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9 Sheets—Sheet 1.

J. P. LEE.

MAGAZINE FIRE ARM.

No. 383,363. Patented May 22, 1888.

Fig. 1.

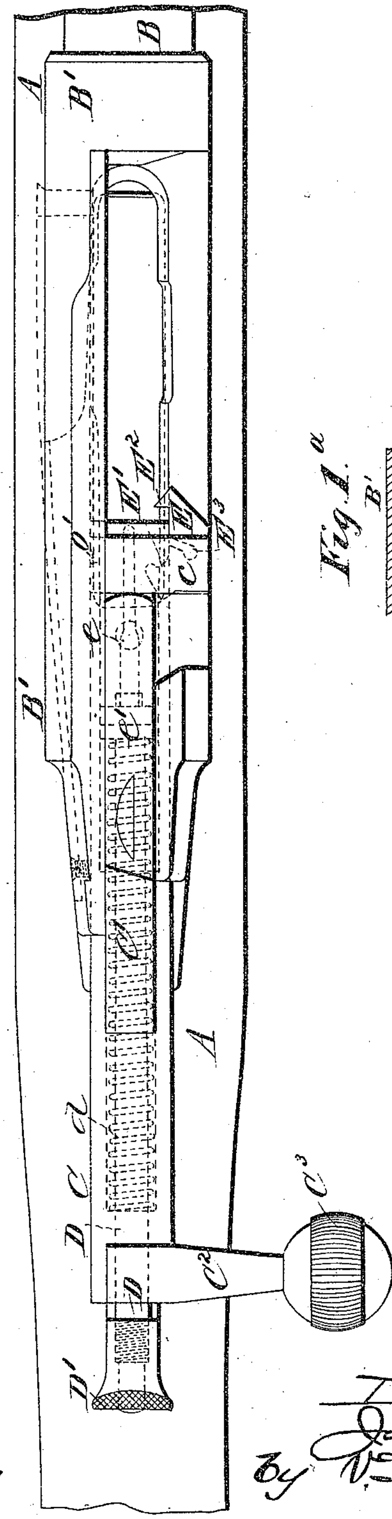
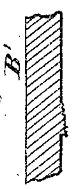


Fig. 1ª



Witnesses.
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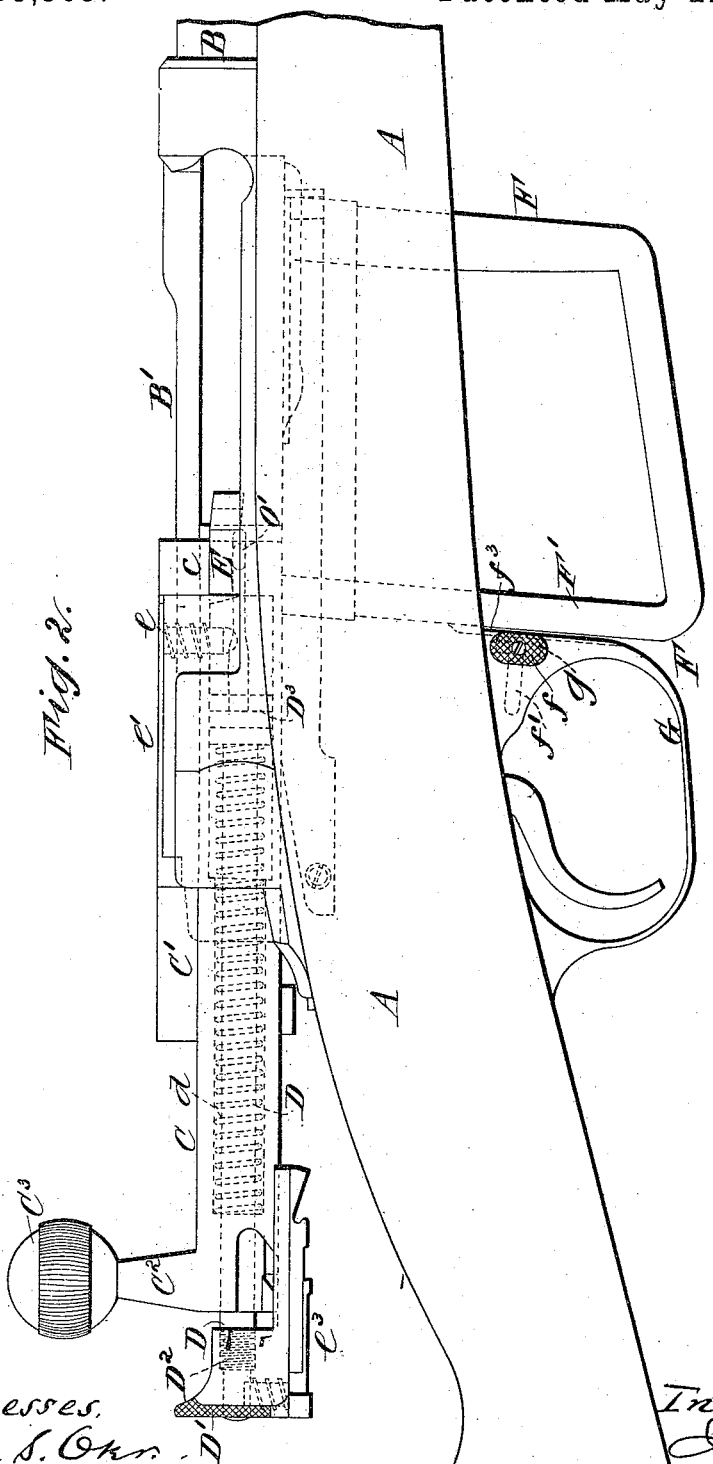
(No Model.) 9 Sheets—Sheet 2.

