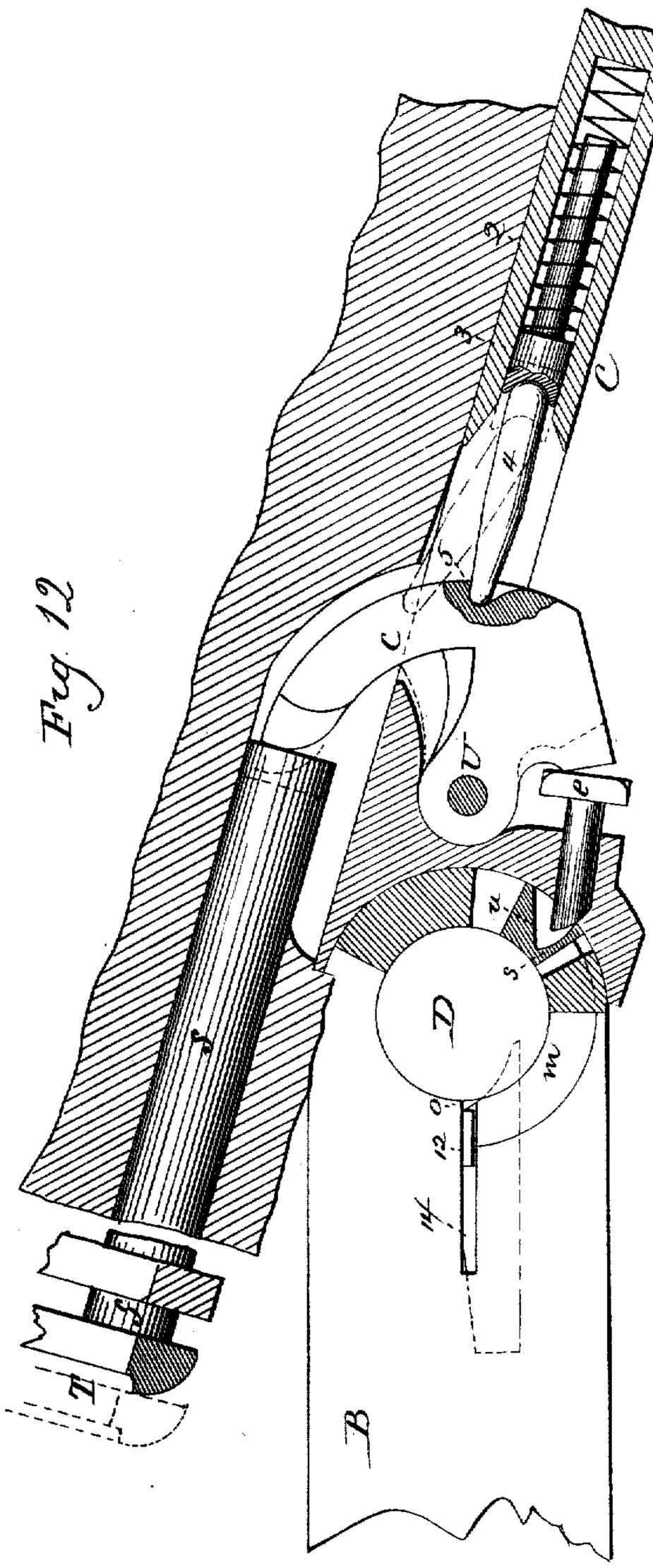
(No Model.) 8 Sheets—Sheet 6.

C. J. EHBETS.

BREECH LOADING FIRE ARM.

No. 415,451. Patented Nov. 19, 1889.

Fig. 12



Witnesses:
J. C. Shumway.
Fred C. Earle.

Carl J. Ehbets
Inventor
By atty.
Thos. E. Earle.

