2 Sheets—Sheet 1.

J. W. KEENE.

MAGAZINE FIRE-ARMS.

No. 182,583. Patented Sept. 26, 1876.

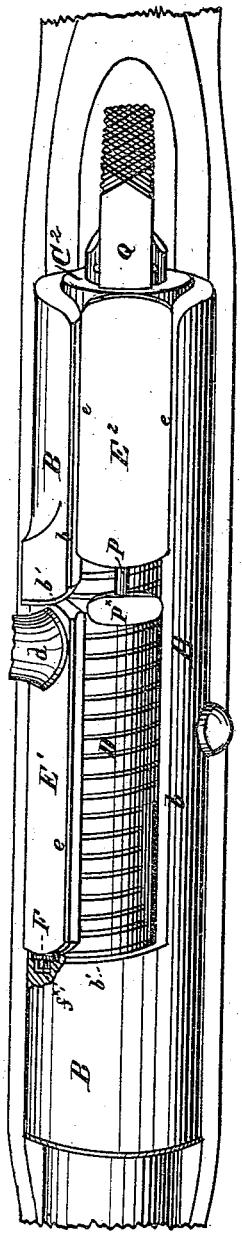

Fig. 1.

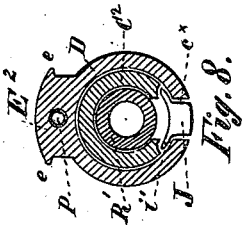

Fig. 8.

Fig. 7.

Fig. 5.

Fig. 6.