J. P. LEE.

MAGAZINE FIRE ARM.

No. 383,363. Patented May 22, 1888.



Witnesses.
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(No Model.) 9 Sheets—Sheet 3.

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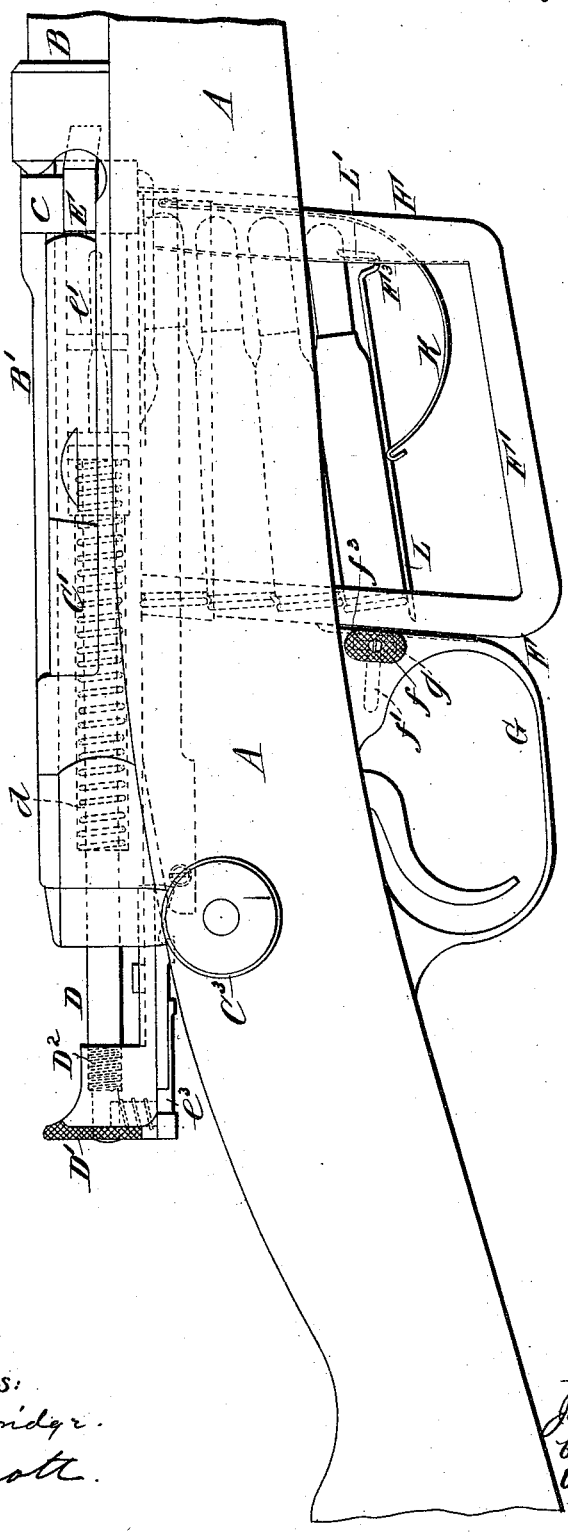
MAGAZINE FIRE ARM.

No. 383,363. Patented May 22, 1888.

Fig. 3.



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(No Model.) 9 Sheets—Sheet 4.

J. P. LEE.

MAGAZINE FIRE ARM.

No. 383,363. Patented May 22, 1888.

Fig. 4.

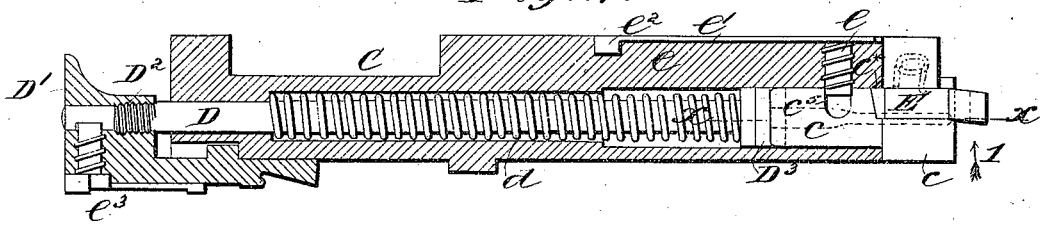


Fig. 5.

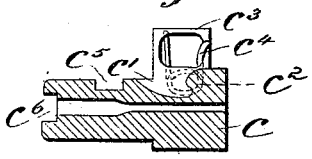


Fig. 6.

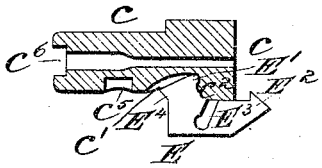


Fig. 7.

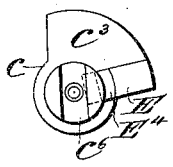


Fig. 9.

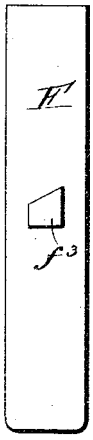


Fig. 10.

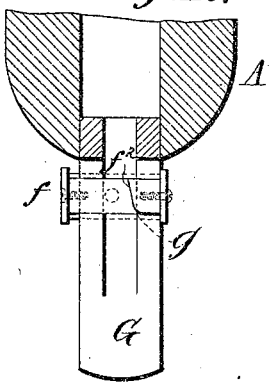
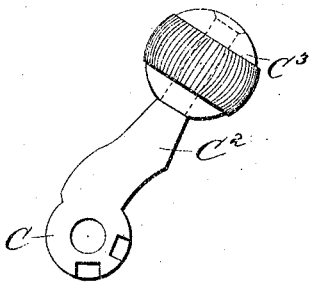


Fig. 8.