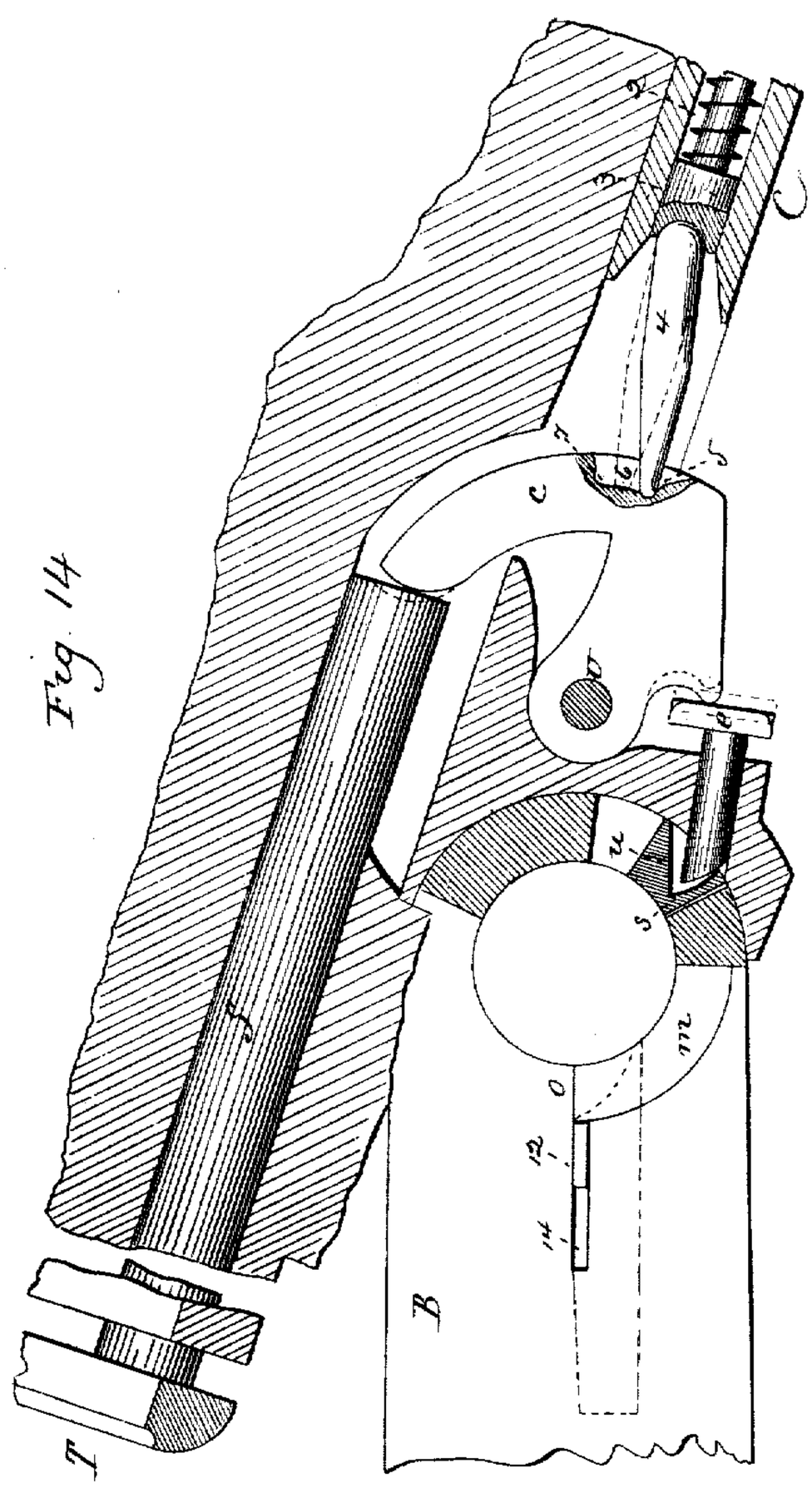
(No Model.) 8 Sheets—Sheet 7.

C. J. EHBETS.

BREECH LOADING FIRE ARM.

No. 415,451. Patented Nov. 19, 1889.

Fig. 14



Witnesses
J. H. Shumway
Fred C. Earle

Carl J. Ehbets
Inventor
By atty.
Thos. E. Earle

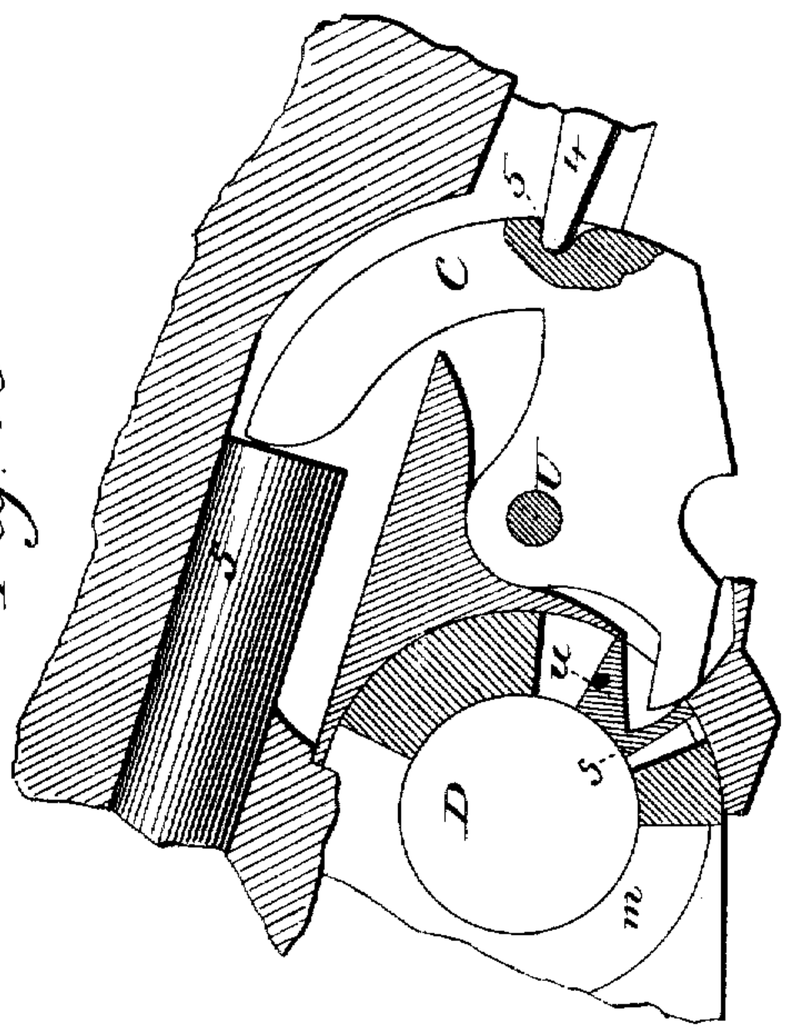
(No Model.) 8 Sheets—Sheet 8.

C. J. EHBETS.

BREECH LOADING FIRE ARM.

No. 415,451. Patented Nov. 19, 1889.

Fig. 15



Witnesses.
J. H. Shumway
Fred C. Earle.

Inventor
Carl J. Ehbets
By atty.
Wm. E. Earle.

UNITED STATES PATENT OFFICE.