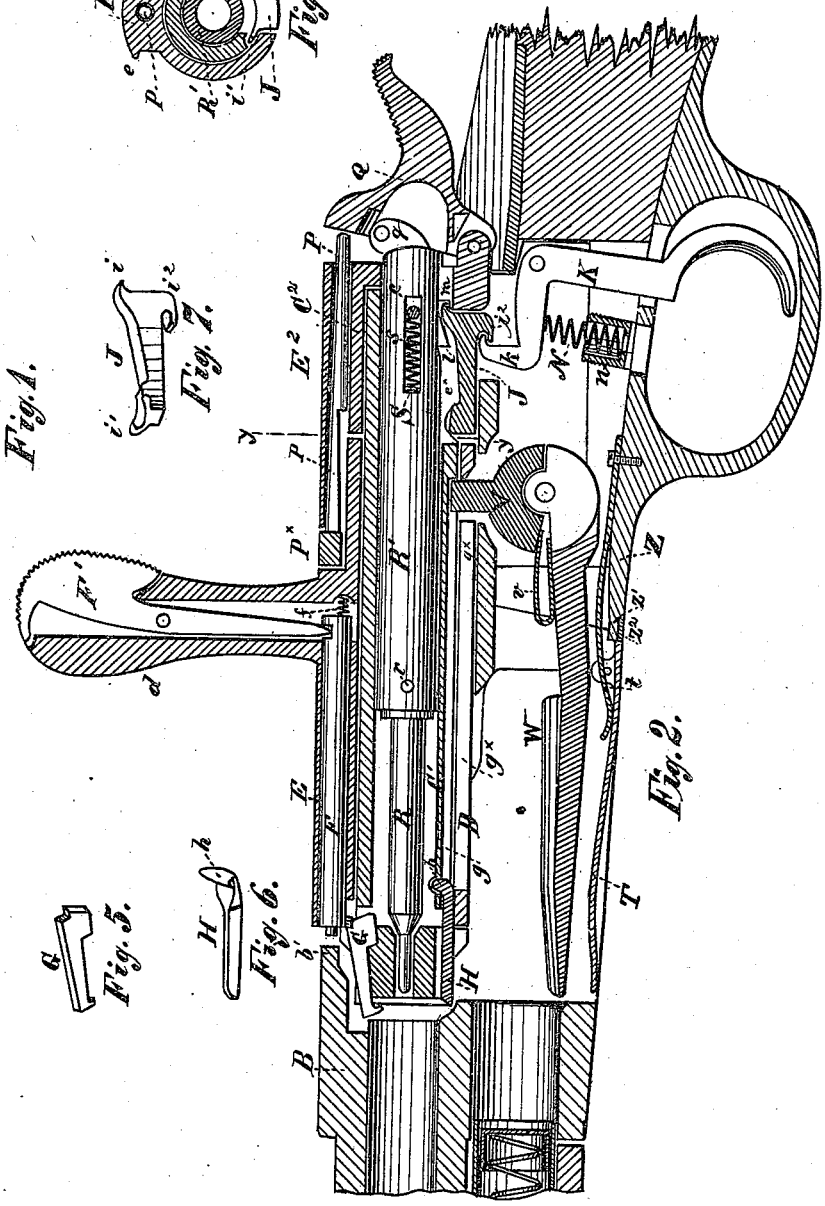

Fig. 2.

Witnesses:

E. R. Brown.

Wm. F. Faucett

Inventor:

J. W. Keene

2 Sheets—Sheet 2.

J. W. KEENE.

MAGAZINE FIRE-ARMS.

No. 182,583. Patented Sept. 26, 1876.

