

(No Model.)

5 Sheets—Sheet 1.

L. L. DRIGGS.  
BREECH MECHANISM FOR ORDNANCE.

No. 550,602.

Patented Dec. 3, 1895.

FIG. 1.

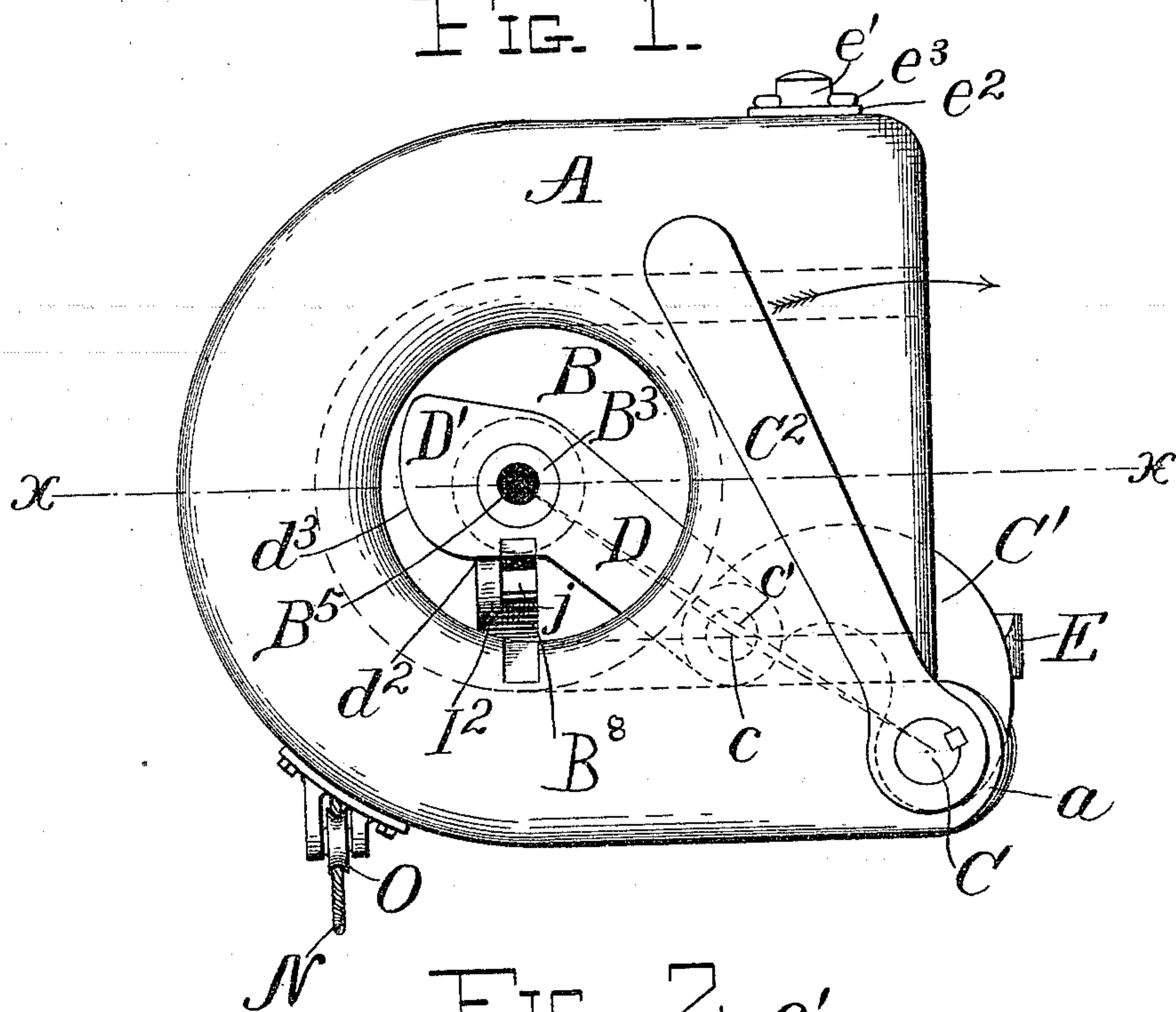
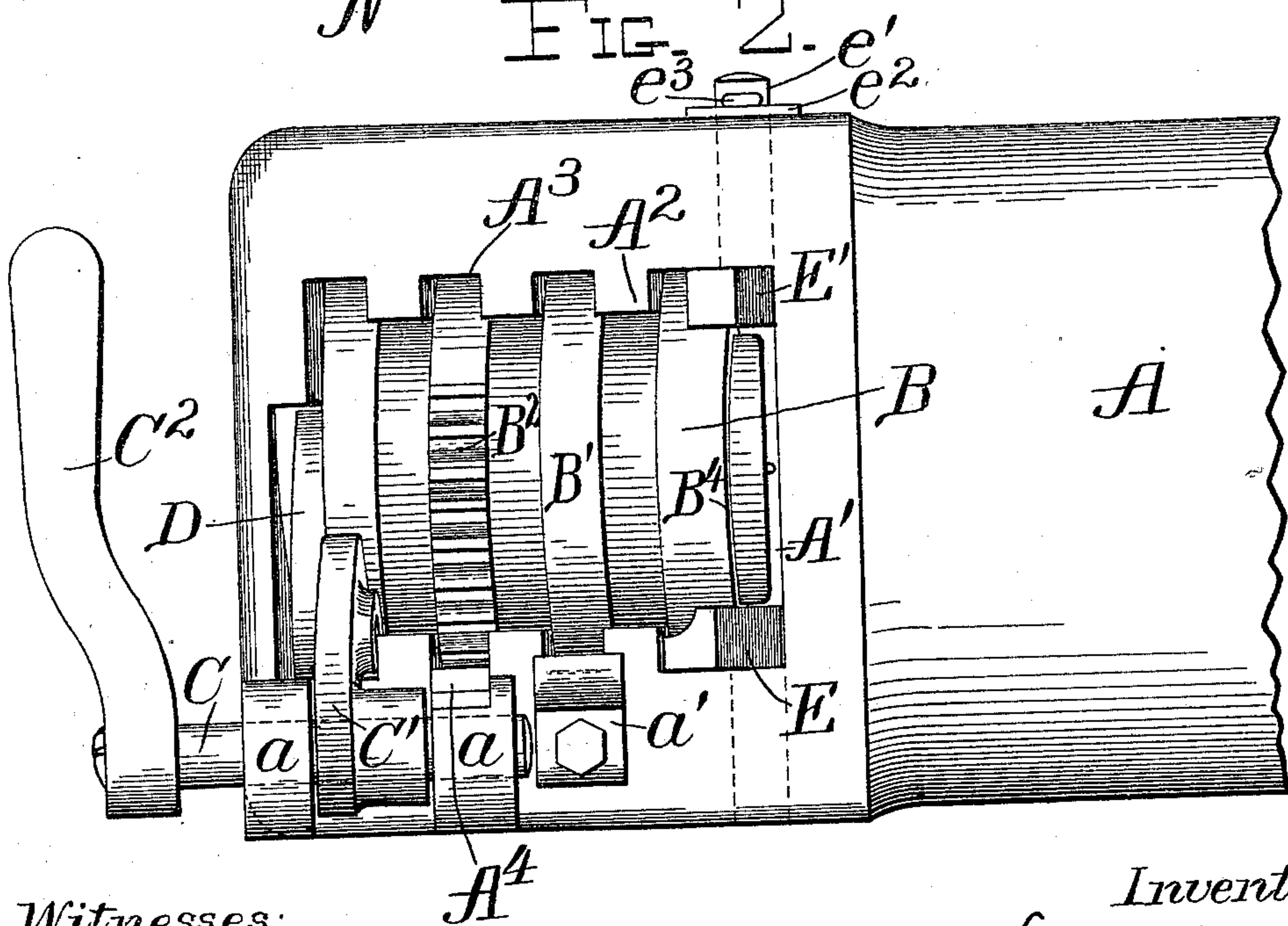