CARL J. EHBETS, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE COLT'S PATENT FIRE ARMS MANUFACTURING COMPANY, OF SAME PLACE.

BREECH-LOADING FIRE-ARM.

SPECIFICATION forming part of Letters Patent No. 415,451, dated November 19, 1889.

Application filed July 10, 1889. Serial No. 317,055. (No model.)

To all whom it may concern:

Be it known that I, CARL J. EHBETS, of Hartford, in the county of Hartford and State of Connecticut, have invented a new Improvement in Breech-Loading Fire-Arms; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a longitudinal section cutting centrally through one of the barrels and showing side view of the fore-end and of the lock mechanism, the parts being in the normal position; Fig. 2, the same as Fig. 1, showing the parts in the position which they occupy when the barrels are thrown open from the position in Fig. 1; Fig. 2ª, a transverse section through the cocking-bar, representing the pin 9; Fig. 3, a transverse section through the extractor-slide on line *x x* of Fig. 2, looking rearward; Fig. 4, the same as Fig. 2, showing the parts in the position after the barrels have been returned; Fig. 5, the same as Fig. 4, showing the parts in the position when the barrels are opened without the hammer having been discharged; Fig. 6, a sectional side view illustrating the ejecting devices in the normal position; Fig. 7, an under side view of the parts shown in Fig. 6; Fig. 8, a forward end view of the arm B with the fore-end removed; Fig. 8ª, a transverse section through the fore-end directly in front of the cams, looking rearward; Fig. 9, the same as Fig. 6, illustrating the parts in the open position, as when the hammers are cocked, the cam *c* removed to show the operation of the central cam *a*; Fig. 10, a transverse section through the frame or arm B on line *x x* of Fig. 9; Fig. 10ª, a top view of the slides 11; Fig. 11, a perspective view of one of the segments *m* detached; Fig. 12, the same as Fig. 6, representing the parts in the open position and as after the hammers have been discharged. Fig. 13 represents a modification with the parts in the normal position; Fig. 14, the same modification with the parts in the open position, and showing the cam just on the turning-point and under the action of the strut; Fig. 15, a modification in the operative mechanism of the cams, Fig. 6 and succeeding figures being enlarged.

This invention relates to an improvement in that class of breech-loading fire-arms in which the barrel is hung to the frame at a point forward of its breech end, and so that the barrel will swing up from the frame in opening the breech, commonly called "break-down arms," it having special reference to those arms of this class in which the hammer or hammers are concealed within the frame and are thrown to the cocked position in the breakdown movement, the invention being specially applicable to double-barrel shotguns of this class, but also applicable to single barrels and other breakdowns.

In the more general construction of this class of arms the cartridge-retractor is operated by the breakdown movement, and so as to simply start the cartridge from its seat in the barrel whether or not the hammer has been discharged to explode the cartrige, the starting of the cartridge affording the operator an opportunity to grasp the cartridge or exploded shell, as the case may be, with his fingers to withdraw it from the barrel.

The object of my invention is an automatic device which will operate to eject the cartridge, but do so only in case the hammer has been released and thrown to its normal position to explode the cartridge, and so that in double-barrel arms if one barrel has been discharged and the other not the opening movement of the barrels will eject the exploded shell without a corresponding ejecting movement of the unexploded cartridge; and the invention consists in the mechanism hereinafter described, and particularly recited in the claims.

A represents the frame, from which an arm B projects forward, and to which arm the fore-end C is hinged in the usual manner.

E represents the barrels, secured to the fore-end, and so that turning the barrels forward and downward upon the pivot will open the breech and a corresponding return movement will close the breech in the usual manner.

F represents one hammer, hung in the frame upon a pivot G.

H represents one arm of the mainspring,

which carries a roller I, that works upon a bearing-surface in the frame and extends forward. The other arm, returning, terminates in a cam-like end J, which bears upon the hammer forward of its pivot.

K represents the sear, hung upon a pivot L in rear of the hammer, its nose adapted to engage the cock-notch of the hammer, its tail, extending rearward, adapted for engagement with the trigger M.

N represents the cocking-bar, which is hung by its forward end to the upper side of a rock-shaft D, arranged transversely through the forward end of the arm B. The bar N being engaged with the rock-shaft upon its upper side, as at O, extends rearward, and at its rear end is constructed with a shoulder P, adapted to engage a pin R on the hammer, and so that as the rock-shaft D is turned forward it will draw upon the bar N and bring the hammer to the cocked position, as seen in Fig. 2, at which point the hammer will be engaged by the sear, as also seen in Fig. 2, and so that the barrels may then be returned, leaving the hammers at full-cock and ready for discharge.

The usual interlocking devices for securing the barrels in the closed position are provided and not necessary to be described. The rock-shaft is connected to the fore-end by means of studs D′, which project through vertical slots D^2 in the forward end of the arm B, (see Fig. 8,) the said studs passing through corresponding openings in the rear end of the fore-end, so as to engage the fore-end, that when the fore-end is turned, as from the position seen in Fig. 1 to that seen in Fig. 2, the rock-shaft D will be correspondingly rotated. The forward end of the mainspring engages the locking-bar N, so as to partake of its backward-and-forward movement, and whereby the mainspring is partially compressed during the opening movement, as from Fig. 1 to Fig. 2, and then on the return movement the cam-shaped end J of the mainspring rides onto the bearing upon the hammer, so as to complete the compression of the mainspring, as represented in Fig. 4.

As thus far described the construction is substantially the same as that described as the invention of William Mason in Letters Patent of the United States No. 263,191, dated August 22, 1882, assignor to the assignees in this application.