Witnesses,
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(No Model.) 9 Sheets—Sheet 5.

J. P. LEE.

MAGAZINE FIRE ARM.

No. 383,363. Patented May 22, 1888.

Fig. 12.

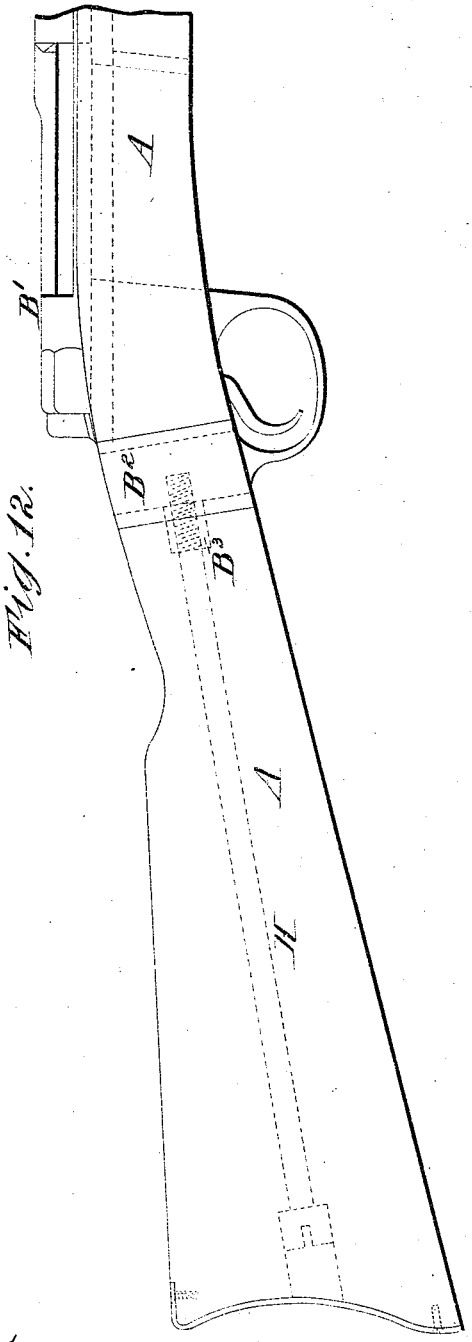
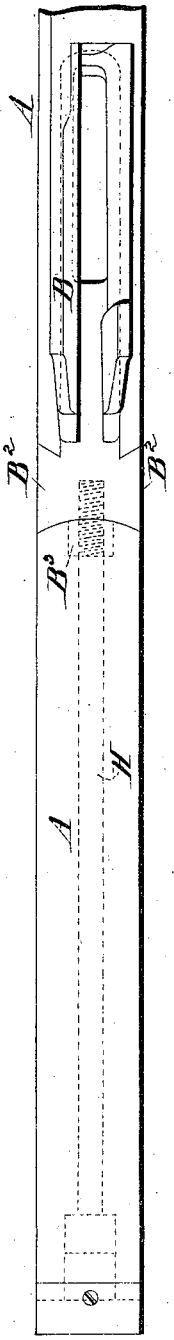


Fig. 11.



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(No Model.) 9 Sheets—Sheet 6.

J. P. LEE.

MAGAZINE FIRE ARM.

No. 383,363. Patented May 22, 1888.

Fig. 14.

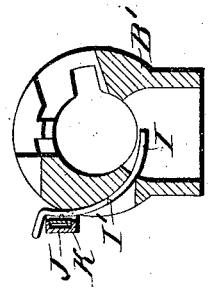

Fig. 13.

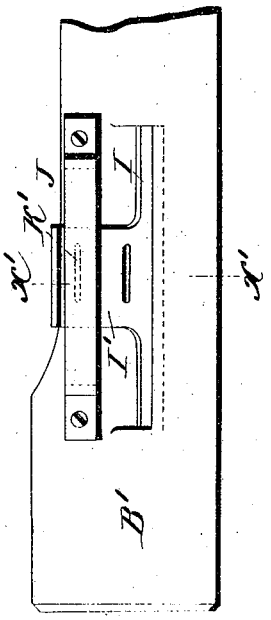

Fig. 15.

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(No Model.) 9 Sheets—Sheet 7.

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MAGAZINE FIRE ARM.

No. 383,363. Patented May 22, 1888.

Fig. 17.

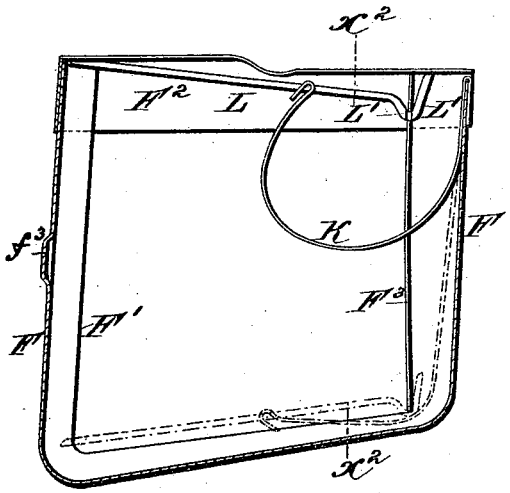


Fig. 18.

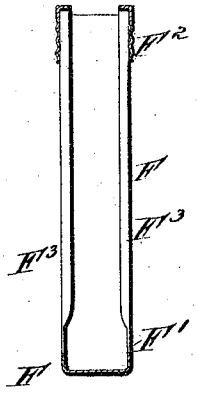


Fig. 16.