Fig. 2.  $e^3$ ,  $e^2$ ,  $e^1$



*Witnesses:*

Percy C. Bowen.  
John Q. Wilson

*Inventor:*

L. L. Driggs,  
By Whitman & Wilkinson,  
Attorneys.

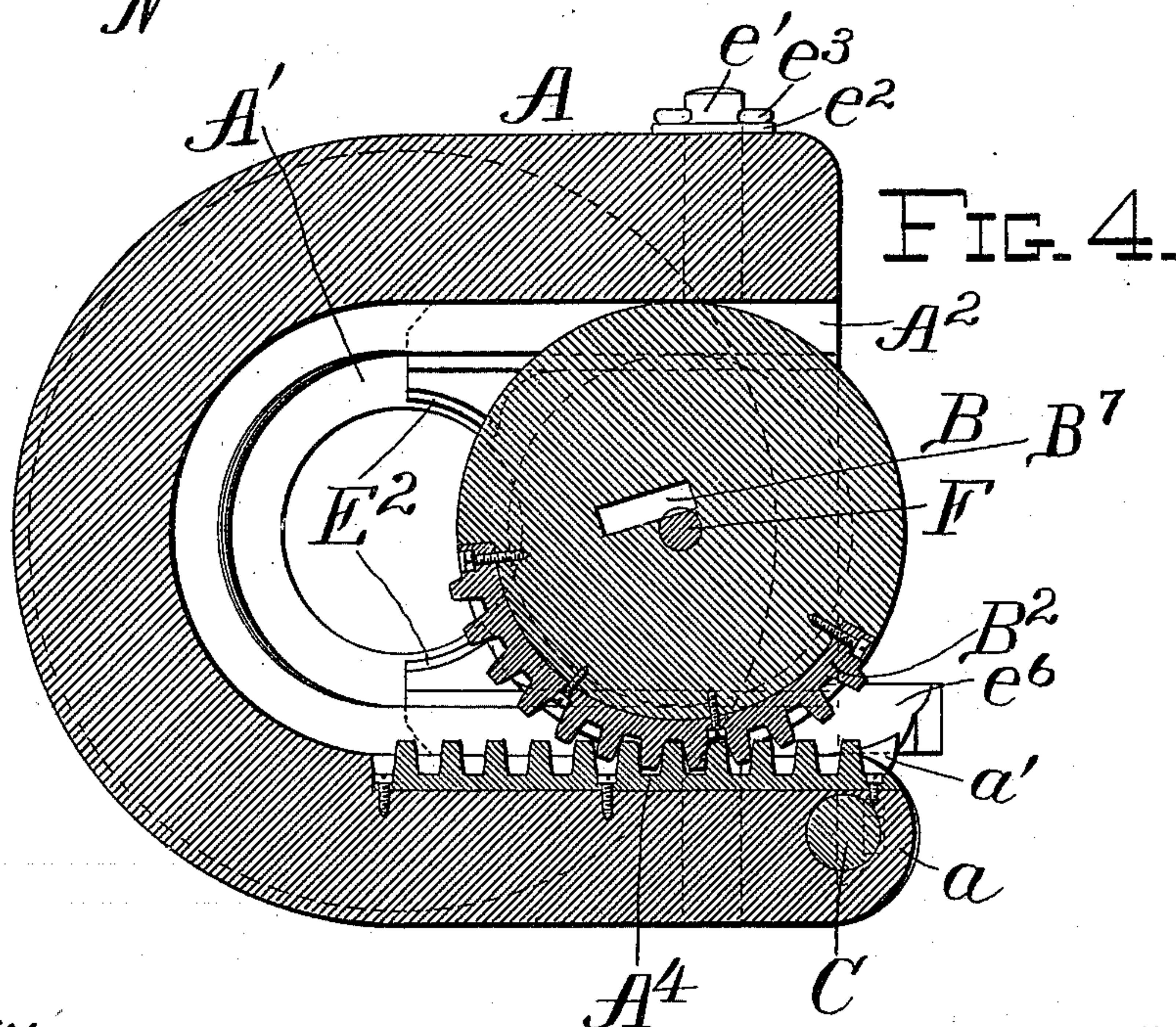
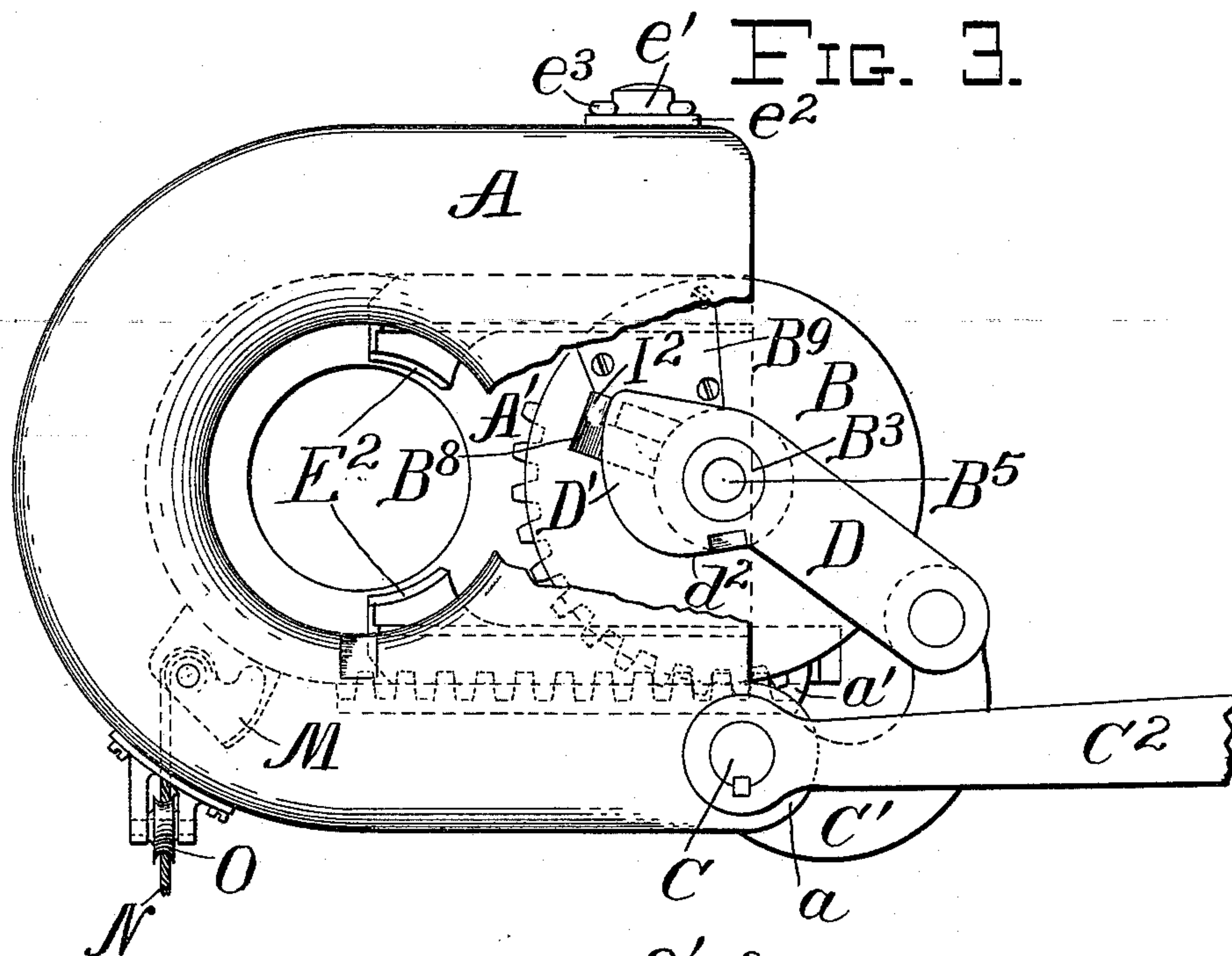
(No Model.)

