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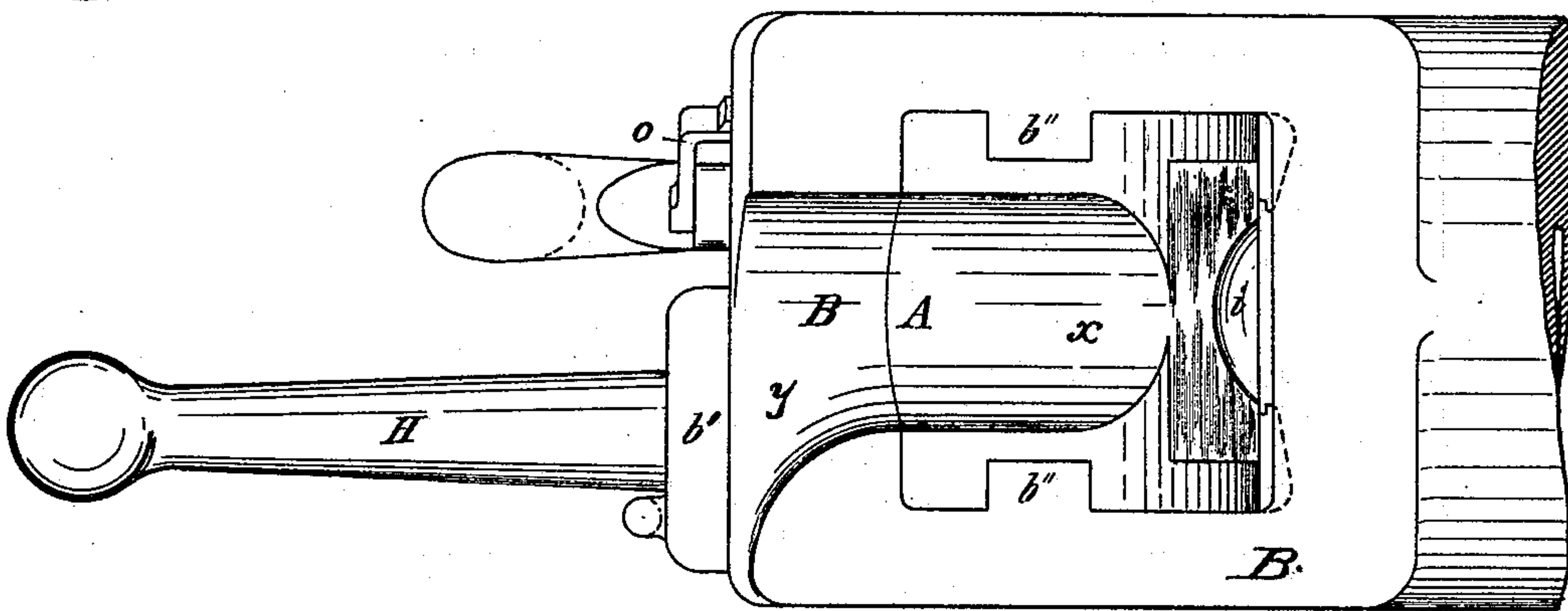
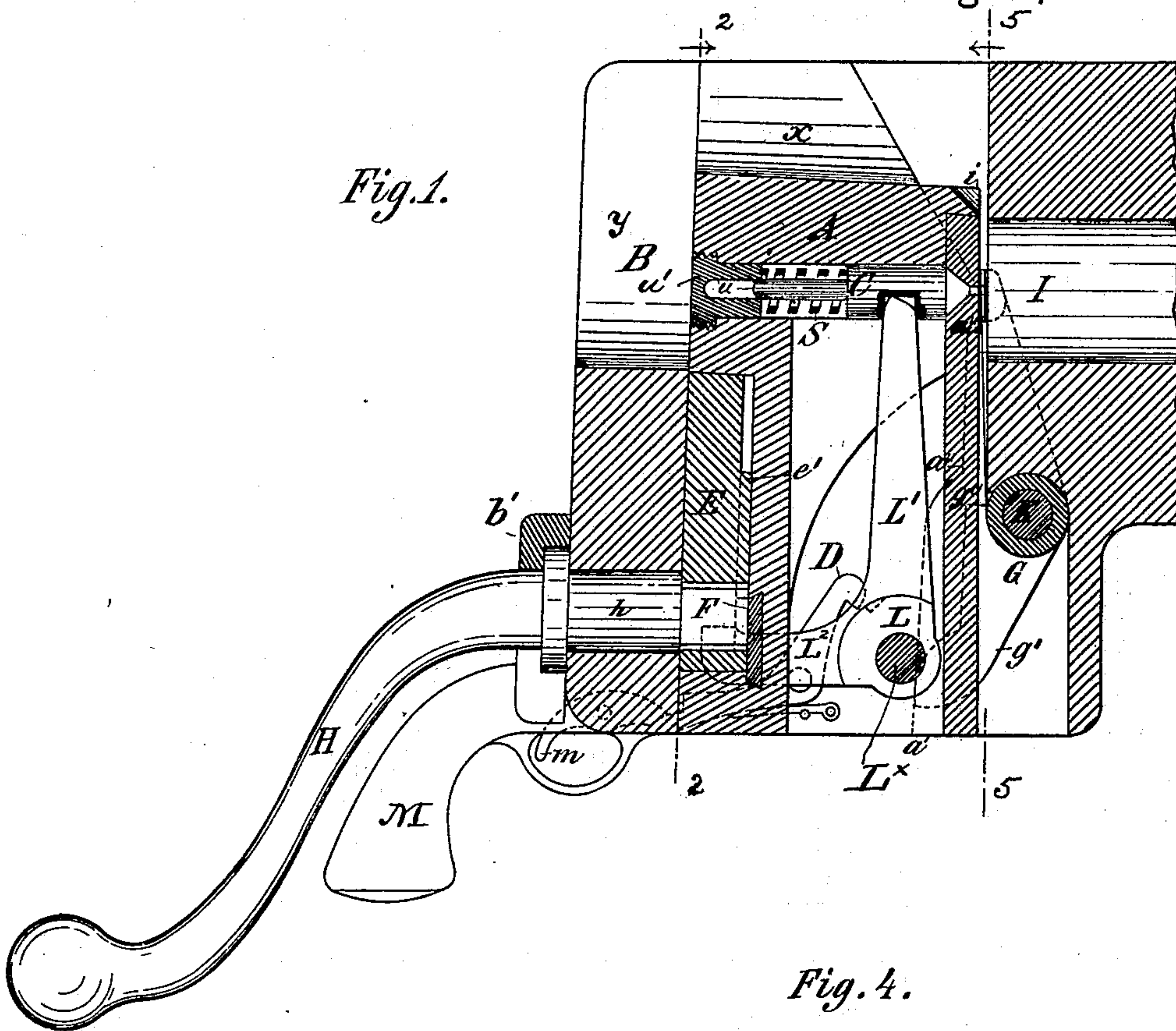
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H. T. J. THRONSEN.