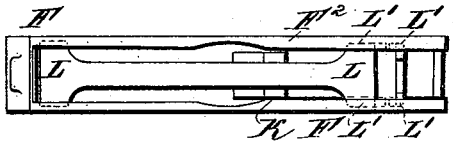
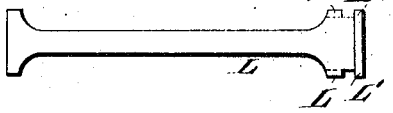


Fig. 20.

Fig. 19.



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(No Model.) 9 Sheets—Sheet 8.

J. P. LEE.

MAGAZINE FIRE ARM.

No. 383,363. Patented May 22, 1888.

Fig. 22.

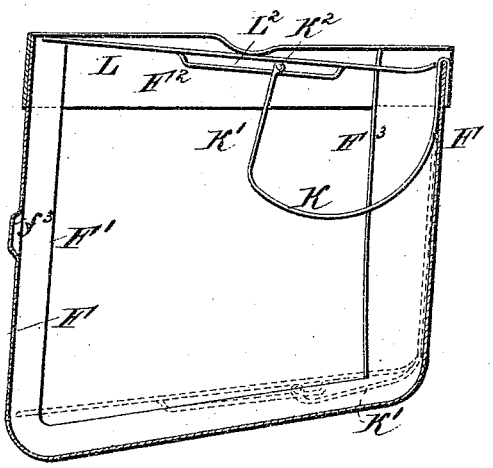


Fig. 24.

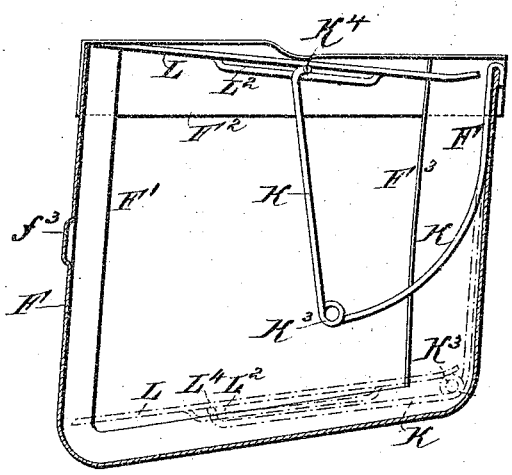


Fig. 21.

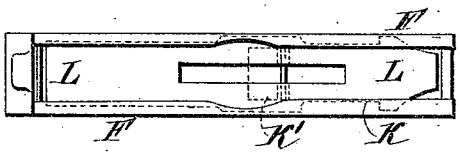


Fig. 23.

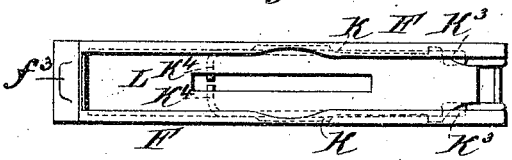


Fig. 27a.

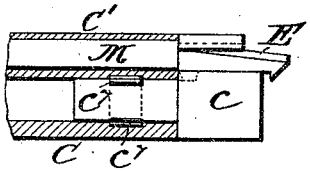
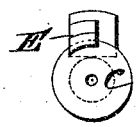


Fig. 28a.



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(No Model.) 9 Sheets—Sheet 9.

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MAGAZINE FIRE ARM.

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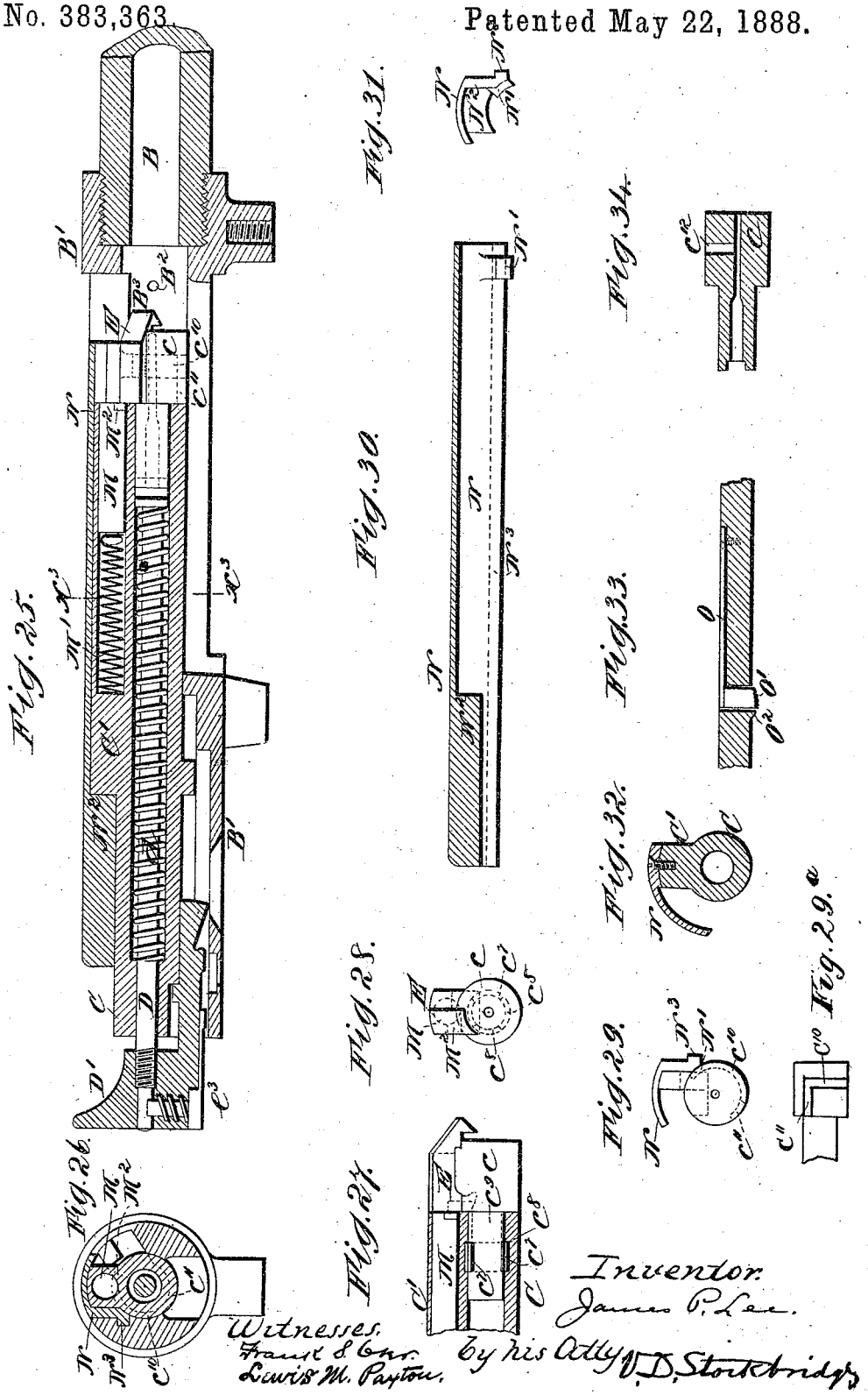