5 Sheets—Sheet 2.

L. L. DRIGGS.  
BREECH MECHANISM FOR ORDNANCE.

No. 550,602.

Patented Dec. 3, 1895.



Witnesses:

Percy C. Bowen.  
John Q. Wilson.

Inventor:

L. L. Driggs,  
By Whitman & Wilkinson,  
Attorneys.



(No Model.)

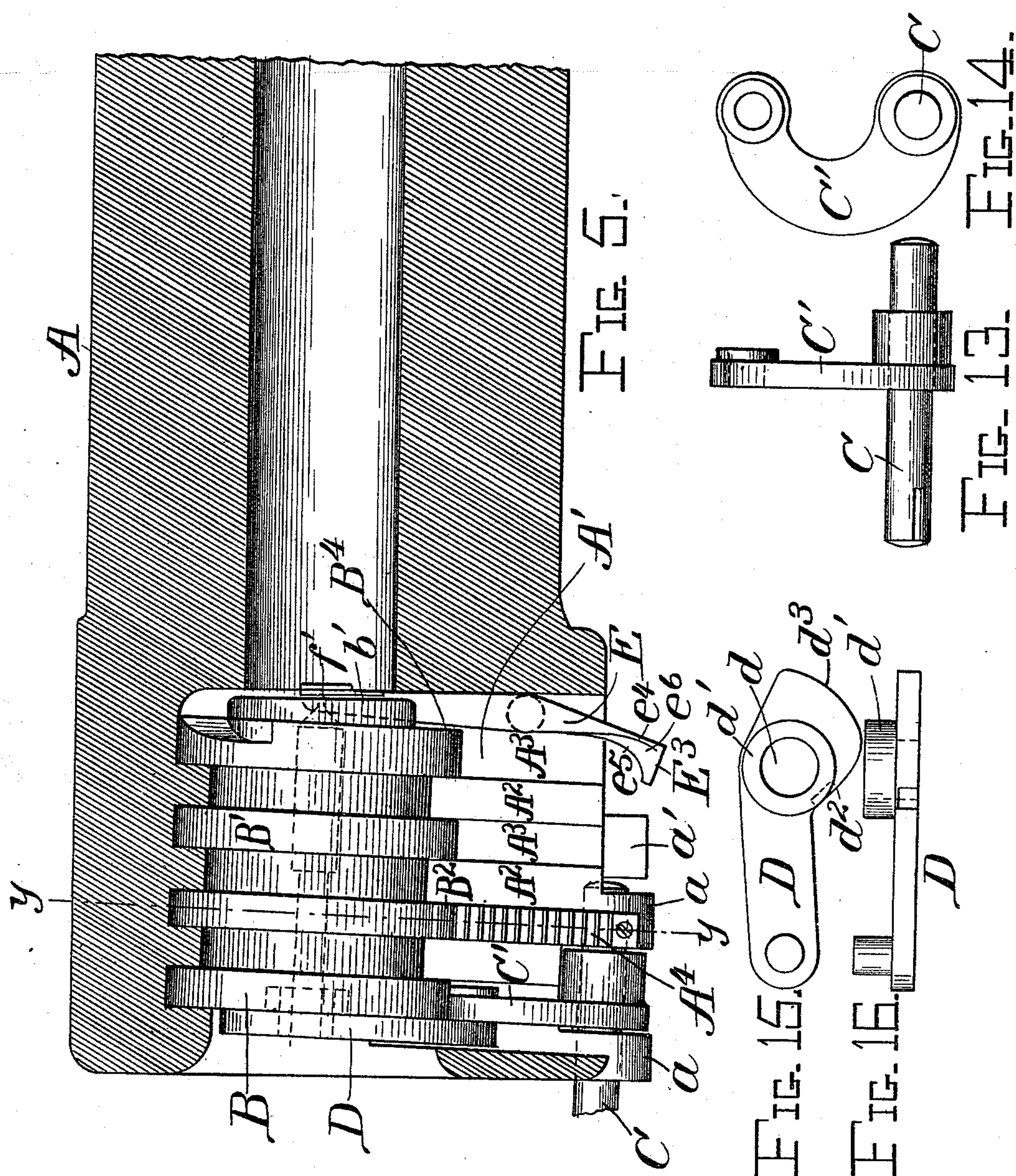
5 Sheets—Sheet 3.

5

L. L. DRIGGS.  
BREECH MECHANISM FOR ORDNANCE.

No. 550,602.

Patented Dec. 3, 1895.



*Witnesses:-*

Percy C. Bowen.  
John Q. Wilson.

*Inventor:*

L.L. Driggs  
By Whitman & Wilkinson  
Attorneys.