# BREECH LOADING ORDNANCE.

No. 408,637.

Patented Aug. 6, 1889.



WITNESSES:

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(No Model.)

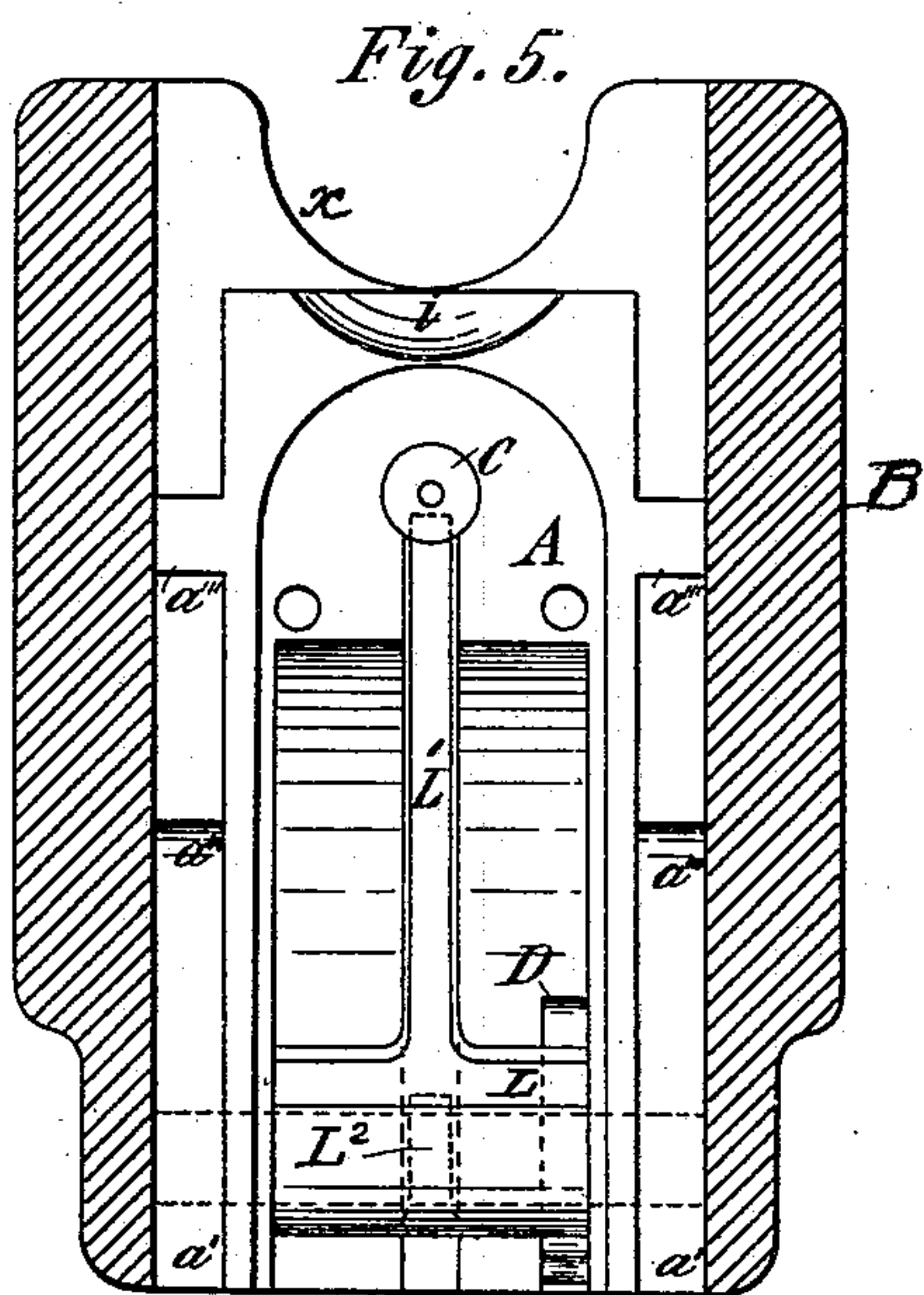