Witnesses.
Frank E. Carr.
Lewis M. Paxton.

Inventor.
James P. Lee.
by his Atty
W. D. Stockbridge

UNITED STATES PATENT OFFICE.

JAMES P. LEE, OF NEW YORK, N. Y.

MAGAZINE FIRE-ARM.

SPECIFICATION forming part of Letters Patent No. 383,363, dated May 22, 1888.

Application filed November 9, 1887. Serial No. 254,716. (No model.) Patented in England August 18, 1887, No. 11,319.

To all whom it may concern:

Be it known that I, JAMES P. LEE, engineer, a citizen of the United States of America, and a resident of New York, United States of America, have invented new and useful Improvements in and relating to Magazine and other Fire-Arms, (for which I have obtained a patent in Great Britain, No. 11,319, and August 18, 1887,) of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to magazine-rifles and other fire-arms of the kind or class described in the specification of former Letters Patent, dated November 4, A. D. 1879, No. 221,328, and is chiefly designed to improve the construction and increase the efficiency of such fire-arms.

My said invention comprises various improvements, hereinafter described, and illustrated in the accompanying drawings, in which—

Figure 1 is a plan, and Fig. 1ª is a sectional detail; Fig. 2, a side elevation of part of a magazine-rifle embodying my present improvements, showing the said gun with the breech open. Fig. 3 is a side elevation showing the said gun with the breech closed. Fig. 4 is a vertical longitudinal central section of the breech-bolt, some of the parts being shown in side elevation. Fig. 5 is a horizontal section of the head of the breech-bolt on the line $x\,x$, Fig. 4, looking in the direction of the arrow 1, the extractor being removed. Fig. 6 is a horizontal section on the line $x\,x$, Fig. 4, looking in the reverse direction to that indicated by the said arrow, the extractor being shown in plan. Fig. 7 is a rear end elevation of the head of the breech-bolt detached, and Fig. 8 is a rear end elevation of the body of the breech-bolt. Fig. 9 is a rear end elevation of the magazine; and Fig. 10 is a transverse section of the gun at the forward end of the trigger-guard, showing a catch, hereinafter described. Fig. 11 is a plan, and Fig. 12 a side elevation, showing a modified form of my gun. Fig. 13 is an elevation of the left-hand side of part of the shoe or body of the gun. Fig. 14 is a transverse section on the line $x'\,x'$, Fig. 13. Fig. 15 is a plan of a guide and spring, hereinafter described. Fig. 16 is a plan, and Fig. 17 a vertical longitudinal central section, of a magazine, hereinafter described. Fig. 18 is a transverse section on the line $x^2\,x^2$, Fig. 17. Fig. 19 is a plan, and Fig. 20 a side elevation, of a follower, hereinafter described. Fig. 21 is a plan, and Fig. 22 a vertical longitudinal central section, showing a modification of the magazine spring and follower. Fig. 23 is a plan, and Fig. 24 a vertical longitudinal central section, of another modification thereof. Fig. 25 is a vertical longitudinal central section showing another form or modification of my rifle. Fig. 26 is a transverse section on the line $x^3\,x^3$, Fig. 25. Fig. 27 is a side elevation, and Fig. 28 an end elevation, showing details of construction. Figs. 27ª and 28ª are similar views to Figs. 27 and 28, showing another modification of my invention. Fig. 29 is a front end elevation of the breech-bolt, the extractor being removed. Fig. 29ª is an elevation of the breech-block head shown in Fig. 29. Fig. 30 is a longitudinal section, and Fig. 31 an end elevation, of a shield or cover, hereinafter described, for projecting the breech-bolt against sand, dust, and rain. Fig. 32 is an end elevation of the breech-bolt, showing a modified form of the said shield or cover attached thereto. Fig. 33 is a horizontal section showing an improved ejector, hereinafter described. Fig. 34 is a horizontal section showing means for permitting the escape of gas at the forward end of the breech-bolt, as hereinafter described.

Like letters indicate corresponding parts throughout the drawings.

A is the stock, B the barrel, and B′ the shoe or body, of the gun.