S represents the ejector-slide, which is arranged to slide longitudinally between the barrels in the usual manner; but instead of being made in the form of a single bar it is divided, as indicated in Fig. 3. Each slide is provided with an independent ejector T, these ejectors being substantially the usual ejector for double-barrel guns secured to the end of the slide, except that the ejector is divided, so that each part is in connection with its own particular slide, and so that each may be moved independent of the other.

In the fore-end C, and near the joint between it and the arm B, a transverse pivot U is introduced, upon which three cams *a b c* are hung so as to swing in a vertical plane. The cam *a* is in a vertical central position in a plane between the two barrels, and so that its nose *d* may normally bear against the rear end of both ejector-slides. The two cams *b c*, being upon opposite sides of the cam *a*, are adapted to bear each against its own respective ejector-slide. In the fore-end below the cams two followers *e f* are arranged and so as to slide longitudinally. The tail *g* of the cam *a* bears against the forward ends of both these followers, as represented in Figs. 6 and 7. The noses of the two cams *b c* normally stand in a position as bearing against the forward ends of the respective slides S, as does the nose of the cam *a*. The lower ends *h i* of the respective cams *b c* stand in the path of the respective followers *e f*, as seen in Fig. 7; but the lower ends of each of the cams *b c* normally rest against a stop 1, which holds the said cams a short distance away from the ends of their respective followers, as represented in Fig. 6.

In the opening movement of the barrels if either follower be thrown outward to a limited extent such movement of the follower will impart to the central cam *a* a rotative movement before the said follower can reach its cam *b* or *c*, as the case may be. Under such movement of the followers, therefore, the central cam will receive a movement in advance of the two cams *b c*, and such movement of the central cam will impart a corresponding longitudinal or retractive movement to both ejector-slides. Then a further movement of either of the followers will bring such follower into contact with its cam *b* or *c*, as the case may be, and then that cam *b* or *c* will move under the continued movement of its follower, together with the central cam *a*.

On the shaft D, and in recesses in the arm B around the shaft D, segments *m* are arranged concentric with the shaft, one for each of the followers *e f*. One of these segments is shown detached in Fig. 11. The recesses in which the segments are arranged are of a length greater than the length of the segments, and so that when the parts are in the closed or normal position, as seen in Fig. 6, a space *n* will be left in the segment-recess between the rear end of the segments and corresponding shoulders *o* in the frame. These two segments are represented in broken lines, Fig. 8, also seen in Fig. 10. At the forward end each segment is constructed with an inward projection *p*, and these projections *p* are constructed with seats *s*, (see Fig. 8,) in which the inner ends of the followers *e f* respectively rest. The ends of the followers which so rest in the seats *s* are of cam shape, as seen in Fig. 6.

In breaking down the arm—that is, in turning from the position in Fig. 6 to that seen in Fig. 9—the followers and the cams swing with the fore-end, and as the followers bear upon

their respective seats in the segments they will turn those segments until the said segments come to a bearing against the shoulder *o*, as seen in Fig. 9. At this point the further movement of the segments will be arrested; but the followers and the cams will continue their movement with the fore-end. The cam-shaped ends of the followers and the corresponding seats of the segments now come into action, the result of which is to throw the followers forward to the position seen in Fig. 9, and such forward movement of the followers will act upon the central cam *a* and turn it accordingly, throwing its nose rearward to the position indicated in Fig. 9, the broken line *t* representing the position of the nose of the cam before such movement. This movement of the cam will impart a corresponding rearward movement alike to both ejectors, and sufficient to start both cartridges or shells, as the case may be, from their seats in the barrel, and sufficient to enable the operator to grasp the heads to remove the shells or cartridges should he desire to do so. If from this open position in Fig. 9 the barrels be returned, the cam *a* and followers return therewith, and as the closing position is approached the followers come to a bearing upon the upper side *u* of the seats *s* in the segments, and then in completing the closing movement this engagement between the followers and the segments will return the segments to their normal position, as seen in Fig. 6. In this movement it will be observed there has been no action upon the cams *b c*. In this closing movement the ejectors will strike the recoil-plate of the gun and be forced inward in the usual manner, and this movement of the ejector-slides will force the cam *a* back to its normal position.

In the fore-end C, forward of the respective cams, longitudinal recesses 2 are formed, (see Figs. 6 and 7,) in each of which a piston 3 is arranged, and in the recesses, forward of the pistons, spiral springs are introduced, the tendency of which is to force the pistons rearward, and between each of said pistons and the back of the respective cams *b c* struts 4 are arranged, one end of the struts taking a seat on the piston, and the other end of the struts rest upon seats 5 in their respective cams. The seats 5 in the respective cams, when the parts are in the normal position, as seen in Fig. 6, are at points on the cams below a line drawn between the center of the axis upon which the cams turn and the seat for the struts on the pistons, so that the struts stand in a downward and rearwardly inclined position, the result of which is that the springs bearing against the said pistons and through the said struts yieldingly hold the respective cams against their respective stops 1. Stops 8 are arranged, as seen in Fig. 6, to arrest the upward movement of the cams *b c* in like manner as the stop 1 arrests their descent, broken lines, Fig. 6, indicating such stopped position. If the cams *b c*, or either of them, be turned upward, the result of such movement of the cams is to bring such strut into line between the axis upon which the cams turn and the seat of the strut on its piston. Now, if the movement of the cam be continued above this point, as seen in Fig. 12, so that the end of the strut is brought to a position above the said line, the reaction of the spring upon the strut will then tend to force the strut rearward against the cams and impart to the nose of the cams a rearward movement, as indicated in broken lines, Fig. 12. It will be evident that if the followers are forced farther forward than when in the previously-described opening movement of the barrels it will correspondingly turn their respective cams *b c*, and will also continue the turning movement of the cam *a*. The nose of that cam *a*, being, therefore, in advance of the nose of the respective cams *b c*, will correspondingly move the ejector-slides in advance of the noses of the cams *b c*, and it will also be seen that if the segments be stopped earlier than upon the shoulders *o* the action of the segments upon the followers will occur earlier and produce a corresponding greater extent of movement of the followers.