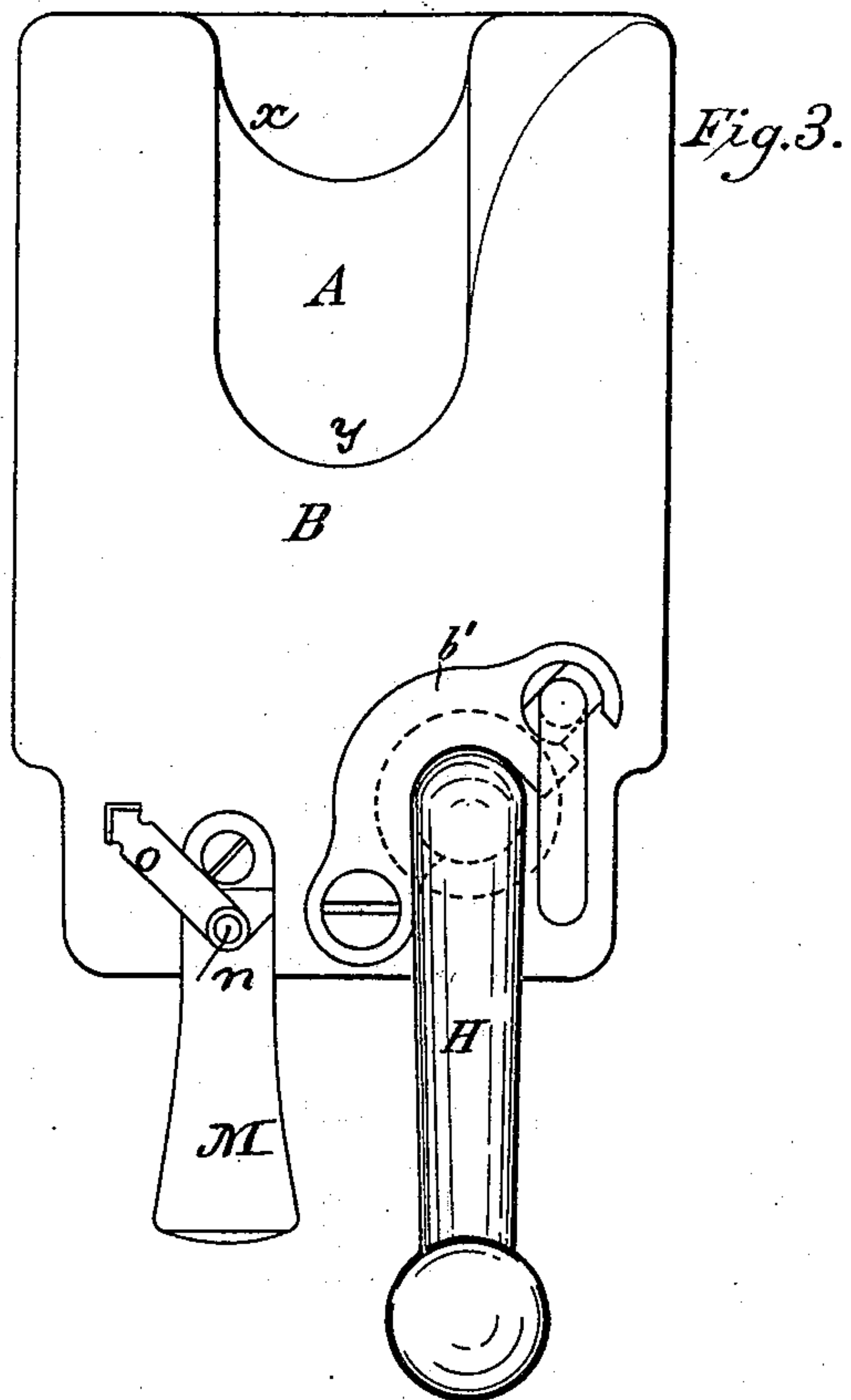
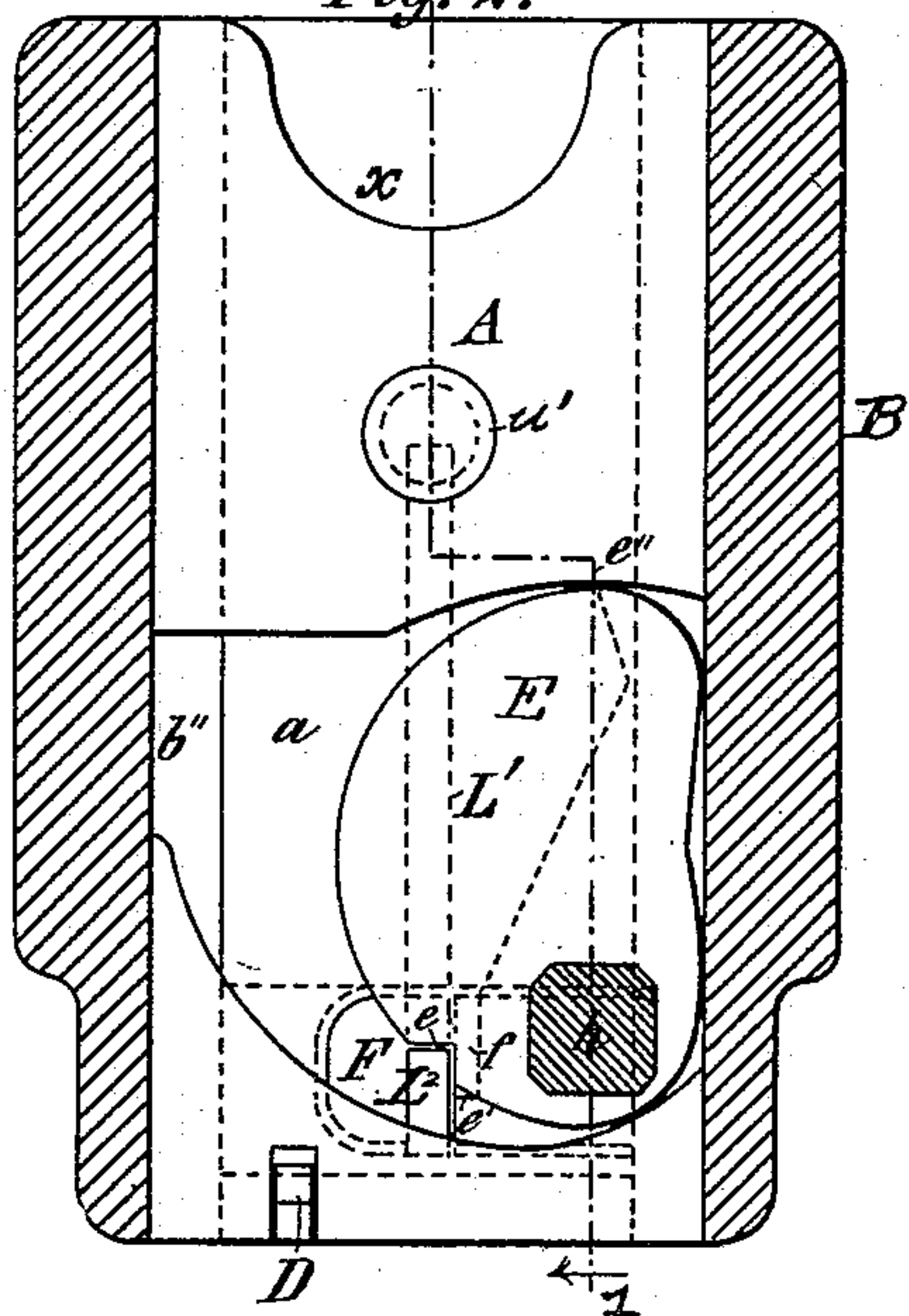
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BREECH LOADING ORDNANCE.