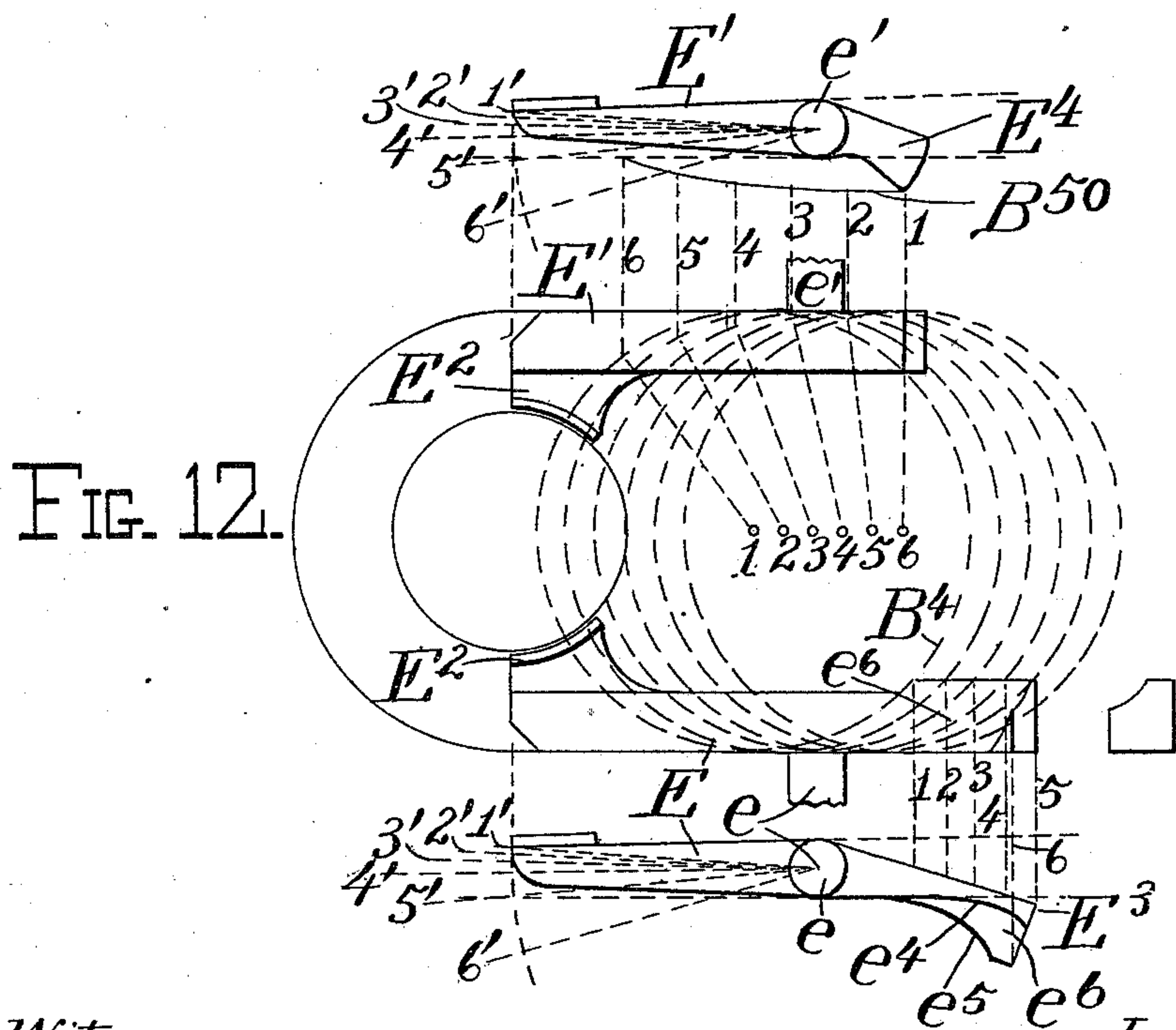
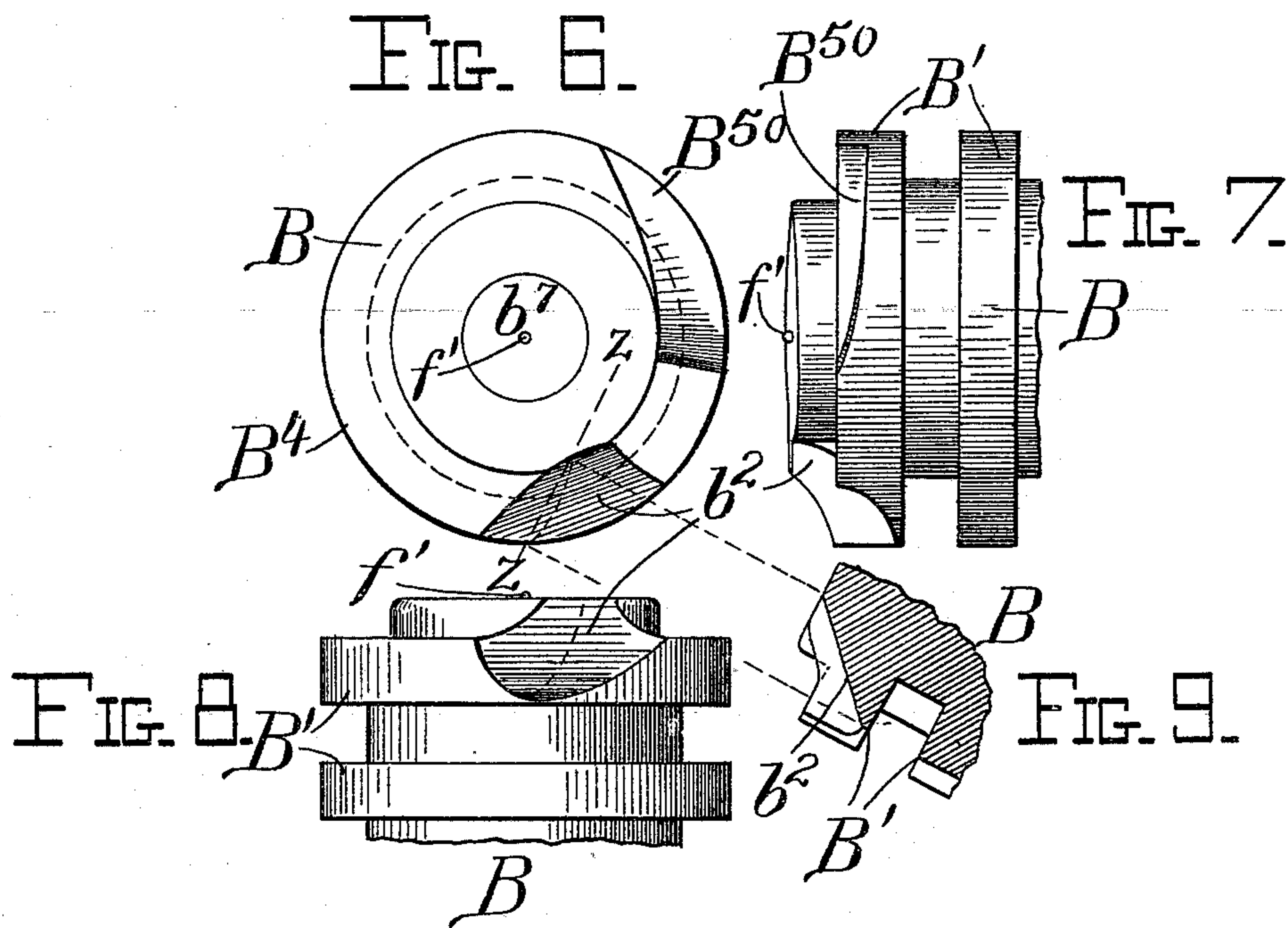
(No Model.)

5 Sheets—Sheet 4.

L. L. DRIGGS.  
BREECH MECHANISM FOR ORDNANCE.

No. 550,602.

Patented Dec. 3, 1895.



*Witnesses:*

Percy C. Bowen.  
John Q. Wilson.