The movement which I have described, with the segments coming to a bearing against the shoulder *o*, is that which occurs when the hammer is in the cocked position, and so long as the hammer remains in that cocked position the movement of the segments will be, as I have described, from the normal position until they come to a bearing against the shoulders *o*.

As the ejection of a cartridge is not desirable unless the hammer has been thrown forward to explode the cartridge, I utilize the hammers to operate in connection with the segments to leave the segments free to reach the shoulders *o* when the hammers are in the cocked position, or to interpose a stop for the segments at an earlier point when the hammers, or either of them, are discharged. To thus utilize the hammers, I arrange a headed pin 9 vertically through the cocking-bar N, the head of the pin adapted to rest upon the upper side of the bar N and directly below the arm J of the mainspring, so that the tendency of the mainspring upon the pin 9 is to force it downward, as seen in Fig. 1, when the hammer is in the normal position. Combined with this pin 9 is a spring 10, very much lighter than the mainspring, the tendency of which is to raise the pin 9. When the hammer is thrown to the cocked position, as seen in Fig. 2, the pin is free to rise under the action of its own spring 10, and as the arm J of the mainspring rises the pin 9 rises accordingly, as seen in Fig. 2, and when the hammer is returned to the normal position, as seen in Fig. 1, then the pin 9 will be forced to its down position. Forward of this pin and between it and the pivot D a longitudinal slide 11 is arranged, the rear end of this

slide standing directly forward of the pin 9 when the parts are in the normal position, as seen in Fig. 1, but so that when the hammer is in the cocked position, as seen in Fig. 4, the pin 9 will be raised so far as to escape the slide in the forward movement of the pin, and so that the pin will pass over that end of the slide 11, as seen in Fig. 5. Consequently when the hammer is in the cocked position the pin 9 has no effect upon the slide 11; but when the hammer is in the normal or closed position, as seen in Fig. 1, the pin stands in rear of the rear end of the slide 11, and so that in the forward movement of the pin the slide will be forced forward, as seen in Fig. 2. The position of the lower arm of the main-spring is such with relation to the pin 9 that the pin 9 cannot escape under the action of its own spring 10 from engagement with the slide 11 until the open position of the barrels is reached, as seen in Fig. 2. Then the pin, under the action of its own spring 10, has risen out of engagement with the slide. An independent slide 11 is arranged for each segment.

The forward end of each of the slides 11 is constructed with an inward flange 12. (See Figs. 10 and 10ª.) These projections extend through a slot 14 in the frame and normally stand in rear of the spaces *n* and shoulders *o*, as seen in Figs. 6 and 9; but under the forward movement of the slide 11, as before described, the said flange 12 is brought into a space *n* and below the shoulders *o*, as seen in Fig. 12, and so as to form a bearing against which the segment *m* may come to a stop at a point earlier than the shoulders *o*. The result of this earlier stoppage is to bring the seat *s* of the segment to an earlier action on the follower *e*, and as seen in Fig. 12, which represents the fore-end at its extreme open movement. In this position, it will be observed, the rear end of the strut 4 has been raised to a point above a line drawn from the pivot of the cam to the seat of the strut on its piston. As the downward or opening movement is being completed the seat between the cam and the strut 4 passes above the said line between the center of the pivot and the piston-seat of the strut, as seen in Fig. 12. Then the action of the spring through the strut upon the cam is to turn the cam rearward, which it is free to do, there being nothing interposed other than friction to prevent such rear movement of the cam and the ejector-slide, and the cam will be thrown under such action of the strut until it is arrested by a suitable stop. When this rearward action of the strut commences, the nose of the cam upon which the strut acts stands forward of the rear end of the ejector-slide by so much as the nose of the cam *a* has been moved in advance of the cam upon which the strut acts. The result of this action of the spring-strut upon its cam, therefore, is a quick accelerated movement of the cam, which will bring its nose against the forward end of its ejector-slide, giving to it a blow, as by a hammer, and of a force sufficient to give to that ejector-slide such a sudden rearward movement as to enable it to throw the exploded shell, or the cartridge, if it be not exploded, entirely from the barrel, and as indicated in broken lines, Fig. 12. On the return or closing movement of the barrels the ejector strikes the recoil-plate of the frame, as before mentioned, returning the ejector to its place in the usual manner, which imparts a returning movement to the cam until the forward end of the strut has passed below the said line between the pivot of the cam and the piston-seat of the strut, as indicated in broken lines, Fig. 6, when the strut will, under the action of its own spring, return to its normal position, as seen in Fig. 6.