No. 408,637. *Fig. 2.*

Patented Aug. 6, 1889.



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Fig. 6.

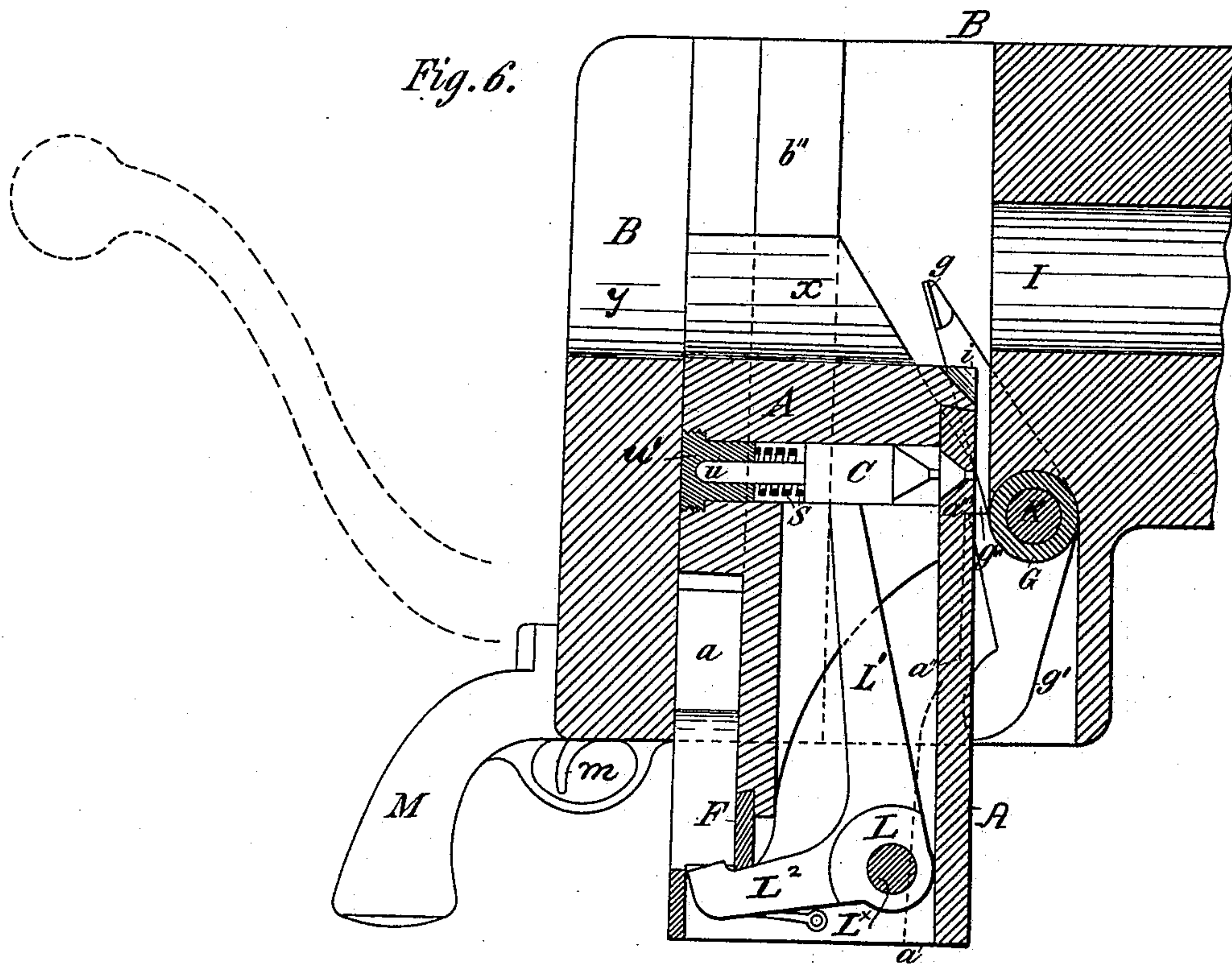
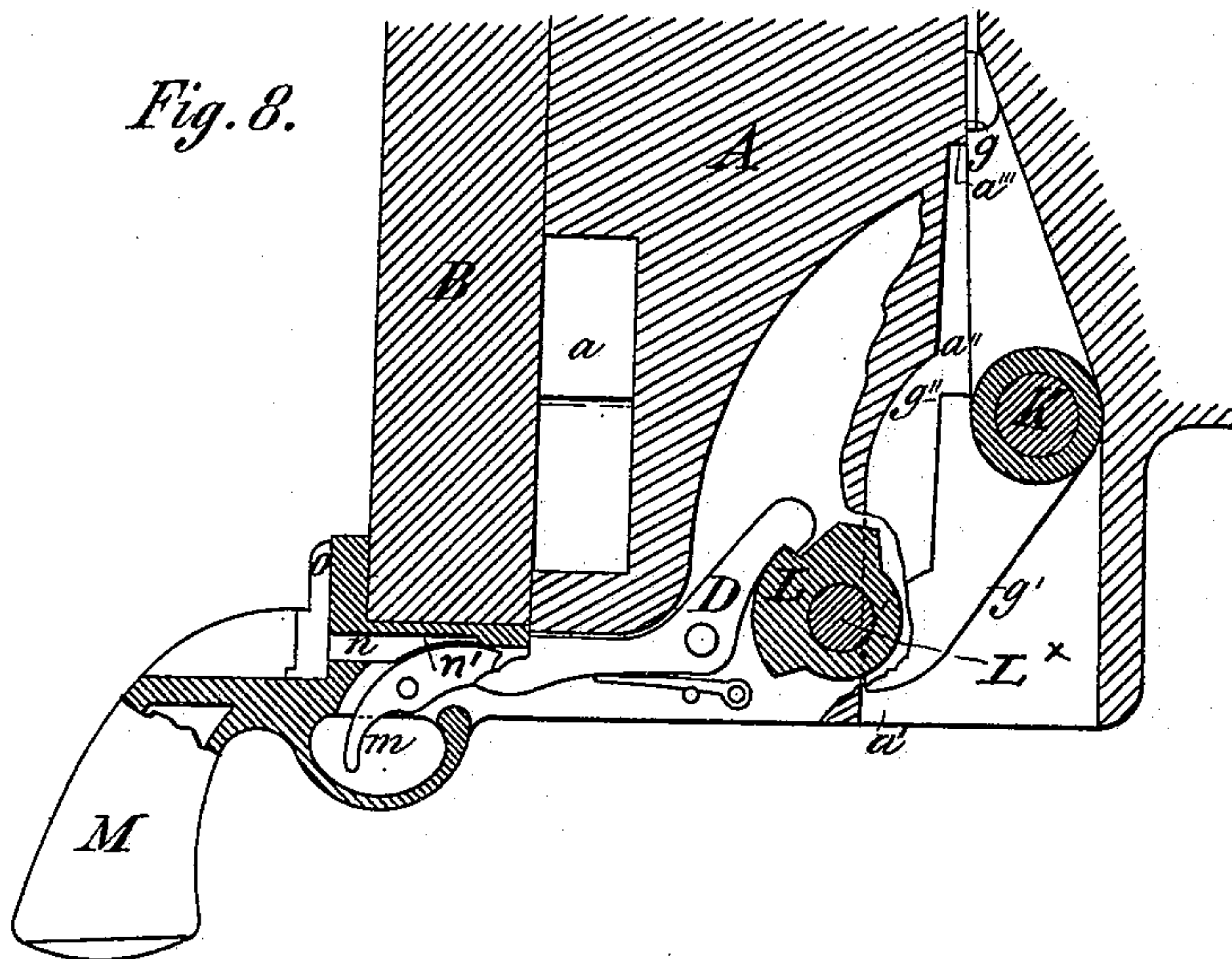