*Inventor:*

L. L. Driggs,  
By Whitman & Wilkinson  
Attorneys.

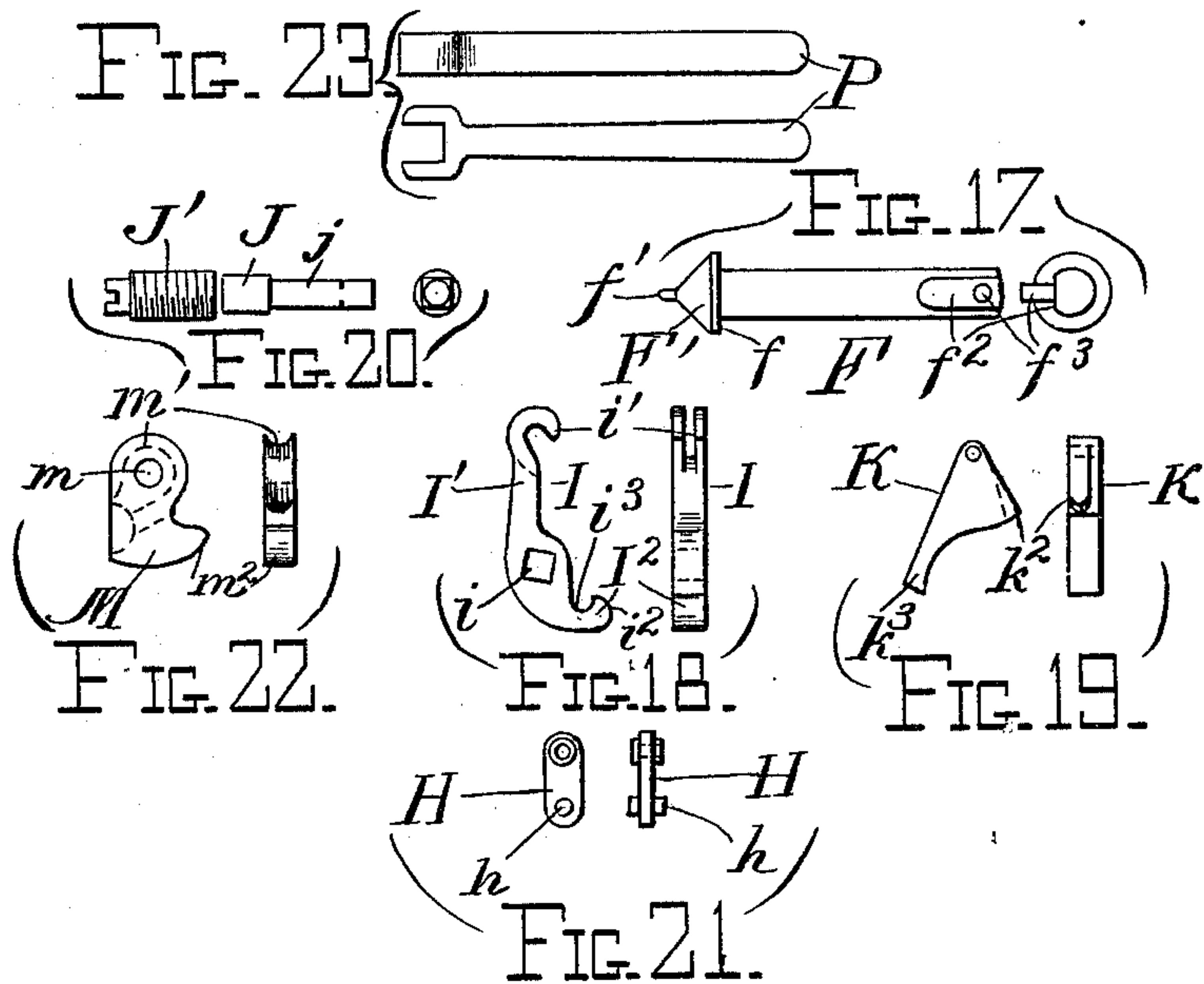
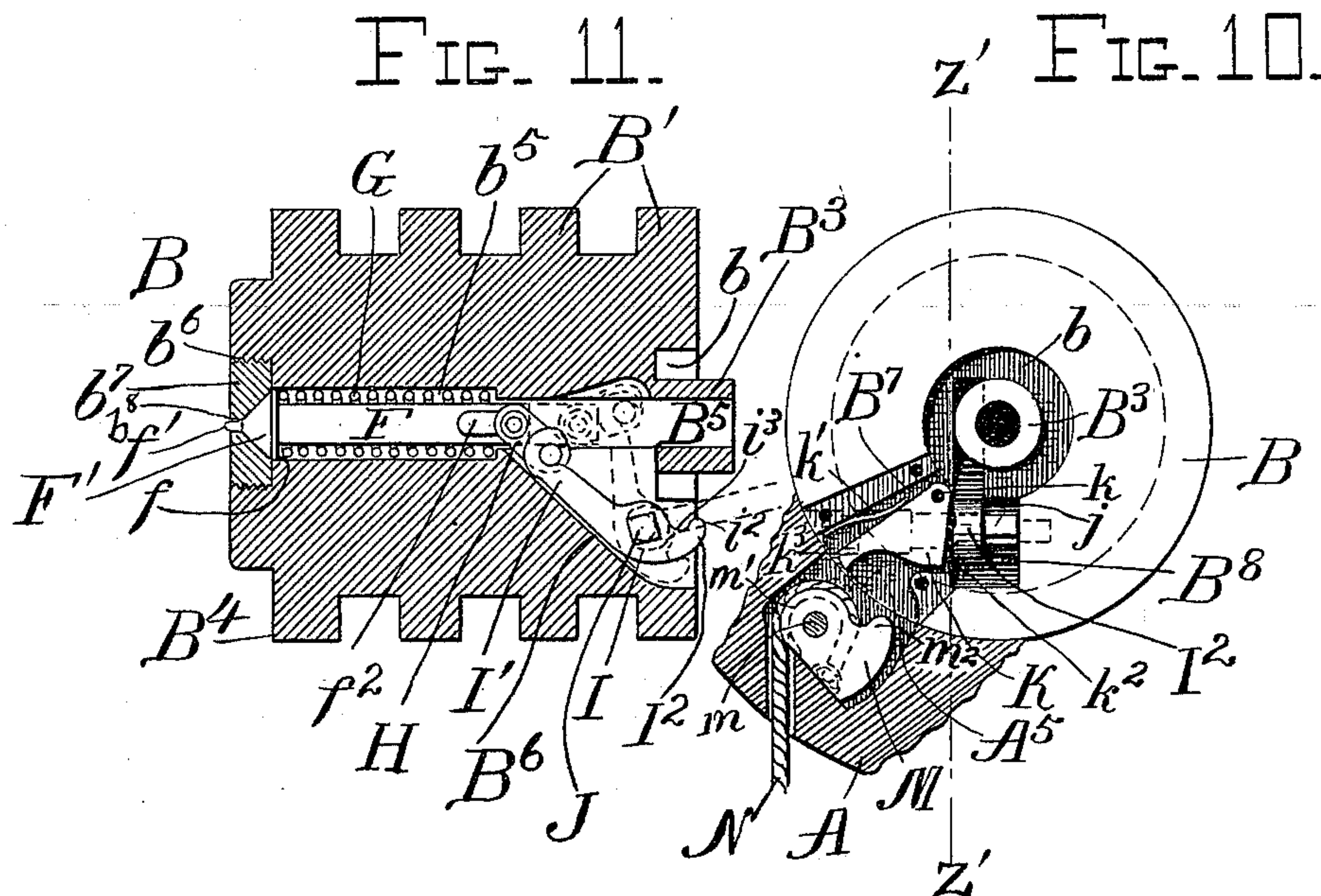
(No Model.)

5 Sheets—Sheet 5.

L. L. DRIGGS.  
BREECH MECHANISM FOR ORDNANCE.

No. 550,602.

Patented Dec. 3, 1895.



Witnesses:

*Percey C. Bowen.*  
*John Q. Wilson.*

Inventor:

*L. L. Driggs.*  
By *Whitman & Wilkinson,*  
Attorneys:



# UNITED STATES PATENT OFFICE.

LOUIS LABADIE DRIGGS, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO THE DRIGGS ORDNANCE COMPANY, OF SAME PLACE.