The shaft D is constructed with a cam-recess in its periphery, forming a cam 15, (see Figs. 1 and 2,) adapted to operate against the corresponding forward end of the slide 11. When the barrels are opened and the slide 11 moved forward, as I have before described, the forward end of the said slide 11 passes below the cam 15 of the shaft D, (see Fig. 2,) and so that as the barrels are returned the said cam 15 operates upon this then-projecting end of the slide 11, and so as to force the slide to its rear or home position, as seen in Fig. 1. The opening movement and return of the barrels which I have thus described leaves the hammer in the cocked position, as seen in Fig. 4, and so long as the hammer remains in the cocked position the pin 9 will be held up out of possible contact with the slide 11, and so that the barrels may be opened, and, as seen in Fig. 5, without operation upon the slide 11; but so soon as the hammer is discharged the arm J of the main-spring forces the pin 9 downward into position to engage the slide 11. While the hammer stands in the cocked position the movement of the ejector will be limited by the shoulder *o* in the frame, against which the segment bears, as first described. The result of this is that the ejector will be moved but a short distance and without an ejective action, and so as to only start the cartridge from the barrel to be returned as the barrel is closed; but after the hammer has been discharged and the slide 11 thrown forward to earlier arrest the movement of the segment the increased movement will be imparted to the ejector-cam and the ejective or accelerated action which I have described will be the result. It will be understood that a like slide 11, with its flange 12, is employed for each of the segments, and so that upon the discharge of either hammer its particular slide 11 will be thrown forward to bring the flange or auxiliary stop 12 into position to arrest the rotative movement of that hammer's segment. So long, therefore, as both hammers are in the cocked position there will be no ejective force applied to the ejector-slide; but after the discharge of one hammer the opening movement of the barrels applies the ejective

force to the barrel with which that discharged hammer operated, and so as to eject the shell exploded by such discharge of the hammer, (or cartridge, if it be not exploded,) while the other hammer not having been discharged its cartridge will remain in its place. If, however, both hammers be discharged, then upon the next opening of the barrels the shells from both barrels will be simultaneously ejected. Thus either barrel may be fired, according to the desire of the operator, the shell from the barrel fired being ejected, while the cartridge of the other barrel will remain in place, the ejection from each barrel being independent of the other, and the ejection can only occur after the hammer has been discharged.

The intermediate cam *a* may be omitted and the two outside or independent cams employed. An illustration of this modification is represented in Figs. 13 and 14, the representation of one cam being sufficient for illustration. In this case the tail of the cam, instead of standing normally out of reach of the follower *e*, rests against the follower, as seen in Fig. 13, and the strut bears upon the cam, as before described; but in this arrangement recesses 6 are made in the cams above the seat 5, in which the struts normally rest, and so as to form a seat 7 at a distance above the seat 5. In the opening movement of the barrels, as in cocking the hammer, both cams in this case will start with the followers and move to a distance corresponding to the distance heretofore described for the cam *a*, as seen in broken lines, Fig. 14, and will give to the ejector-slides the corresponding initial movement, and this will occur before the seats 5 of the struts have reached a point above the line through the axis on which the cams turn, so that such initial movement of the cams will not turn them so far as to bring the struts into action, it being understood in this case that the struts are inclined downward to a greater extent than in the first description, and as seen in Fig. 13; but on the increased movement of a follower, as by the earlier stopping of the segment, a correspondingly-increased turning movement will be imparted to the cam, and so as to bring the seat 5 of the strut above the line through the axis of the cam, as seen in broken lines, Fig. 14, and when this point is reached the strut will fly to its up position, as indicated in broken lines, Fig. 13, and in so doing will give to the cam and to the ejector-slide an accelerated movement corresponding to the blow of the cams heretofore described. Under the modification which I have thus described the segments operate the same as before until they stop against the shoulder *o*, as seen in Fig. 14. The continued opening movement of the barrels forces the follower outward, and so as to turn the cam to give the preliminary movement to the ejector-slide, but not to an extent sufficient to bring the strut above the line between the axis of the cam and the seat of the strut on its piston, and as represented in Fig. 14; but if the auxiliary stop 12 be brought into action, as before described, to earlier arrest the rotative movement of the segment *m*, then the follower will be forced farther forward, and so as to turn the cam with the strut into the position seen in broken lines, Fig. 14, when the strut will be forced upward in the seat of the cam, and so as to impart the blow, as before described. I, however, prefer the employment of the three cams.

While I prefer to employ the followers *e f* as a means of operating the cams from the segments, the tail of the cams may extend into the seat in the segments, as seen in Fig. 15, so that the segments will act directly upon the cams, with substantially the same result.

The modifications which I have thus illustrated will be sufficient to enable others skilled in this art to introduce other mechanism between the hammers and the cams to impart the required movement to the cams, it only being essential to the invention that that movement shall be imparted in the opening movement of the barrel through an operator in rear of the cams, and between the cams and the hammer, the said operator having a movement imparted to it in the opening movement of the barrels, with mechanism between said operator and the hammer, whereby the said operator imparts a greater movement to the cams when the hammers are in the discharged position than when in the cocked position. I therefore do not wish to be understood as limiting the invention to the precise construction first described whereby the objects of the invention are attained.

I have described the invention as applied to double-barrel guns; but it will be understood the invention may be advantageously employed in single-barrel breakdown arms.

I claim—

1. In a breech-loading fire-arm in which the fore-end, carrying the barrel, is hinged to the frame, and so that the breech end of the barrel turns upward and forward in opening, the combination therewith of an ejector-slide longitudinally movable in the barrel, a cam hung upon an axis in the fore-end below the barrel and near the joint, so as to swing in a vertical plane, the nose of the cam adapted to impinge upon the forward end of the ejector-slide, an operator in rear of the cam, arranged to partake of the swinging movement of the fore-end and adapted to bear upon the cam below its axis, mechanism, substantially such as described, between said cam-operator and the hammer, whereby the extent of movement of said operator is varied accordingly as the hammer is in the cocked or discharged position, with a spring-strut arranged to bear upon the cam, and so that its bearing-point upon the cam under the swinging movement of the cam may pass above and below a central line through said strut and the axis upon which the cam rotates, substantially as and for the purpose described.