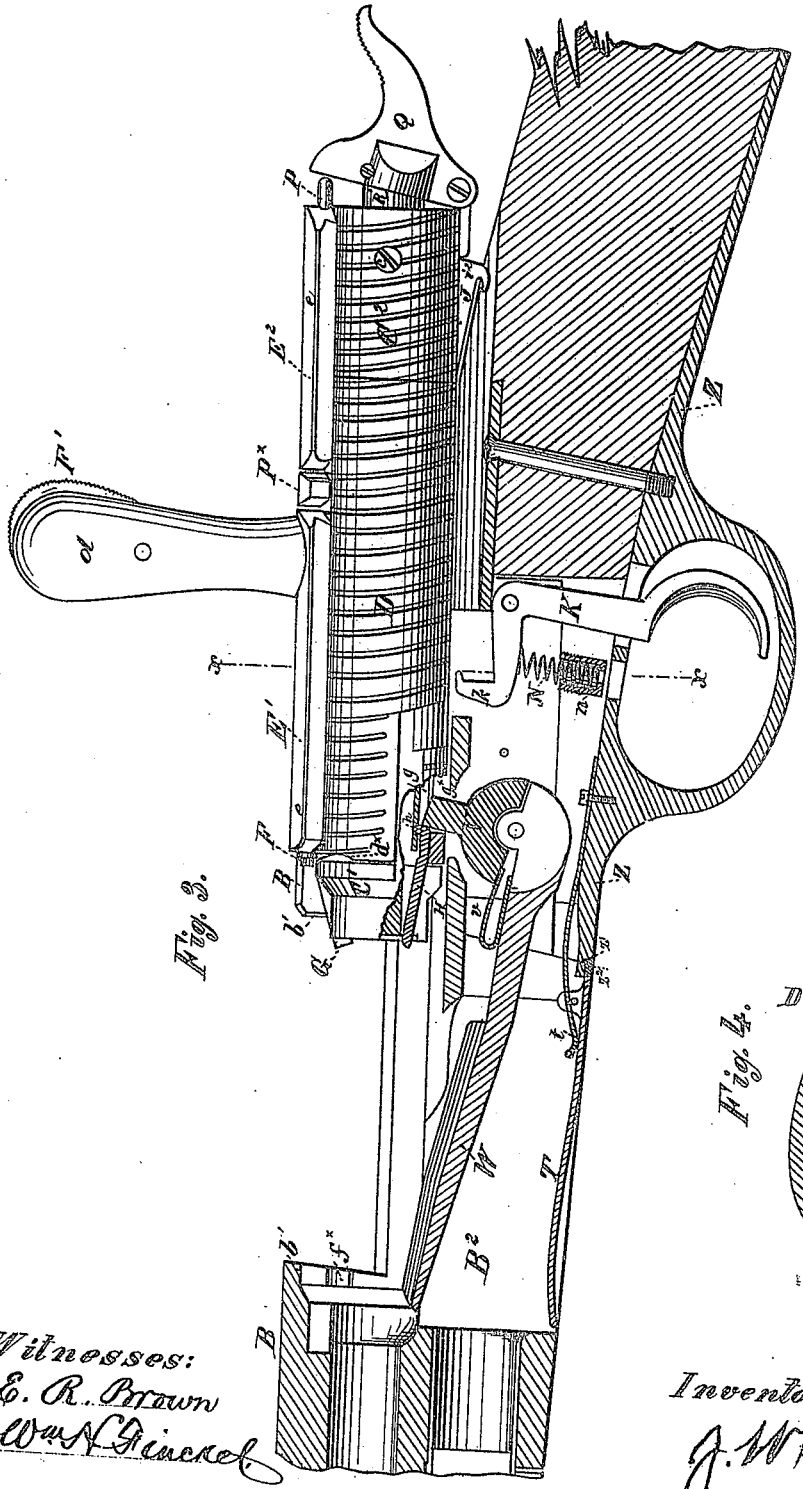

Fig. 3.

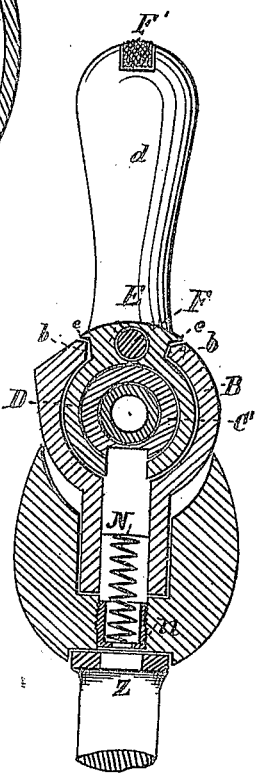

Fig. 4.

Witnesses:
E. R. Brown
Wm. A. Simonds

Inventor:
J. W. Keene

UNITED STATES PATENT OFFICE.

JOHN W. KEENE, OF NEWARK, NEW JERSEY.

IMPROVEMENT IN MAGAZINE FIRE-ARMS.

Specification forming part of Letters Patent No. **182,583**, dated September 26, 1876; application filed February 9, 1876.

To all whom it may concern:

Be it known that I, JOHN W. KEENE, of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Magazine Fire-Arms; and I do hereby declare that the following is a full, clear, and exact description thereof, sufficient to enable those skilled in the art to which my invention appertains to make and use the same.

My invention relates, particularly, to certain improvements in magazine fire-arms similar to those for which Letters Patent were heretofore granted to me—namely, No. 147,945, dated February 24, 1874; No. 148,614, dated March 17, 1874; and No. 172,447 and No. 172,448, dated January 18, 1876; but the various improvements herein described are applicable to fire-arms of any suitable description.

The present invention consists in, first, a novel construction of the locking-sleeve and of the breech-piece or receiver, whereby the operation is facilitated, the friction is reduced, and the bolt is guided, and its displacement prevented; second, a novel construction and combination, with the sleeve and the receiver, of a locking device for securing the breech-bolt when the breech is closed; third, the combination of the locking device with the shell-extractor, whereby said extractor is elastically held in contact with the rim of the cartridge-shell; fourth, a novel construction and mode of attachment and operation of an ejector, for expelling the shell from the receiver; fifth, a novel construction and mode of attachment and operation of a sear for holding the hammer or firing-pin in position either cocked or half cocked; sixth, a novel construction of the trigger, and the combination thereof with the sear for operating the hammer and firing-pin; seventh, a novel arrangement of the trigger-spring, for insuring the engagement of the trigger with the sear, and the engagement of the sear with the hammer or firing-pin; eighth, a novel construction and combination, with the hammer or firing-pin, of a device for placing and holding the gun at half-cock, so as to prevent the premature discharge thereof; ninth, a novel arrangement and operation of a swinging cocking piece or lever, in combination with a reciprocating breech-block, carrying the lock or firing mechanism therein, whereby the operation of cocking the gun is facilitated; tenth, a novel construction of the hammer and firing-pin, whereby several advantages are obtained, as hereinafter particularly described; eleventh, a novel arrangement of a pivoted elastic leaf for closing the bottom of the carrier-well at all times, except when the magazine is being charged from below, said leaf being arranged to allow it to be pressed inward to permit the insertion of a cartridge, and adjust itself in place as soon as the pressure is removed; twelfth, an improved construction and arrangement of the carrier and its operating-lever; thirteenth, an improved construction of the locking-sleeve, and the combination thereof with the shell-extractor for insuring the proper operation of said extractor; fourteenth, an improved construction of the breech-bolt, whereby it is properly guided in its reciprocating motion.