C is the breech-bolt, which is made with a removable head, *c*.

D is the firing-pin, which is fitted to slide longitudinally in the said bolt and is provided with a spring, *d*.

E is the extractor, which is constructed and arranged as hereinafter described, so that the stronger the backward pull on the breech-bolt the tighter the extractor will grip the cartridge-flange—that is to say, the extractor E is made with a hooked rear end, as shown, and the head *c* of the breech-bolt C is formed with a recess or cavity, *c′*, into which the said hooked end of the extractor is fitted in such a manner that the hook E′ will engage with a hook, c^2, on the head *c*. The point where the extremity of the hook E′ bears against the head *c* serves as a fulcrum, upon or about which the extractor

may turn to permit its hook E^2 to pass over the flange of a cartridge. This point is nearer the axis of the breech-bolt than the hook E^2. Therefore, as the breech-bolt moves backward, drawing the empty cartridge-case with it, the pull on the extractor will tend to keep the same in engagement with the flange of the said cartridge-case.

The head *c* of the breech-bolt C is formed or provided with a hollow projection, c^3, in such a position that the open side of the said projection will be in contact with the adjacent side of the extractor. A peculiarly-shaped spring, c^4, is so arranged in the cavity of the said hollow projection c^3 that one of its ends extends outward into a slot or notch, E^3, in the extractor E, while the other end of the said spring is held or supported so that the said spring tends to keep the hook E^2 of the extractor in engagement with a cartridge-flange. The said extractor is formed with a beveled extension, E^4, which, when the head *c* of the breech-bolt is inserted in the body thereof, will project into a recess, c^*, in the said body of the bolt, and will thus be so connected with the bolt that it cannot be detached therefrom except when the head of the bolt is removed from the body thereof. By these means I provide for keeping the extractor and its spring in place without the use of screws or the like, thereby greatly facilitating the operations of taking the gun to pieces and putting it together again.

The forward end of the body of the bolt C is so formed that when the said bolt is turned into its locking position its forward end will act as a cam upon the rear end of the extractor E and will force it into engagement with the flange of a cartridge in the barrel, (should the extractor-spring fail to act,) and will securely retain the said extractor in engagement with the cartridge-flange until the bolt C is turned to open the breech.

I employ lever-screws for securing the ends or heads upon the body of the bolt and upon the firing pin or striker—that is to say, instead of using ordinary screws having the usual saw-cut for the introduction of a screw-driver, I employ screws provided with spring-levers, so that the parts can be readily connected or separated without the use of a screw-driver or other tool. The head *c* of the breech-bolt is formed with a recess, c^5, into which the end of a lever-screw, *e*, is adapted to enter when the parts are properly fitted and secured together. The screw *e* is provided with a lever, *e'*, having a projection, e^2, which fits into a corresponding recess in the rib C' of the bolt C, and thus prevents accidental displacement of the said lever. The lever *e'* is made to act as a spring to hold the projection e^2 in the said recess. The screw *e* is made of such pitch that only one revolution or a part of a revolution thereof will be required to withdraw the end thereof from the recess c^5, and thus permit the removal of the end or head *c* from the bolt C. The recess c^5 extends partially around the head *c*, so as to permit the turning of the breech-bolt to open the breech. The end or head D' of the firing-pin or striker D is secured to the said firing-pin in substantially the same manner by means of a lever-screw, e^3. The said head is, however, screwed upon the firing-pin, as shown at D^2, before being secured by means of the said lever-screw.

The handle C^2, by which the breech-bolt C is operated, is curved, as shown in Fig. 8, so that the thumb of the right hand can be placed thereon while the trigger is being pulled. By this means I obviate any liability to accidental unlocking of the breech-bolt while the gun is being fired. The head or knob C^3 of the said handle is preferably fitted to rotate upon a pin or stud in the end thereof, as shown in Fig. 8.

I also provide means for enabling the head *c* of the breech-bolt to be used as a wrench for screwing the firing-pin or striker D into its head or cocking-piece D' and unscrewing it therefrom. For this purpose the rear end of the head *c* of the breech-bolt is formed with a transverse groove or recess, c^6, and the forward end of the firing-pin or striker is provided with a transverse rib or projection, D^3, which fits into the said groove or recess. When it is required to remove the head D' from the firing-pin or striker D, the lever-screws *e* e^3, above described, are slackened, and the head *c* of the bolt and the head D' of the firing-pin are turned in opposite directions until the said head D' is unscrewed from the firing-pin. By the reverse of this operation the firing-pin may be screwed into the head thereof.

From the foregoing description it will be seen that the breech mechanism can be readily taken to pieces and put together again without the use of tools.

The magazine F is inserted in an aperture in the under side of the gun, immediately in front of the trigger-guard G, as shown in Figs. 2 and 3, the mouth of the said magazine coinciding with an aperture in the under side of the shoe or body B'. For retaining the said magazine in place when applied to the gun, I provide a catch, *f*, which is fitted to slide in a dovetail transverse slot or groove, *g*, in the trigger-guard G, and is acted upon by a spring, *f'*, whereby it is held in such a position that a projection, f^2, on the said catch engages with a shoulder, f^3, on the magazine. The ejector is inclined and roughened, so that when the breech-bolt is drawn back and an empty cartridge-shell extracted the flange of the said shell will come in contact with the roughened inclined surface of the ejector and will be thrown out of the gun.

Instead of making the gunstock in one piece, as heretofore, I sometimes form the said stock in two pieces. To provide for the attachment of these pieces to the shoe or body of the gun, I form the said shoe or body with lateral projections B^2, Figs. 11 and 12, the exterior surfaces of which are flush with the outer surface of the stock. The rear portion of the

stock is secured to the shoe or body of the gun by means of a screw or screw-bolt, H, inserted into the stock from the rear end thereof and screwed into a lug, B^3, on the said shoe or body. The other part of the stock is slotted or forked. The forward part of the shoe or body of the gun is fitted into it, as shown.