## BREECH MECHANISM FOR ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 550,602, dated December 3, 1895.

Application filed October 16, 1893. Serial No. 488,340. (No model.)

*To all whom it may concern:*

Be it known that I, LOUIS LABADIE DRIGGS, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Breech-Loading Ordnance; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to breech-loading ordnance; and it consists in supplying a rolling breech-block and mechanism whereby the same may be rolled into and out of position in rear of the breech, and also caused to assume the same relative positions during each part of successive revolutions, whereby it is possible to operate by contact with the said breech-block extractors or firing mechanism, and it consists, also, in certain novel features hereinafter described and claimed.

Reference is had to the accompanying drawings, wherein the same letters and numerals of reference indicate corresponding parts in the several views.

Figure 1 represents a rear elevation of the gun with the breech closed. Fig. 2 represents a side elevation of the same. Fig. 3 represents a rear elevation of the gun with the breech open, a part of the gun being broken away to better illustrate the device. Fig. 4 represents a transverse sectional view on the line  $y y$  of Fig. 5. Fig. 5 represents a horizontal sectional view on the line  $x x$  of Fig. 1, the breech-block being shown in plan. Fig. 6 represents a front elevation of the breech-block. Fig. 7 represents a side elevation of the front end of the breech-block. Fig. 8 represents an elevation of the lower side of the front end of the breech-block. Fig. 9 represents a detail sectional view of a part of the breech-block on the line  $z z$  of Fig. 6. Fig. 10 represents a rear elevation of the breech-block with the plate removed to show the cocking mechanism, also a section of the adjacent part of the gun, showing the firing-hammer. Fig. 11 represents a sectional view of the breech-block on the line  $z' z'$  of Fig. 10. Fig. 12 is a diagram representing the different relative positions of the breech-block and

shell-extractors as the former moves outward. Figs. 13 and 14 represent a side and end view, respectively, of the operating-shaft and the arm carried thereby. Figs. 15 and 16 represent a side and edge view of the link connecting the operating-arm with the breech-block. Fig. 17 represents a side and end view of the firing-pin. Figs. 18, 19, 20, 21, and 22 represent in detail the several parts of the cocking and firing mechanism. Fig. 23 represents a side and end view of the key for cocking the gun by hand.

A represents the gun, which is enlarged, as usual, at its breech and formed with a chamber  $A'$  to receive the breech-block B.

The chamber  $A'$ , as shown in Figs. 2, 4, and 5, is open through one side of the gun and round at its opposite side and communicates with the bore at its front and opens through the breech at the rear.

On the inside of the chamber  $A'$  are formed ribs  $A^2$ , which extend at an angle of about two degrees with a plane at right angles to the axis of the gun, the said ribs extending from the open side of the chamber around the round side thereof.

The breech-block B is cylindrical in form and provided with annular ribs  $B'$ , which when the block is in the gun fit in the spaces  $A^3$  between the ribs  $A^2$ . Thus the block is free to roll in and out of the chamber in the gun; but the ribs and spaces on the block and in the chamber prevent it from moving in any other way. A toothed segment  $B^2$  is set in one of the ribs of the block B, so that the pitch-circle of the teeth coincides with the circumference of the said rib. The teeth on the segment  $B^2$  mesh with a rack  $A^4$ , secured in one of the spaces  $A^3$ , so that the block is prevented from slipping as it rolls to the side. This rack and segment also cause the block to return to exactly the same position after each operation of loading has been performed.

A pair of lugs  $a$  are formed upon or secured to the side of the gun near its rear end and just below the chamber  $A'$ , and the said lugs are perforated to receive a shaft C, which is journaled therein. This shaft C has a curved arm  $C'$ , secured thereto, which latter extends into the rear end of the chamber  $A'$  in the side of the gun and is pivoted to one end of a link



D. The opposite end of the link D is perforated, as at  $d$ , to receive a boss  $B^3$  in the center of the rear end of the breech-block B. In order to give a longer bearing for the breech-block, a groove  $b$  is formed around the boss  $B^3$ , and a corresponding flange or boss  $d'$  is formed upon the link D around the opening  $d$  to enter the groove  $b$ , the boss  $B^3$  of the breech-block thus being free to revolve in the link D.

A handle  $C^2$  is keyed upon the rear end of the shaft C, and by turning the said handle in the direction of the arrow in Fig. 1 the arm  $C'$  will, through the medium of the link D, draw the breech-block to the side, as shown in Figs. 3 and 4, causing it to roll out, leaving the breech open, the block making a little more than a quarter of a revolution. By returning the handle to its original position the breech-block will be returned to its closed position, and when forced home the pivoted point  $c$  of the arm  $C'$  and the link D will pass below the line  $c'$  between the center of the shaft C and the breech-block B, and the adjacent pivoted ends of the arm  $C'$  and link D, resting upon the bottom of the chamber in the gun, as shown by dotted lines in Fig. 1, will lock the breech-block securely in its closed position.

To prevent the breech-block from rolling entirely out of the gun, a stop  $a'$ , extending slightly over the chamber  $A'$ , is bolted on the side just below the opening, as shown in Fig. 2.

Referring now to Fig. 5, it will be seen that the ribs  $A^2$  in the gun are formed at a slight angle (about two degrees) and that the breech-block in rolling out also moves back a little away from the cartridge. The front end  $b'$  of the block is cut off at an angle with the rest of the block, so that when in its closed position, as in Fig. 5, it will be at right angles with the bore of the gun and will form a firm back for the head of the cartridge. On one side of the front end of the block is formed an inclined plane  $b^2$ , set in such position that as the block rolls in should the cartridge not be entirely in the said incline will be the first part of the block to come in contact with the head of the cartridge and will force it home as the block moves in.

The extractors (shown more clearly in Fig. 12) are two in number, the lower one E being pivoted in the lower part of the chamber  $A'$  by means of a spindle  $e$ , secured to the said extractor and extending into a corresponding opening in the lower part of the gun, and the upper extractor  $E'$  is pivoted in the upper side of the chamber  $A'$  by a similar spindle  $e'$ , extending through a corresponding opening in the upper side of the gun, and is held in position by a washer  $e^2$ , placed on the upper end of the spindle, and a dowel-pin  $e^3$ , which passes through the spindle above the said washer.

The inner ends  $E^2$  of the extractors are formed to take under the flange of the cartridge in the usual manner and their outer

ends are curved to lie in the path of the end of the block as it rolls out.

The outer end of the lower extractor is curved rearwardly, as at  $E^3$ , viz:  $e^4$  represents a parabolic curve at the upper edge of the extractor, and  $e^5$  a similar curve with shorter radii at its lower edge, and  $e^6$  an inclined curved plane connecting the two curves. As the block rolls out, the periphery of the first rib  $B^4$  on the breech-block impinges against the slow part of the curve  $e^4$ , where the dotted line  $l$  intersects, and begins to move the extractor out very slowly, accelerating the speed as it nears the end of the movement. The movement of the upper side of the block being much faster than the lower side, the parabolic curve is formed in the periphery of the front rib  $B^4$ , as at  $B^5$ , the shape of this curve being shown in the diagram Fig. 12 at  $B^5$ . The upper extractor  $E'$  is curved out in the path of the curve  $B^5$ , as at  $E^4$ . By reference to the diagram Fig. 12 it will be seen that the block begins to act upon the extractors when its center has moved out to position No. 1. At this time the inclined surface  $b^2$  has just left the flange of the cartridge, and the movement of the block from position 1 to 2 moves the ends  $E^2$  of the extractors from their position 1' to 2' with a very slow but powerful movement, which starts the empty cartridge-case from its place in the gun. The next movement of equal distance—from 2 to 3—of the block moves the extractors through a greater distance, as from 2' to 3', at an increased speed, and as the block moves onward to 4, 5, and 6 the speed of the extractors increases until, with the movement, from 5 to 6 of the block, they are thrown from their position 5' to 6' with a quick movement which will throw the empty case clear of the gun. This leaves the breech open ready to receive another cartridge, which is pushed in until its flange comes against the extractors, when the breech-block is returned to its place, the inclined plane  $b^2$  thereof forcing the cartridge and extractors in to their proper position, when they are finally pushed home by the inclined end  $b'$  of the breech-block, which at that time comes in position to press squarely against the head of the cartridge.