Fig. 8.



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BREECH LOADING ORDNANCE.

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Fig. 7.

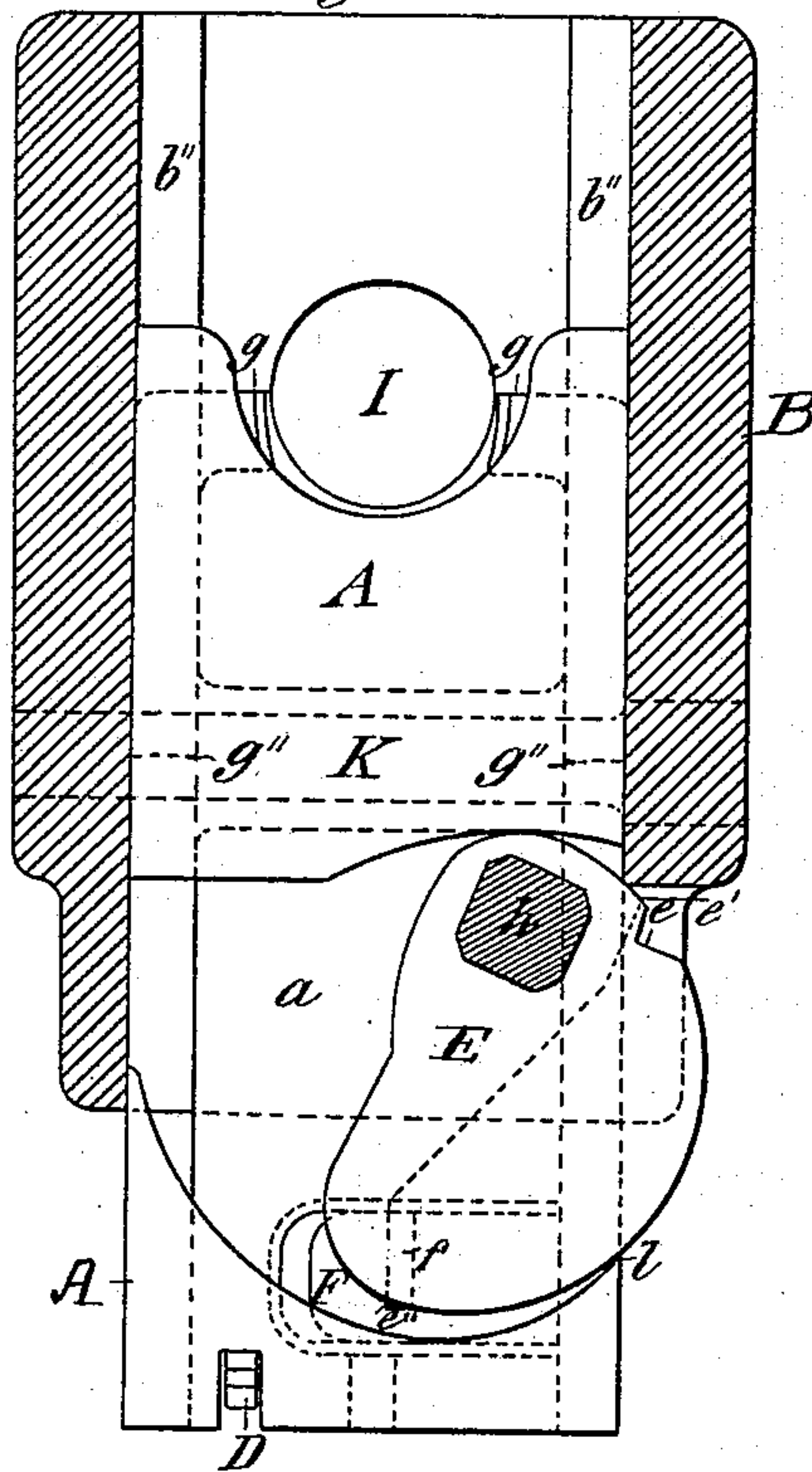
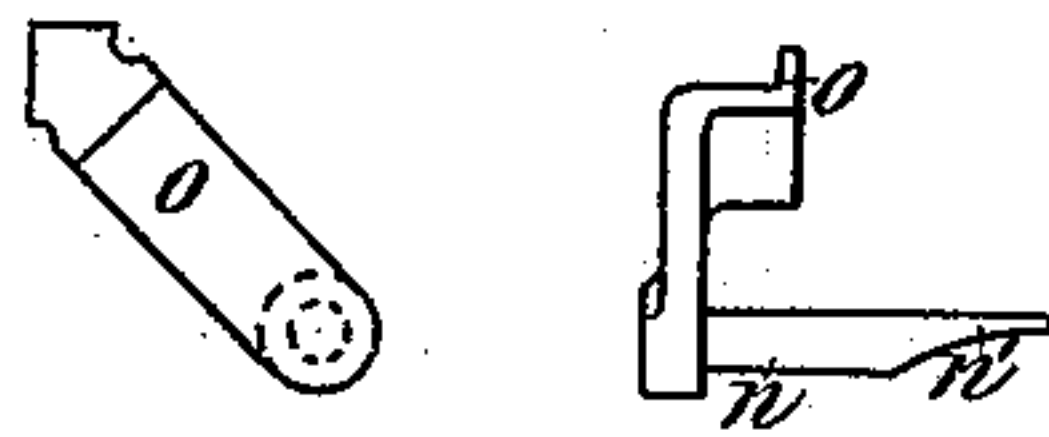


Fig. 9.



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# UNITED STATES PATENT OFFICE.

HARALD THORVALD JOHANNES THRONSEN, OF FINSPONG, SWEDEN, AS-  
SIGNOR TO THE AKTIEBOLAGET FINSPONGS STYCKEBRUK.

## BREECH-LOADING ORDNANCE.

SPECIFICATION forming part of Letters Patent No. 408,637, dated August 6, 1889.

Application filed July 7, 1888. Serial No. 279,324. (No model.) Patented in Sweden May 3, 1888, No. 1,698; in France June 16, 1888, No. 191,273; in Norway June 16, 1888, No. 957; in Belgium June 18, 1888, No. 82,230; in England June 19, 1888, No. 8,974, and in Germany June 20, 1888, Nos. 46,432 and 46,694.

*To all whom it may concern:*

Be it known that I, HARALD THORVALD JOHANNES THRONSEN, a subject of the King of Norway, and a resident of Finspong, Sweden, have invented certain new and useful Improvements in Guns Designed for Rapid Firing, (for which patents have been granted in Sweden, No. 1,698, dated May 3, 1888; in Germany, No. 46,432, dated June 20, 1888, and No. 46,694, dated June 20, 1888; in France, No. 191,273, dated June 16, 1888; in Norway, No. 957, dated June 16, 1888; in Great Britain, No. 8,974, dated June 19, 1888, and in Belgium, No. 82,230, dated June 18, 1888,) of which the following is a specification.

My invention relates to breech-loading guns, and my object is to improve the breech mechanism of a gun of this class.

My invention will be fully described hereinafter, and its novel features carefully defined in the claims.

In the drawings which serve to illustrate my invention, Figure 1 is a longitudinal vertical section of the breech-piece of the gun and the breech mechanism substantially on line 1 1 in Fig. 2. Fig. 2 is a transverse section of same on line 2 2 in Fig. 1. Fig. 3 is a rear end view of the gun. Fig. 4 is a plan view of the parts seen in Figs. 1, 2, and 3. Fig. 5 is a transverse section on line 5 5 in Fig. 1. Fig. 6 is a view similar to Fig. 1, but showing the position of the parts when the breech-block is depressed for loading. Fig. 7 is a transverse section similar to Fig. 2, but showing the movable parts in the position seen in Fig. 6. Fig. 8 is a longitudinal section similar to Fig. 1, but taken in a different plane in order to better illustrate the firing mechanism. Fig. 9 is a detail view of the device employed to permit the discharge of the gun automatically.