In the said former specification a curved sliding shield is described for closing the mouth of the magazine, and thus enabling the gun to be used as a "single-loader," while a number of cartridges is held in reserve in the magazine. This shield has heretofore been arranged to be partially rotated concentrically, or nearly so, with the axis of the breech-bolt, so that when the magazine was open the said shield extended above the breech-bolt. With the breech-bolt constructed as herein described a shield so arranged could not be used. My present invention therefore comprises the construction and arrangement of a shield of this kind in such a manner that it can be readily moved into and out of its operative position and will at all times be clear of the breech-bolt. The said shield is made so that it moves eccentrically to the breech-bolt and can be operated from one side of the gun. Moreover, I provide a spring whereby the said shield will be retained at either extremity of its movement.

In Figs. 13, 14, and 15 I have shown one form of my improved shield. This shield I is arranged to slide in a slot in the side of the shoe or body B′ and is formed with an extension, I′, which works in a guide, J, attached to the said shoe or body. A spring, K, is arranged within the said guide and is provided with a projection, K′, adapted to enter one or the other of two depressions in the extension I′, and thus retain the said shield I at either extremity of its movement.

To reduce the cost of the cartridge-holders or magazines, I sometimes make the same of skeleton form. For instance, I make a magazine from a U-shaped or channeled bar, the flanges of which are suitably cut, and which is bent or curved to the required shape, and then has its ends united by means of flat bars or by means of a metal cap forming the top of mouth of the magazine.

In Figs. 16, 17, and 18 I have shown a magazine so constructed. F′ is the body of the magazine, which is formed from a channeled bar, and F^2 is a metal cap uniting the ends of the said bar and forming the top or mouth of the magazine. The sides of the said cap may, if desired, be corrugated, as shown in Fig. 18, to increase the rigidity thereof.

In some instances I use a curved or partially-coiled spring, K, for feeding or moving the cartridges upward in the magazine. This spring is bent at one end and secured upon the front wall of the magazine, as shown. It bears at its other end against the under side of a follower, L, this end of the said spring being slotted, if desired, so that it will engage with the said follower. The follower L is made with lateral projections L′, and the edges of the channel-bar F′ are turned or bent inward, as shown at F^3, so that they may engage with the projections L′ and thus guide the follower L in its upward and downward movements; or I provide other suitable guides on the sides of the magazine to engage with the said projections for this purpose. When one end of the follower is raised higher than the other end thereof, these projections will grip the said turned-in edges or guides and prevent further upward movement of the follower until it is brought into a horizontal or nearly-horizontal position. Moreover, when the topmost cartridge in the magazine is pressed against the edges of the mouth thereof by the magazine-spring, the said follower will rigidly support the cartridges at their rear ends, and thus effectually obviate the liability of the topmost cartridge to be moved downward and thus freed from the action of the breech-bolt thereon when thrusting the cartridge into the barrel.

The spring K is so made that when the magazine is full of cartridges the said spring will extend around the inner side of the front wall and bottom of the magazine, as shown by dotted lines in Fig. 17, and will therefore occupy a very small space therein. I am thus enabled to make the magazine more compact than heretofore. The said spring is sometimes made with a rigid straight portion, K′, Figs. 21 and 22, which, when the magazine is full of cartridges, extends along the bottom of the said magazine, as shown by dotted lines in Fig. 22. Moreover, the said spring is in some instances connected with the follower by means of a pin or rod, K^2, fixed in the said spring and working in a slot, L^2, in the said follower. In other instances I use two springs, K, as shown in Figs. 23 and 24. Each of these springs is made of wire and is secured to the front wall of the magazine, as shown. The said springs have two or more coils or turns at K^3, which give them the required elasticity. The free end of each spring is bent, as at K^4, and works in the slot L^2 of the follower L.

In Figs. 25 to 29 I have shown a rifle of small caliber. The extractor E is pivoted to the head *c* of the breech-bolt, substantially as hereinbefore described.

In this form of my invention I have shown the extractor-hook as secured in place by a rod, M, fitted to slide longitudinally in a hole in the rib C′ of the breech-bolt and acted upon by a spring, M′, situated within the said hole, which spring tends to press the said rod against the extractor, and thus causes the said extractor to engage with and hold it in engagement with the flange of a cartridge. The rod M is made with a lateral projection, M^2, so that it will always act upon the extractor, notwithstanding the turning of the breech-bolt into and out of its locking position.

To attach the head *c* to the body of the breech-bolt *f*, I sometimes form lateral projections c^7 on that part of the head which fits

into the body, and I form in the body an annular groove, c^8, and longitudinal slots c^9, extending from the said annular groove to the forward end of the body of the bolt. By inserting the head into the body so that the projections c^7 pass through the slots c^9 into the annular groove c^8, and then turning the head through an angle of ninety degrees, the head may be securely attached to the body. It is evident that as the body of the bolt only requires to be turned through a small angle to move it into or out of its locking position, the turning thereof for this purpose will not disengage it from the head.

The parts should be so constructed that when the body of the bolt is in position to be drawn back the projections c^7 on the head will be fully in engagement with the groove c^8 in the body of the bolt, and the head and body will thus securely connect during the extraction of an empty cartridge-shell.

It is obvious that any desired number of projections c^7 and grooves c^8 may be provided for the purpose above specified.