In carrying out my invention I construct the breech-bolt in a single piece, and provide it with a cap or collar attached to it at or near its rear end. The rear cap or collar, and the front end of the bolt, are of a corresponding diameter with the interior of the breech-piece or receiver; and the intermediate portion is smaller, and is surrounded by a sleeve provided with a handle for operating the gun. This construction permits of a rotary, as well as a reciprocating longitudinal, motion being imparted to the sleeve, instead of to the central portion of the bolt, while the bolt itself has a reciprocating motion only. I thus prevent friction against the head of the cartridge, and provide means for operating the gun without allowing any portion of the bolt to rotate.

The top strap or straps may be grooved or flanged on the edges for engagement with tongues, ribs, or projecting edges on the receiver, by which means the bolt is guided in its back and forward motion, and prevented from displacement, while the tongues and grooves, or flanges and projecting edges, form bearing-surfaces and prevent the wear and friction from coming on the surfaces of the sleeve and receiver.

The locking device for securing the breech-bolt, when the breech is closed, consists of a bolt or catch working in the sleeve parallel with the length thereof, and shooting into a recess in the front portion of the receiver. It is provided with a lever for withdrawing it when desired, which lever is connected to the handle of the sleeve, so as to enable the locking device to be released by the act of grasping the handle to operate the gun.

The shell-extractor is loosely connected, at or near its rear portion, to the front portion of the breech-bolt, so as to move freely, and allow its hooked front end to drop of its own weight over the rim of the cartridge in the chamber of the barrel.

In order to insure the engagement of the extractor-hook with said rim during the act of withdrawing the cartridge, and at the same time to preserve the requisite degree of elasticity, the locking bolt or catch is so arranged that when the handle is turned up to open the breech the front end of said bolt or catch bears against the heel of the extractor and holds it in contact with the rim of the cartridge until the bolt is drawn back, when the amount of elasticity is sufficient to allow the extractor to yield, and permit the ejector to expel the shell from the receiver.

My improved ejector is constructed with an arm or head at its rear end, and rests loosely in a recess in the breech-bolt, so as to oscillate freely in its seat to a limited extent. When the breech is closed the ejector does not exert any pressure upon the cartridge-shell; but when the breech-bolt is drawn back to open the breech the rear end of the ejector strikes a projection in the receiver, so as to suddenly elevate its front end and expel the shell.

My improved sear is constructed with an arm or head on its front end, and is hung loosely in a depression or recess in the bolt, so as to work freely in its seat. Near its rear end, on the lower side, is a hook for engagement with the nose of the trigger, and on the upper side is a nose for engagement with the cock and half-cock notches on the hammer.

The three parts last above described are attached and held in place without screws, rivets, or other fastenings.

The trigger is formed with an arm extending somewhat forward of its fulcrum and provided with a nose for engagement with the sear, so that the sear may be released from engagement with the cock-notch by pulling the trigger. The trigger-spring lies in a recess in the receiver, and may be held in place without fastenings of any kind. One end bears against the trigger-arm in such a manner as to hold it in position for engagement with the sear, and, when so engaged, to also hold the sear in position for engagement with the hammer.

In order to avoid the premature discharge of the gun, means are provided for preventing the pulling of the trigger and the release of the firing-pin until the breech is closed and locked and the gun cocked. For this purpose I employ a pin, which is arranged to slide freely in the top strap of the sleeve, and carries a cam or inclined surface at its front end. When the handle of the breech-bolt is turned up, a projecting portion of said handle or of the bolt or sleeve engages with the cam and slides the pin backward until its rear end strikes the cocking-piece or other projecting portion of the hammer or firing-pin, and forces it back far enough to allow the sear to engage with the half-cock notch. As the breech-bolt moves backward or forward, the pin holds back the hammer, and when the handle is turned down to lock the gun the nose of the sear engages with the half-cock notch and prevents the pulling of the trigger; and thus the gun cannot be fired until the hammer is drawn back to the position of full cock, when the pulling of the trigger will release the hammer and allow it to be driven forward.