Referring primarily to the first nine figures of the drawings, B is the breech-piece of the gun, in which is formed a slightly-tapered or wedge-shaped mortise. In this mortise is fitted a breech-block A, which is shown in Fig. 1 as elevated and in position to close the cartridge-chamber I of the gun. In Fig. 6 said block is represented as depressed, so

as to permit the cartridge to be inserted from the rear. There is a concavity  $x$  in the upper end of the breech-block A and a similar concavity  $y$  in the rear wall of the breech-piece B. When the block is lowered or depressed, as in Fig. 6, these concavities are brought substantially into coincidence with each other, so as to permit the cartridge to be inserted readily from the rear. Means are provided for depressing and elevating the breech-block, and also for retracting the shell of the cartridge and cocking the hammer through the medium of the depression of said block. The breech-block is depressed and elevated by means of weighted crank H on a shaft  $h$ , rotatively mounted in the breech-piece, and a cam E, secured to the inner end of said shaft  $h$  and occupying a recess  $a$  (see Fig. 2) in the breech-block A. The handle H is designed to have weight enough to counterbalance the breech-block and to support it in its elevated position.

$b'$  is a hinged cap-plate that takes behind a stop-collar on the shaft  $h$  and prevents the latter from working out.

When the handle H (see Fig. 3) is turned to the right and upward, the cam E (see Fig. 2) turns to the left and downward and depresses the breech-block. The breech-block is guided in its vertical movement on tongues  $b''$ , formed on the inner lateral faces of the mortise in the breech-piece and engaging and fitting grooves in the sides of the breech-block. It will be seen that the breech-block is embraced all around by the walls of the mortise in which it plays, and that it moves up and down in a straight line and does not rock or tilt, as in some guns of this class. This the better enables the axis of the cam-shaft to be arranged parallel with the axis of the bore of the gun, with the crank C at the rear end of the gun. The crank is set to stand opposite to the highest part of the cam E, so that the weight of the crank serves to hold the breech-block elevated.

The firing mechanism of the gun comprises the following devices: In the breech-block A is mounted the firing-pin or hammer C, which is backed by a suitable spring S and strikes



the cartridge through an aperture in the front plate of said block. This pin has a stem or tail  $u$ , which plays in a hollow in a screw-plug  $u'$  in the block A. By unscrewing the plug  $u'$  the pin C and its spring may be conveniently removed without disturbing the other mechanism. On a transversely-arranged shaft  $L^x$  in the breech-block is mounted a tumbler L, in which a suitable notch is formed to receive a spring-dog or sear D, as represented in Fig. 8. The firing-pin C has a mortise or recess in it, and the upper end of an arm  $L'$  on the tumbler engages this recess, as seen in Figs. 1, 5, and 6. The tumbler has also a rearwardly-projecting arm  $L^2$ , which extends back under the cam E and stands in a notch  $e$  in said cam when the block is elevated, as seen in Fig. 2. This arm also engages under these conditions a deep notch in the lower edge of a transversely-sliding bar or plate F, mounted in guides in the breech-block just in front of the cam E. This plate or bar F forms a safety-stop to prevent the accidental discharge of the gun. From its rear or outer face projects a lug or shoulder  $f$ , (seen in dotted lines in Fig. 2,) which lug is acted on by a shoulder  $e' e''$ , extending across the inner face of the cam E and represented by the zigzag dotted line in Figs. 2 and 7.

When the cam E is rotated, (toward the left, as seen in Fig. 2,) it does not act upon the breech-block to depress it during the first part of its movement, (about thirty degrees;) but the shoulder of the notch  $e$  on the cam acts on and depresses the arm  $L^2$  of the tumbler, thus cocking the gun—that is, the arm  $L'$  draws back the pin C until the dog D engages the notch in the tumbler, as seen in Fig. 8. The further movement of the cam E causes it to act on the lower wall or face of the recess  $a$  in the breech-block and depress the latter; but the movement of the block at starting is very easy and gradual, owing to the shape and proportions of the cam. When the block has been once started down, the movement is quicker, as the bearing-point on the cam is then farther from the center of rotation.

When the breech-block is elevated, it rests on the cam directly over shaft  $h$ , and the cam bears at its right side against the wall of the breech-piece. When the cam has nearly completed its movement, the shoulder  $e' e''$  on the cam engages the plate F and moves it to the right far enough to put the notch therein out of register with the arm  $L^2$ . Thus the plate F serves as a safety-stop to prevent the accidental discharge of the gun until said plate has been again moved back to its first position. The depression of the breech-block serves also to extract the empty cartridge-shell. The extractor G is pivotally mounted on a shaft K in the breech-piece, and has two upwardly-extending arms  $g$ , that take into recesses at the sides of the chamber I and embrace the body of the cartridge. The ex-

tractor has also two downwardly-extending arms  $g'$ , on which, at a point about opposite the axis of shaft K, are formed two shoulders  $g''$ . The arms  $g'$  of the extractor project, respectively, into two cam-slots  $a' a'' a'''$  in the face of the breech-block, as best seen in Figs. 5 and 8. The letters  $a' a'' a'''$  refer to different parts of the cam-surfaces, which act on the arms  $g'$ .

When the breech-block has been depressed until the chamfer or recess  $i$  at the front edge of the top of the block is below the flange on the cartridge-shell, the cam-face  $a''$  begins to push forward the arms  $g'$  of the extractor, and this causes the arms  $g$  of the latter to start the cartridge back out of its chamber; and when the shoulders  $g''$  on the extractor encounter the upper ends  $a'''$  of the slots, which occurs when the block is nearly down to its lowest position, the arms  $g$  are moved suddenly backward and the cartridge-shell thrown out.