2. In a breech-loading fire-arm in which the fore-end, carrying the barrel, is hinged to the frame, and so that the breech end of the barrel turns upward and forward in opening, the combination therewith of an ejector-slide arranged to move longitudinally in the barrel, a cam hung upon an axis in the fore-end below the barrel and near the joint, the nose of the cam adapted to impinge against the forward end of the ejector-slide, a segment arranged in a recess around the joint between the fore-end and the frame, the length of said recess being greater than the length of said segment, the rear end of said recess forming a stop to limit the movement of said segment, the said segment adapted to engage the said cam below the axis upon which the cam swings, a longitudinal slide between the hammer and said segment, said slide constructed with a projection adapted to move into or out of the segment-recess between the rear end of said segment and the rear end of said recess, whereby the extent of movement of said segment may be varied, the said slide adapted to receive its longitudinal movement from the hammer, with a spring-strut forward of the cam and adapted to bear thereon, and so that its bearing-point on the cam may pass above and below a central line through the axis on which the cam turns, substantially as and for the purpose described.

3. In a breech-loading fire-arm in which the fore-end, carrying the barrel, is hinged to the frame, and so that the breech end of the barrel turns upward and forward in opening, the combination therewith of an ejector-slide arranged to move longitudinally in the barrel, a cam hung upon an axis in the fore-end below the barrel and near the joint, and so as to swing in a vertical plane, the nose of the cam adapted to impinge against the forward end of said ejector-slide, a spring-strut arranged in the fore-end forward of the cam, the cam constructed with a recess in which the rear end of said strut may work, the arrangement of the said strut and recess being such that the bearing-point of the said strut on the cam passes both above and below a central line through the axis on which the cam swings, with an operator movable with the fore-end in the opening movement and adapted to bear upon the cam below its axis, and whereby in the opening movement of the barrels a rearward-swinging movement is imparted to said cams, with mechanism, substantially such as described, between said operator and the hammer, substantially as specified, and whereby the extent of movement of the operator to impart such swinging movement to the cam is varied accordingly as the hammer is in the cocked or discharged position, and so as to give to the cam a greater extent of action when the hammer is in the discharged than when in the cocked position.

4. In a breech-loading fire-arm in which the fore-end, carrying the barrel, is hinged to the frame, and so that the breech end of the barrel turns upward and forward in opening, the combination therewith of an ejector-slide movable in the barrel, a cam hung upon an axis in the fore-end below the barrel near the joint, the nose of the cam adapted to impinge upon the forward end of the ejector-slide, a segment *m*, arranged in a recess in the frame concentrically around the axis on which the fore-end turns, the said recess being of greater length than the length of said segment, its rear end forming a stop *o* to limit the turning movement of the said segment, a longitudinally-movable follower arranged in the fore-end between the cam and said segment, the said segment constructed with a cam-shaped seat *s*, in which the rear end of said follower may rest, the said cam below its axis adapted to bear upon the forward end of said follower, a spring-strut 4, arranged in the fore-end forward of said cam, the cam constructed with a recess on its forward surface, said recess forming a seat 5, the said bearing end of the strut arranged to pass above and below a line through the center of the axis upon which the cam turns, a longitudinal slide 11, arranged in the frame in rear of said segment and constructed with a projection 12, the said projection adapted to enter or recede from the space between the end of the segment and the said bearing *o*, with mechanism, substantially such as described, between the hammer and said slide to impart longitudinal movement to said slide, substantially as described.

5. In a breech-loading fire-arm in which the fore-end, carrying the barrel, is hinged to the frame, and so that the breech end of the barrel turns upward and forward in opening, the combination therewith of an ejector-slide longitudinally movable in the barrel, a cam hung upon an axis in the fore-end below the barrel and near the joint, the nose of the cam adapted to impinge upon the forward end of the ejector-slide, a spring-strut in the fore-end forward of said cam, the cam constructed with a seat in which the rear end of said strut rests, and so that in the swinging movement of the cam the said bearing of the strut is carried both above and below a line through the axis on which the cam swings, a segment *m*, arranged in a recess concentrically around the axis on which the fore-end swings, the recess for the segment being of greater length than the length of the segment, and so as to form a stop *o* to limit the extent of movement of said segment, the segment constructed with a cam-shaped seat *s*, a connection between said cam and said seat, and in which seat said connection works in the opening and closing movements of the barrels, a longitudinal slide 11, arranged between said segment and the hammer, the said slide 11 constructed with a projection 12, arranged to enter and recede from the space between the rear end of the said segment and the said stop *o*, with mechanism between the said slide and said

hammer to impart the required longitudinal movement to said slide as the hammer is thrown to its cocked position or discharged, substantially as and for the purpose described.