In some bolt-guns, as heretofore constructed, it is customary to provide the hammer or firing-pin with a cocking-piece rigidly attached or connected thereto; and, in order to cock the gun, it is necessary to pull backward on the cocking-piece in a direction exactly parallel with that in which the hammer or firing-pin reciprocates. This construction necessitates the use of both hands in the operation of cocking the gun—the cocking-piece being operated by one hand, while the gun is grasped by the other hand—and even then the operation is attended with some difficulty and inconvenience. To avoid this difficulty and inconvenience, I employ a pivoted cocking-piece, formed for engagement with the thumb or finger and connected to the hammer or firing-pin in such a manner as to swing or oscillate and to operate as a lever of the second order. By this means the gun is easily cocked by the thumb or finger of the hand which grasps the wrist of the stock, without releasing the grasp and by the application of a small amount of power.

In bolt-guns of the ordinary construction the hammer and firing-pin have been made in one piece, and the seat for the spiral spring has been made by boring from the rear end. In my present invention the firing-pin proper and the part which I call the "hammer" are made in two separate pieces. The seat for the spiral spring is formed by boring from the front end of the hammer, leaving the front end closed and solid, and the firing-pin is attached by inserting its rear end in the front end of the hammer and securing it by a pin or screw. By this means the construction is cheapened and simplified, and the breakage of either part is more easily and economically replaced than if made in one piece, while the closed and solid rear portion of the hammer furnishes a substantial means of attachment for the connection with the cocking-piece. The hammer and firing-pin thus formed work in the interior of the hollow breech-bolt, and the abutment for the rear end of the spiral spring may be formed by the pin or screw which fastens together the

breech-bolt and the rear cap or collar, the hammer being slotted for the reception thereof.

In my Patent No. 148,614, dated March 17, 1874, I have shown a "broken-jointed carrier," which may be pressed inward to allow the magazine to be loaded from the bottom. In my Patent No. 172,447, dated January 18, 1876, I have shown, for the same purpose, a leaf pivoted to and carried by the carrier-lever. In my present invention the leaf is attached to a portion of the receiver or carrier-well, so as to serve the same purpose as described in my said patents, but to operate independent of the carrier-lever. The leaf is provided with a spring for holding it down to close the bottom of the carrier-well at all times, except when the magazine is being charged from below.

In the two last-mentioned patents I have shown two different forms of broken-jointed carriers, which may be pressed inward to load the magazine from the bottom when the breech is closed.

In my present invention I have shown a modification in the form of the joint and mode of attachment of the carrier and lever, the details of which are hereinafter particularly described.

To enable those skilled in the art to which my invention appertains to fully understand the same, I will proceed to describe a mode of carrying it into effect, reference being had to the accompanying drawings, which represents a gun constructed according to my invention, and in which—

Figure 1 is a top view, showing the breech closed and the handle turned down to lock the gun. Fig. 2 is a longitudinal vertical section, showing the breech closed, the handle turned up, and the gun at half-cock. Fig. 3 is a similar view, with the breech open and the breech-bolt drawn back. Fig. 4 is a transverse section, taken in the line *x x* of Fig. 3. Figs. 5, 6, and 7 are detail views, hereinafter referred to. Fig. 8 is a transverse section, taken in the line *y y* of Fig. 2.

The receiver B and carrier-well B^2 are made in one piece of metal, as described in my patent of February 24, 1874, No. 147,945; and the working parts are attached to and carried by an extension of the receiver or the carrier-well, in substantially the same manner as in my patent of January 18, 1876, No. 172,447.