When a cartridge is forced into the chamber I in loading, its flange engages the arms  $g$  of the extractor and pushes them forward into their recesses. This causes the shoulders  $g''$  on the extractor to engage the upper ends of the slots in the block and thus raise the latter a little. This upward movement of the block causes it to rotate the cam E a little by contact therewith at the point  $l$  in Fig. 7. The crank H being now thrown off its center or balance, its weight, which slightly dominates that of the block, suffices to elevate the block. As the cam E turns back in elevating the block the shoulder  $e' e''$  thereon returns plate F to its first position, and the gun is ready for firing.

The firing may take place automatically, being effected by the mere elevation of the breech-block, or it may take place at any time after the block is raised by means of a trigger.

The gun is furnished with a pistol-like handle M (see Fig. 8) and a trigger  $m$ , which acts to depress the tail of the sear D, and thus release the tumbler, acting on substantially the same principle in this respect as an ordinary gun-lock.

When the gun is to be fired automatically or by the mere elevation of the breech-block, the sear D and trigger  $m$  are rendered inert for the time by a device seen *in situ* in Fig. 8 and detached in Fig. 9. This consists of a bolt  $n$  in a socket in the handle M. This bolt is capable of axial rotation and has a flattened part  $n'$ . The bolt is arranged over the trigger, and when it is so set, as seen in Fig. 8, that this flattened or beveled part is below room is left for the trigger to rise and allow the sear to engage the notch in the tumbler; but if the bolt  $n$  be turned part way around axially the trigger will be depressed thereby and the sear will not be allowed to remain in engagement with the tumbler. The bolt  $n$  is provided with an arm or indicator  $o$  of some kind, whereby the po-



sition of its flattened part with respect to the trigger may be known. This arm may also be employed to rotate the bolt axially.

When the gun is set for automatic firing, the lever or crank H may be so weighted that it will not entirely elevate the breech-block by its weight, but leave the remainder of the movement to be effected by hand. For example, the weight of the crank may be such that it will raise the breech-block until the part *e'* of the shoulder on the cam E comes in contact with the lug *f* on the plate F, but not sufficient to move said plate to the left without the aid of the hand. This arrangement will prevent a premature discharge, as the firing cannot be effected until the plate F shall have been moved to the left.

To enable the operation of the bolt *n* to be clearly understood, it is only necessary to note that when the trigger is depressed by said bolt the upward movement of the breech-block brings the tail of the sear D into forcible contact with the depressed trigger, and the sear is thus released from its engagement with the notch in the tumbler.

Usually two men are required to manage quick-firing guns; but my gun is adapted to be operated by one man as well as two. In case two men are employed and one should be disabled the other may operate the gun very effectively and rapidly.

The extractor G need have only one arm *g'* and the block A only one set of cam-faces *a' a'' a'''* to act thereon; but the double set of these parts herein shown produces a more even movement and provides more room at the middle of the block for the other mechanism.

Having thus described my invention, I claim—

1. The combination, with the gun having a vertically-arranged mortise in its breech, of the breech-block A in said mortise and adapted to play vertically in a right line in said mortise, the cam-shaft *h*, mounted in the rear wall of the breech with its axis parallel with the bore of the gun, the cam E, fixed on the inner end of said cam-shaft and engaging the recess *a* in the breech-block, and the weighted counterbalancing-crank H, fixed on the outer end of the cam-shaft and standing opposite to the higher part of the cam, whereby the breech-block is embraced at all times by the walls of said mortise and is held in its elevated position by said crank, substantially as set forth.

2. The combination, with the gun having a vertically-arranged mortise in its breech, of the breech-block A, mounted in and adapted to play vertically in said mortise and provided with cam-faces *a' a'' a'''*, the cam-shaft *h*, mounted in the rear wall of the breech with its axis parallel with the bore of the gun, the cam E, fixed on the inner end of said shaft and engaging a recess in the breech-block, the weighted crank H, fixed on the outer end of said cam-shaft, and the cartridge-shell extractor G, pivotally mounted in a recess in the gun in front of the breech-block, said extractor having an arm *g'*, with a shoulder *g''*, to engage the cam-faces on the breech-block, and also having arms which embrace the shell in the cartridge-chamber, substantially as and for the purposes set forth.

3. The combination, with the gun having a mortised breech-piece, of the breech-block A, the recessed firing-pin and its spring mounted in said block, the tumbler having an upright arm that engages the firing-pin and a rearwardly-projecting arm *L*<sup>2</sup>, the sear D and its spring, the cam E, provided with a notch to engage arm *L*<sup>2</sup> of the tumbler and the cam-shaft *h*, the crank H on said shaft, and the trigger, all arranged to operate substantially as set forth.

4. The combination, with the gun having a mortised breech and the breech-block, of the firing-pin, tumbler, and sear or spring-dog mounted in said block, the notched slide-plate F, mounted in said block and provided with a lug *f*, the trigger, the cam E, provided with the shoulder *e' e''*, whereby said slide-plate is moved, the cam-shaft *h*, and the handle H, all arranged substantially as and for the purposes set forth.

5. The combination, with the gun having a mortised breech-piece and the breech-block, of the firing-pin, the tumbler, the sear and its spring, all mounted in said block, the cam and its crank for moving said block, the trigger mounted in the breech-piece, and the flat-sided bolt *n*, arranged over the trigger, whereby the trigger may be depressed, for the purpose set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

HARALD THORVALD JOHANNES THRONSEN.

Witnesses:

NILS MIER,

S. C. MOBECK.