6. In a breech-loading fire-arm in which the fore-end, carrying the barrel, is hinged to the frame, and so that the breech end of the barrel turns upward and forward in opening, the combination therewith of an ejector-slide longitudinally movable in the barrel, a cam hung upon an axis in the fore-end below the barrel and near the joint, the nose of the cam adapted to impinge upon the forward end of the ejector-slide, an operator between said cam and the hammer movable in the opening and closing movements of the barrels, and so as to impart swinging movement to said cam, a spring-strut on the fore-end arranged to operate upon the cam, and so as to pass a central line through the axis on which the cam turns, a longitudinal slide 11, arranged in the frame, constructed with a projection 12 to move into or out of the path of and so as to vary the extent of movement of the said operator, the rock-shaft D, arranged in the frame, but so as to turn with the fore-end, cocking-bar N between said cam and hammer, the said rock-shaft constructed with a cam 15 to operate upon the forward end of the slide 11, the vertically-movable pin 9, arranged in said cocking-bar and in rear of the said slide 11, the mainspring adapted to bear upon the head of the said pin, and a spring *n* in connection with said pin in opposition to the action of the mainspring on said pin, substantially as and for the purpose described.

7. In a double-barrel fire-arm in which the fore-end, carrying the barrels, is hinged to the frame, and so that the rear ends of the barrels swing upward and forward in opening, the combination therewith of independent longitudinally-movable ejector-slides for the respective barrels, cams *a b c*, hung upon an axis in the fore-end below the barrels and near the joint, and so as to swing in a vertical plane, the noses of the cams *b c* adapted to bear against the respective ejector-slides, while the cam *a* is adapted to bear against both of the said ejector-slides, the fore-end constructed with stops 1 and 8 to limit the extent of movement of the said cams *b c*, two segments *m*, arranged in recesses concentrically around the axis upon which the fore-end swings, said segments each constructed with a cam-shaped recess *s*, two followers *e f*, arranged to slide longitudinally in said fore-end and movable therewith, the rear end of said followers working in the said recesses *s* of the respective segments, the forward end of said followers normally standing distant from the rear end of the respective cams *b c*, the rear end of the cam *a* extending toward both of said followers and adapted to bear upon both and to come into engagement therewith before the said followers reach the rear end of the said cams *b c*, spring-struts in the fore-end forward of said cams and adapted to independently bear upon the said cams *b c* and pass both above and below a central line through the axis upon which the cams swing, and mechanism, substantially such as described, between the said segments and the hammer to vary the extent of movement of said segments, substantially as and for the purpose described.

8. In a double-barrel fire-arm in which the fore-end, carrying the barrels, is hinged to the frame, and so that the rear ends of the barrels swing upward and forward in opening, the combination therewith of independent longitudinally-movable ejector-slides for the respective barrels, cams *a b c*, hung upon an axis in the fore-end below the barrel, and so as to swing in vertical planes, the noses of said cams *b c* adapted to bear against the respective ejector-slides, while the nose of the cam *a* is adapted to bear against both of said slides, the said cams *b c* constructed with a recess in their forward faces, each recess forming a seat 5, spring-struts 4 in the fore-end forward of the said cams, the rear ends of said struts entering the recesses of the respective cams and adapted to bear upon the said seats 5, the bearing ends of the said struts arranged to pass both above and below a central line through the axis on which the cams swing, stops 1 and 8, to limit the extent of movement of the said cams *b c*, the central cam extending rearward beyond said stops 1, with two independent operators movable with the fore-end, the said operators both adapted to engage the said cam *a* and to independently engage the said cams *b c*, with mechanism between said operators and the respective hammers, substantially as described, and whereby the extent of movement imparted by said operators is greater when the hammers are in the discharged than when in the cocked position.

9. In a double-barrel fire-arm in which the fore-end, carrying the barrels, is hinged to the frame, and so that the rear ends of the barrels swing upward and forward in opening, the combination therewith of independent longitudinally-movable ejector-slides for the respective barrels, cams *a b c*, hung upon an axis in the fore-end below the barrels, and so as to swing in vertical planes, the noses of said cams *b c* adapted to bear against the respective ejector-slides, while the nose of the cam *a* is adapted to bear against both of said slides, the said cams *b c* each constructed with a recess forming a seat 5, spring-struts 4 in the fore-end forward of the said cams, the rear ends of said struts entering the recesses of the respective cams and adapted to bear upon the said seats 5, the bearing ends of the said struts arranged to pass both above and below a central line through the axis on which the cams swing, stops 1 and 8, to limit the extent of movement of the said cams *b c*, the central cam extending rearward beyond said stops 1, two segments *m*, concentrically arranged in the recesses around the axis upon

which the fore-end turns, each of said segments constructed with a cam-shaped recess *s*, followers *e f*, arranged in the fore-end, and so as to slide longitudinally, the rear end of said followers working in the said recesses *s* of the respective segments, the forward end of said followers adapted each to bear upon its respective cam *b c* and both to bear upon the cam *a*, the recesses in which the segments are arranged being of greater length than the length of the segments, and so as to form a stop *o* for the rear end of said segments, longitudinal slides 11, arranged in the frame, corresponding to the respective segments, and each constructed with a projection 12, adapted to enter or recede from the space between the rear ends of the segments and the said stops *o*, the transverse rock-shaft D in the frame, but connected with the fore-end, so as to rotate therewith, the cocking-bars N, in connection with said rock-shaft and adapted to engage the respective hammers, the said rock-shaft constructed with cams 15, adapted to work against the forward end of the said slides 11 to impart rear movement thereto, a vertically-sliding pin 9, arranged in each of the cocking-bars N, the mainspring J, arranged to bear upon the upper end of said pins, each of said pins provided with a spring *n* in opposition to the mainspring, but of less power, the lower ends of the said pins standing in rear of said slide 11 when the parts are in the normal position, but adapted to pass over said slide when the hammers are in the cocked position, substantially as described.

CARL J. EHBETS.

Witnesses:
FRED C. EARLE,
J. H. SHUMWAY.