The breech-bolt C^1 is hollow, and carries the hammer and firing-pin. The front end of the bolt forms the recoil-block, and is of a diameter corresponding with that of the interior of the breech-piece or receiver, so as to work freely therein; and the remaining portion is smaller, and its rear end enters the front end of a cap or collar, C^2, and the two parts are secured together by a screw, *c*. The smaller portion of the bolt is surrounded by a sleeve, D, the exterior diameter of which corresponds with that of the cap or collar and the front portion of the bolt, so as to present a uniform diameter when the three parts are in place together. The sleeve D rotates freely on the bolt when the breech is closed, and it is provided with a handle, *d*, for operating it. A portion of one side of the receiver is cut away to receive a portion of the sleeve; and when the bolt is moved forward to close the breech the handle is turned down and prevents the bolt from being moved back.

By this construction, the bolt has a reciprocating motion only, thus reducing the amount of friction thereof in the receiver, and avoiding all friction against the head of the cartridge, while the sleeve surrounding the rear and central portion is allowed a rotary motion in order that the handle may be turned down to lock the gun.

The sleeve and the portion of the bolt which it surrounds may be of any suitable length. They are here shown as extending the greater part of the length of the bolt, in order to obtain strength and a broad bearing-surface, and avoid straining any of the parts when operating the gun.

The top of the breech-piece or receiver is open from near the front end entirely back to the rear end. The width of the opening corresponds with that of a strap, E^2, on the top of the rear cap or collar C^2, and another, E^1, on the top of the sleeve. The sleeve is guided in its reciprocating motion by the engagement of the straps with the edges of the open top of the receiver. The straps E^1 E^2 have ribs or flanges *e* formed on their edges, which ribs or flanges overhang the edges *b* of the receiver and bear upon the same, and thus take up the friction and prevent it from coming upon the surfaces of the sleeve and the rear cap or collar and the inner surface of the receiver, as the bolt is moved forward or backward. Instead of the flanges *e* the edges of the straps and of the receiver may be provided with tongues and grooves, or may be beveled or tapered; but the form here shown is preferred on account of its simplicity and convenience of construction. This feature of my invention is applicable to bolts and receivers of other forms than that shown herein. In a recess in the top strap E^1 or sleeve D a bolt, F, is arranged to slide longitudinally of the sleeve, and is provided with a spring, *f*, for pressing it forward. In a recess in the handle *d* of the sleeve a lever, F′, is pivoted, so that pressure may be applied to its long arm when the handle *d* is grasped by the hand to operate the gun. The short arm of the lever F′ engages with the rear end of the bolt F, so as to draw it backward when the upper or long arm is pressed inward. The lever F′ may be arranged to oscillate transversely to the length of the sleeve, and its short arm may connect with the bolt F by a cam or spiral groove, or in any other suitable manner; but it is here shown as arranged to oscillate parallel with the length of the sleeve, with its lower end or short arm entering a notch in the rear portion of the bolt, and its upper or long arm rough-

ened and projecting sufficiently beyond the surface of the handle to insure the engagement of the hand therewith when the handle is grasped. When the handle *d* is turned down to lock the gun the nose of the spring-bolt F, protruding beyond the end of the sleeve, shoots into a recess, $f^{\times}$, in the front portion of the receiver, (see Figs. 1 and 3,) and securely locks the sleeve and prevents the handle *d* from being turned up. By pressing on the upper end of the lever the bolt is withdrawn from the recess, and the handle may then be turned up. The bolt F might be made to engage with the rear end of the cut-away portion of the receiver; but by the arrangement here shown, I preserve the full strength of the recoil-seat, which is formed by said rear end. The transverse front and rear ends *b'* of the cut-away portion of the receiver are inclined forward and downward. When the breech-bolt is moved forward to close the breech the front end of the strap E^1 strikes the front end *b'* of the open portion of the receiver and arrests the forward movement of the breech-bolt before the recoil-block has driven the cartridge fully home in the chamber of the barrel; and when the handle is turned down to lock the gun the engagement of the front and rear ends of the strap E^1 with the inclined ends *b'* of the cut-away portion of the receiver causes the breech-bolt to move forward with a gradual motion until the cartridge is driven fully home in the chamber of the barrel. By this means the danger of accidental explosion of the cartridge is less than it would be if the cartridge were suddenly driven fully home by the forward motion of the breech-bolt. The extractor G (see Fig. 5) is of similar form and construction to that shown in my Patent No. 172,448, dated January 18, 1876. It is hung loosely by its rear portion in a recess in the upper part of the front end of the breech-bolt or recoil-block, so that its hooked front end will drop of its own weight to the position shown in Fig. 2. It is held in place and prevented from dropping out by having its rear portion surrounded by the front end of the sleeve D. On said front end, slightly to the left of the bolt F, is a depression, $d^{\times}$, somewhat wider than the thickness of the extractor G, and having its greatest depth sufficient to allow the extractor to rise and slip over the rim of the cartridge.