The breech-block B is bored through centrally, as at  $B^5$ , to receive the firing-pin F, which latter as formed, as shown in Fig. 17, with an enlarged conical head  $F'$ , and the front part of the opening  $B^5$  through the breech-block is enlarged, as at  $b^5$ , to receive a spiral spring G and also to allow of the conical head  $F'$  of the firing-pin being drawn back into the said opening. The head  $F'$  of the firing-pin forms a shoulder  $f$  around the front end of the pin, against which the front end of the spring G is arranged to press, and at the apex of the cone which forms the front extremity of the pin is formed the point  $f'$ , which strikes the cap in the cartridge. The front of the breech-block is bored out and screw-threaded, as at  $b^6$ , to



receive a nut  $b^7$ , which is perforated at the center, as at  $b^8$ , to allow the firing-point  $f'$  to protrude, and this nut serves as a stop for the firing-pin in its forward movement.

5 The rear end of the firing-pin is flattened, as at  $f^2$ , and provided with a pin or stop  $f^3$ , upon which is pivoted a link H, which forms the connection between the said firing-pin and the cocking mechanism.

10 The rear end of the breech-block B is recessed, as at  $B^6$ , and within this recess is pivoted a bell-crank lever I, having a long arm  $I^1$  and a short arm  $I^2$ . The said bell-crank lever is perforated with a square opening  $i$ , through which passes the square portion  $j$  of a fulcrum-pin J, which has bearings at each end in the breech-block. A screw  $J'$  is screwed in the enlarged outer end of the hole for the fulcrum-pin to keep the latter in its place.

20 The longer arm  $I^1$  of the lever I is hooked and bifurcated, as at  $i'$ , and the link H is arranged to fit between the two arms  $i'$ , and is held therein by a pin or stud  $h$ , which passes through and is secured to the link H. Thus the lever I is flexibly connected to the firing-pin F.

The shorter arm  $I^2$  of the lever I is curved, as shown at  $i^2$ , and projects slightly out of the recess  $B^6$  at the rear end of the block.

30 From the foregoing it will be seen that should the bell-crank lever I be forced to the position shown in dotted lines in Fig. 11 it will draw the firing-pin back against the tension of the spring G. The inner end of the link D is enlarged to form a cam  $D'$ , against the lower side  $d^2$  of which rests the projecting end  $i^2$  of the bell-crank lever I. When the hand-lever  $C^2$  is moved to open the breech, the first movement of the link D as the center  $c$  of its outer end crosses the line  $c'$  causes the cam  $D'$  to press against the end  $i^2$  of the bell-crank lever I and start the firing-pin backward, withdrawing its point from the cap. As the block rolls out, the end of the lever I is caused to travel around the cam-face  $d^3$ , which forces it outward from the center of the block, thereby withdrawing the firing-pin, as will readily be understood by reference to Figs. 1, 3, and 11 of the drawings.

40 The rear end of the breech-block B is recessed, as at  $B^7$ , and a catch K is pivoted therein at the point  $k$ , (see Fig. 10,) so as to lie and move at right angles to the bell-crank lever I. A spring  $k'$  keeps the said catch normally against the side of the short arm  $I^2$  of the bell-crank lever, and when the said arm is forced back beyond the point  $k^2$  of the catch K the spring  $k'$  will force the said point  $k^2$  into the recess  $i^3$  of the said bell-crank lever, and thus hold the latter, together with the firing-pin, in the cocked position when the breech-block returns to close the breech. The catch K has an arm  $k^3$ , which extends out nearly to the periphery of the breech-block, at which point the recess  $B^7$  is open, the rear part of the said recess being closed by a plate  $B^9$ . A recess  $A^5$  is formed in the

gun adjacent to and opening into the edge of the recess  $B^7$ , (when the breech-block is in the closed position,) and within this recess is pivoted, as at  $m$ , a firing-hammer M, which lies normally within the recess  $A^5$ , as shown in Fig. 10. A cord N is secured to the hammer M in any suitable manner and passes round the pivoted end thereof, which is grooved, as at  $m'$ , to receive it. The said cord then passes downward through an opening in the gun, under a sheave O, and to the rear of the gun, from which point it may be operated.

By reference to Fig. 10 of the drawings it will be seen that a pull upon the cord N will throw the end  $m^2$  upward and into the recess  $B^7$  of the breech-block, causing it to strike against the arm  $k^3$  of the catch K. This will force the said catch backward against the tension of the spring  $k'$  and release the lever I, which holds the firing-pin, allowing the latter to be thrown against the cap by the spring G, as will be readily understood. When the cord N is released, the hammer M will fall back to its normal position by its own weight.

Should it be required to cock the gun without opening the breech, I provide another recess  $B^8$  in the breech-block on the opposite side of the lever I, through which the square portion  $j$  of the fulcrum-pin J passes and is exposed to view by inserting a wrench or key P, such as is shown in Fig. 23, made to fit the said square portion of the fulcrum-pin J. The latter may be turned and with it the lever I, thus cocking the gun by hand.

The operation of the device will be clearly understood without further explanation, and it will also be evident that many modifications in the details of construction may be made without departing from the spirit of the invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a breech-loading gun, the combination with the body of the gun having a chamber in the breech in rear of and communicating with the bore, and extending laterally to one side thereof, with ribs on the interior of said chamber, of a cylindrical breech block having ribs fitting between the ribs in the chamber of the gun, and means for rolling the said block to and from its seat in the chamber, substantially as described.

2. In a breech-loading gun, the combination with the body of the gun having a chamber in the breech in rear of and communicating with the bore, and extending laterally to one side thereof, ribs on the interior of said chamber, and a toothed rack in one of the spaces between the said ribs; of a cylindrical breech block having annular ribs fitting between the ribs in the chamber of the gun, a toothed segment in one of the ribs meshing with the rack in the said chamber, and means for rolling the said block to and from its seat in the chamber, substantially as described.

3. In a gun of the character described, the



combination with a gun having a chamber in the breech in rear of and communicating with the bore, and extending laterally to one side thereof, a shaft journaled in the rear of the gun, an arm secured to the shaft and extending into the chamber, and a handle upon the said shaft; of a cylindrical breech block, a link journaled on the breech block and pivoted to the said arm upon the shaft, by means of which the said breech block may be rolled to and from its seat in the chamber, substantially as and for the purposes described.

4. In a breech-loading gun, the combination with the body of the gun having a chamber in the breech in rear of and communicating with the bore, and extending laterally to one side thereof, with ribs on the interior of the said chamber, the faces of said ribs being in planes nearly but not quite perpendicular to the axis of the bore, of a cylindrical breech block having annular ribs fitting between the ribs in the chamber of the gun, and means for rolling the said block to and from its seat in the chamber, substantially as described.