I sometimes provide a shield or cover—such as that shown in Figs. 30 and 31—which is arranged to slide to and fro with the breech-bolt, and which prevents the entrance of sand, dust, or rain into the shoe or body B′. This shield or cover, in the gun shown in Figs. 25 to 29, consists of a curved plate provided with a projection, N′. The head c of the bolt is made with a groove, c^{10}, extending partially around the same, and with a longitudinal slot, c^{11}, extending from the said groove to the rear end of the head. The projection N′ is to be passed through this slot into the groove c^{10}, so that although the shield or cover N will be moved to and fro with the breech-bolt, it can be readily removed therefrom without the use of tools. The said shield or cover is, moreover, made with an internal projection, N^2, with which the rib C′ of the bolt is adapted to engage, so that it secures the head of the breech-bolt to the body thereof. To provide for effectually holding down the breech-bolt, I form on the shield or cover N a longitudinal rib, N^3, adapted to slide in a groove in the shoe or body B′.

In some instances I firmly attach the shield or cover to the rib C′ of the breech-bolt, as shown in Fig. 32. In this case the said shield or cover turns with the breech-bolt, and is made of such width that it will cover the said bolt in any position thereof and of such internal diameter that it will fit or approximately fit the circular part of the shoe or body of the gun.

In Fig. 33 I have shown an improved ejector, which comprises a spring, O, attached to the shoe or body B′, and having at its free end a stud, O′, which extends through a hole in the said shoe or body into the path of a cartridge-shell as it is extracted. The inner surface of the said stud is inclined and roughened, substantially as hereinafter described with reference to the ejector shown in Figs. 1 to 7. I sometimes employ, in combination with the said spring-ejector, a pin or stud, O^2, formed or fixed in the shoe or body of the gun, so that in case the spring-extractor should fail to act the empty shell will be ejected by the said pin or stud. I sometimes form a roughened inclined projection on the shoe or body of the gun, as shown at O′ in Figs. 1 and 2, for the purpose of ejecting the empty cartridge-shells. The flange of the cartridge-shell will come in contact with the roughened inclined surface of the said projection, and will thereby be thrown laterally out of the gun, and the farther the said shell is drawn backward the greater will be the force exerted to eject the said shell.

To obviate any inconveniences arising from the pressure exerted upon the firing-pin by the gas liberated by the explosion of a cartridge in the barrel, I form a hole, c^{12}, in the forward end of the head of the breech-bolt, as shown in Fig. 34, and I form another hole, B^3, in the shoe or body B′, as shown in Fig. 25. When the breech is closed, these holes will coincide with each other. The hole c^{12} extends into the central hole for the firing-pin a short distance in front of the part thereof of larger diameter. Therefore any gas which may pass through the base of the cartridge-shell will escape through the holes c^{12} B^3, and will thus be prevented from acting upon the larger part of the firing-pin.

What I claim is—

1. The combination of a breech-block head having hollow radial projection c^3, an extractor alongside the projection interlocked with the head, and a spring in the hollow projection to hold the extractor in place and to its work, whereby the parts may be assembled and held together without the use of separate tools, substantially as described.

2. The combination, with the head of a breech-bolt movable with relation to the body thereof and provided with a hollow radial projection for a spring and a recess for the extractor, as described, of the extractor having an arm extending inward beyond the hook and a spring arranged in said hollow projection to hold the extractor in its place and to its work, substantially as described.

3. The combination described of the head and body of a breech-bolt radially movable with respect to each other and an extractor whose shank or body is of general bell-crank form and seated between such parts, whereby the forward end of the body of said bolt serves as a cam for forcing the extracting-hook into engagement with the flange of a cartridge as the said bolt is turned into locking position, substantially as described.

4. In a fire-arm, the combination of the frame or shoe, a trigger-guard provided with groove or slot, a transversely-sliding spring-stop, and a magazine having a lug, f^3, engaged thereby for securing the magazine to the gun, substantially as described.

5. The combination, with a breech-bolt and extractor, of a shoe or receiver having an inclined roughened projection or stud therein in

line with the cartridge being extracted to engage the same when withdrawn by the extractor and to assist in ejecting it, as and for the purposes specified.

6. The combination, with the shoe or receiver of a magazine-gun and a magazine adapted to hold the cartridges side by side and feed them sidewise to the gun, of the curved cut-off or arch-shaped gate having the chord of its arc arranged at an angle of about forty-five degrees, oscillating across the mouth of the magazine, substantially as described.

7. The combination, with the shoe or receiver, of an inclined roughened spring-stud in line with the cartridge being retracted to engage the same when withdrawn by the extractor for automatically ejecting it from the gun, as specified.

8. The combination, with a breech-bolt having a head provided with annular groove c^{10} and longitudinal groove c^{11}, connecting with the same, of a shield or cover provided with projection N′, whereby the shield is detachably connected with said bolt, as set forth.

9. The combination, with a breech-bolt having a projection, C′, and a head provided with annular groove c^{10} and longitudinal groove c^{11}, connecting therewith, of a shield or cover provided with projections N^2 and N′, engaging such projection and grooves, respectively, whereby said shield is detachably connected with the bolt and the body and head of the bolt are secured together, substantially as described.

10. The combination of the shoe or body of a gun, provided with a longitudinal groove along the inside thereof, a breech-bolt, and a shield or cover engaging said bolt, having a rib, N^3, to fit in the groove in the shoe for holding the bolt in position, substantially as described.

11. The combination of a breech-bolt provided with a lateral opening and a shoe or body of the gun, provided with an opening or passage registering therewith when the bolt is locked, for the escape of gas from defective or ruptured cartridges, as set forth.

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

J. P. LEE.

Witnesses:
DAVID YOUNG,
C. JUNGE.