The depression $d^{\times}$ tapers gradually from its deepest portion to the straight portion of the front end of the sleeve. (See Fig. 3.) When the handle *d* is turned up, the front end of the locking-bolt F bears against the heel of the extractor and holds it in said position, but as soon as the handle is turned down, and the locking-bolt is moved away from the extractor, the depression $d^{\times}$ in the front end of the sleeve D is brought opposite to the heel of the extractor, leaving it free to slip over the rim of the cartridge and drop of its own weight. When the handle *d* is fully turned down to lock the gun, the straight portion of the front end of the sleeve bears solidly and rigidly against the heel of the extractor and prevents the possibility of the disengagement of the extractor from the rim in consequence of the explosion or escape of gas. When the handle is again turned up to open the breech, the front end of the locking-bolt is again brought to bear against the extractor, and holds it in contact with the rim of the cartridge until the breech-bolt reaches the end of its backward motion, when the elasticity of the spring *f* allows the bolt F to yield, and the extractor G to rise sufficiently to permit the ejector to expel the shell.

The ejector H (see Fig. 6) is constructed and arranged to operate with an oscillating motion, instead of a rectilinear motion, as in some guns heretofore constructed. It is provided at or near its rear end with an arm or head, *h*, which serves as its center of oscillation. It rests in a recess in the front portion of the breech-bolt on the under side, and its rear end is surrounded by the front end of the sleeve D and prevented from dropping out. The recess corresponds with the shape of the ejector, but is sufficiently larger to allow its front end to rise and fall to a limited extent. When the breech is closed, or the breech-bolt is in the act of moving forward or backward, the front end of the ejector falls of its own weight to the position shown in Fig. 2, so as to exert no pressure on the rim of the cartridge; but when the breech-bolt reaches the end of its backward motion, a projection in the receiver strikes the rear end of the ejector and elevates its front end with a sudden motion to the position shown in Fig. 3, so as to expel the shell from the receiver. The projection shown herein for operating the ejector consists of the upper end of the carrier-lever, but it may be operated by a fixed point or projection of any suitable description.

The sear J works in a slot, $c^{\times}$, in the rear lower portion of the breech-bolt. On or near its front end (see Fig. 7) is an arm or head, i^1, which rests in a recess in the smaller portion of the bolt, and its projecting ends are covered by the cap or collar C^2 on either side of the slot $c^{\times}$, as shown in Fig. 8, by which means the sear is held in place without a pin or other fastening, and is allowed to rise and fall to a limited extent with the head i^1 as a center of oscillation. On the lower side is a hook, i^2, for engagement with the nose of the trigger, and on the rear end is a nose, *i*, for engagement with the cock and half-cock notches of the hammer. The firing-pin or the rear portion thereof, which I call the "hammer," is provided on its under side with a hook, *m*, which serves as the half-cock notch, and a projection or shoulder, *l*, which serves as the cock-notch. When the nose of the sear is engaged with the hook or half-cock notch *m*, it cannot be released by pulling the trigger, but it may readily be released from the cock-notch, as the shoulder *l* presents a straight flat surface for the engagement of the nose *i*.

The trigger K is constructed with an arm extending forward of the fulcrum, so as to operate as an elbow-lever. The nose *k* is of hook form, and extends in a backward direction, for engagement with the hook i^2 on the sear.