5. In a breech-loading gun, the combination with the body of the gun having a chamber in the breech in rear of and communicating with the bore, and extending laterally to one side thereof, ribs on the interior of the said chamber, the faces of said ribs being in planes nearly but not quite perpendicular to the axis of the bore, and a toothed rack in one of the horizontal spaces between the said ribs; of a cylindrical breech block having annular ribs fitting between the ribs in the chamber of the gun, a toothed segment in one of the ribs meshing with the rack in the said chamber, and means for rolling the said block to and from its seat in the chamber, substantially as described.

6. In a gun of the character described, the combination with a gun having a chamber in the breech in rear of and communicating with the bore, and extending laterally to one side thereof, with ribs on the interior of the said chamber, a shaft journaled in the rear of the gun, a curved arm secured to the shaft and extending into the chamber, and a handle upon the said shaft; of a cylindrical breech block having annular ribs thereon adapted to engage the ribs in said chamber, a link journaled on the breech block and pivoted to the said arm upon the shaft by means of which the said breech block may be rolled to and from its seat in the chamber, substantially as and for the purposes described.

7. In a breech-loading gun, the combination with the body of the gun having a chamber in the breech in rear of and communicating with the bore, and extending laterally therefrom, ribs on the interior of said chamber, and extractors pivoted in the said chamber adapted to take under the flanges of the cartridge at their inner ends and having their outer ends curved to lie in the path of the rolling breech block; of a cylindrical breech block having annular ribs to fit between the ribs in the

chamber of the gun, and means for rolling the said breech block to and from its seat in the chamber and causing it to impinge against the ends of the said extractors, substantially as and for the purposes described.

8. In a breech-loading gun, the combination with the body of the gun having a transverse chamber in the breech communicating with the bore, ribs on the interior of said chamber in a plane nearly but not quite perpendicular to the axis of the bore extractors pivoted in the said chamber to take under the flanges of the cartridges at their outer ends curved to lie in the path of the rolling breech block; of a cylindrical breech block having annular ribs fitting between the ribs in the chamber of the gun, an inclined plane in the front end of the block adapted to press the cartridge home, and means for rolling the said breech block to and from its seat in the chamber, substantially as and for the purposes described.

9. In a breech-loading gun the combination with the body of the gun having a transverse chamber in the breech communicating with the bore, a cylindrical breech block rolling in the said chamber and having an axial opening therethrough; of a firing pin within the said opening projecting through the front end of the block, a spring adapted to throw the said firing pin forward, a bell crank lever pivoted in the said breech block and flexibly connected to the firing pin, a shaft journaled in the rear of the gun, an arm and a hand crank on said shaft, and a link connecting said arm and said breech block for rolling the said breech block to and from its seat in the chamber and for turning the said bell crank lever to draw the firing pin back, substantially as and for the purposes described.

10. In a breech loading gun, the combination with the body of the gun having a transverse chamber in the breech communicating with the bore, a cylindrical breech block rolling in the said chamber and having an axial opening therethrough; of a spring actuated firing pin within the said opening projecting through the front end of the block, a bell crank lever pivoted in the block and flexibly connected with the firing pin, a spring actuated catch also pivoted in the breech block to hold the said bell crank lever and firing pin in their cocked position, a link journaled upon the rear end of the breech block, a cam upon the said link to impinge against the end of the bell crank lever, means for pulling on the said link to roll the breech block out and cause the bell crank lever to travel around the said cam, and means for holding and releasing the said bell crank lever, substantially as and for the purposes described.

11. In a breech loading gun, the combination with the body of the gun having a transverse chamber in the breech communicating with the bore, a cylindrical breech block rolling in the said chamber and having an axial opening therethrough; of a spring actuated firing pin within the said opening projecting



through the front end of the breech block, a bell crank lever pivoted in the block and flexibly connected with the firing pin, a spring actuated catch also pivoted in the breech block to hold the said bell crank lever and firing pin in their cocked position, a firing hammer pivoted in the rear end of the gun to strike the said catch; means for striking the said firing hammer against the catch to release the said bell crank lever, a shaft journaled in the rear of the gun, an arm and a hand crank on said shaft, and a link connecting said arm and said breech block for rolling the breech block to and from its seat in the chamber, and for operating said bell crank lever and cocking the firing pin, substantially as and for the purposes described.

12. In a breech loading gun, the combination with the body of the gun having a transverse chamber in the breech in rear of the bore, and extractors mounted in said chamber in the path of the breech block, of a breech block adapted to roll in said chamber and having cam faces adapted to strike against and to operate said extractors, and means for rolling said block, substantially as described.

13. In a breech loading gun, the combination with the body of the gun having a transverse chamber in rear of said bore, and extractors pivoted in said chamber in the path of the breech block; of a breech block adapted to roll in said chamber and provided with cam faces on the front end thereof, adapted to wedge the cartridge home as said block is rolled into position in rear of the bore, and to operate said pivoted extractors as said block is withdrawn, substantially as described.

14. In a breech loading gun, the combination with the body of the gun having a transverse chamber in rear of the bore, and extractors pivoted in said chamber; of a breech block adapted to roll in said chamber and provided with cam faces on the front end thereof, adapted to wedge the cartridge home as said block is rolled into position in rear of the bore, and to operate said pivoted extractors as said block is withdrawn, a toothed segment on said block and a rack in said chamber engaging therewith for controlling the movement of said block so that it may return to the same relative positions each time the breech is opened or closed, substantially as described.

15. In a breech loading gun, the combination with the body of the gun having a transverse chamber in rear of said bore, and ex-

tractors pivoted in said chamber in the path of the breech block; of a breech block adapted to roll in said chamber and provided with cam faces on the front end thereof, adapted to wedge the cartridge home as said block is rolled into position in rear of the bore, and to operate said pivoted extractors as said block is withdrawn; a rack attached to said chamber; and a cogged segment attached to the breech block whereby the block is caused to return to the same relative positions each time the breech is opened or closed, substantially as described.

16. In a breech loading gun, the combination with the body of the gun having a chamber in the breech in rear of and communicating with the bore and extending laterally therefrom; of extractors pivoted in the said chamber and adapted to take at their inner ends under the heads of the cartridges; and having their outer ends curved to lie in the path of the breech block; a cylindrical breech block adapted to roll in said chamber, and means for rolling the said breech block to and from its seat in the chamber, thus causing it to impinge against the ends of said extractors, substantially as and for the purposes described.

17. In a breech loading gun, the combination with the body of the gun having a transverse chamber in the breech communicating with the bore; of extractors pivoted in said chamber and adapted to take at their inner ends under the flange of the cartridge, and at their outer ends curved to lie in the path of the breech block; a cylindrical breech block adapted to roll in said chamber, an inclined plane in the front end of the block to press the cartridge home, and means for rolling the said breech block to and from its seat in the said chamber, substantially as and for the purposes described.

18. In a breech loading gun, the combination with the body of the gun having a transverse chamber in the breech in rear of the bore, of an extractor mounted in said chamber and engaging the rim of the cartridge, and a breech block rolling in said breech and adapted to operate said extractor, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

LOUIS LABADIE DRIGGS.

Witnesses:

JOHN C. WILSON,  
GEO. L. CLARK.