The trigger-spring may be of semi-elliptical form, or any suitable construction, in order to operate the trigger above described. As shown herein, however, it consists of a spiral spring, N, resting in a thimble, *n*, screwed or otherwise secured in a recess to the rear of the carrier-well. One end of the spring bears against the trigger-arm, and presses it upward, so as to hold it in position for engagement with the sear, and, when so engaged, to also hold the sear in position for engagement with the cock-notch and half-cock notch. When the breech-bolt is drawn back the rear end of the sear drops below the line of the sleeve, as shown in Fig. 3, and when it is moved forward to close the breech the hook i^2 rides over the trigger-arm, and engages with the nose *k*, as shown in Fig. 2.

In the top strap E^2 a pin, P, is arranged to slide longitudinally of the breech-bolt. The pin P is longer than the strap, and carries on its front end a cam, $P^\times$. When the handle *d* is turned up to the position shown in Figs. 2 and 3, the lower part of the handle, or the rear end of the strap E^1, or other suitable projection on the sleeve D, strikes the cam $P^\times$, and drives it backward, so as to cause the rear end of the pin P to project beyond the rear end of the cap or collar C^2, and strike the cocking-piece, forcing the hammer backward far enough to allow the nose of the sear to engage with the half-cock notch, in which position it is held as long as the handle *d* is turned up. When the handle is turned down to lock the gun, the nose of the sear remains in the half-cock notch, as shown in Fig. 2, and thus prevents the pulling of the trigger and releasing of the hammer or firing-pin until it is brought to the position of full cock. By this means the gun is always at half-cock when in the act of opening, closing, and locking the breech, and all danger of premature explosion is prevented, as the gun cannot be discharged without first bringing it to the position of full cock.

In some cases the top strap E^2 may be rigidly attached to the cocking-piece, and in such cases said top strap would serve as the means for placing the gun at half-cock.

My improved cocking-piece consists of a lever, Q, which may be of any suitable form and construction, but is here shown as similar in form to the hammer of an ordinary hammer-gun, inasmuch as such form is conveniently manipulated, and skill in its operation is readily acquired.

The cocking-piece Q has its lower end pivoted to a lug or extension on the rear end of the cap or collar C^2, and between its fulcrum and upper end it is connected to the hammer or firing-pin by a link, *q*.

By means of this cocking-piece the gun is easily cocked with the thumb or finger of the hand which grasps the wrist of the stock.

This improvement is of particular advantage when the gun is used on horseback, or in any other position where only one hand can be used.

Instead of having the lower end pivoted, and the middle portion connected by a link, as shown, the cocking-piece may be connected to the hammer by a ball-joint, and the lower end may bear against the rear surface of the cap or collar C^2, so as to ride up and down thereon when the cocking-piece is operated.

The hammer R′ is made hollow for the reception of the spiral spring S, which drives the firing-pin. The seat for the spring is bored from the front end, leaving the rear end closed and solid. The firing-pin R has its rear end inserted in the front end of the hammer, and secured by a screw or pin, *r*, or by a male and female screw-thread. The rear abutment for the spring S is here represented as formed by the screw *c*, which secures the cap or collar and the bolt to each other, said screw passing through a slot, *s*, in the hammer.

When the hammer is drawn back the spring S is compressed between the screw *c* and the rear end of the firing-pin; and when released the expansion of the spring drives the firing-pin forward in the usual manner.

The leaf T, for closing the bottom of the carrier-well, is suspended at its rear end by means of a knife-joint hinge, which permits it to rise in the carrier-well, but prevents it from descending below the surface of the guard-plate and stock. It is provided with a spring, *t*, which allows it to be pressed inward to load the magazine from the bottom, but holds it down at all other times in the position shown, to close the bottom of the carrier-well. By this arrangement of the leaf its operation is entirely independent of the carrier.

In order to prevent the breech-bolt from rotating when the handle *d* is turned up or down, the bolt C^1 is provided with a straight longitudinal groove for engagement with a suitable projection in the receiver. As shown herein, this straight groove *g* is formed on the under side of the bolt when applied to a magazine-gun, and the projection consists of the upper end of the carrier-lever, and the groove thus serves to operate the carrier.

In order to allow the projection to reach and engage with the groove in the bolt, I provide in the sleeve D a longitudinal slot, $g^\times$, corresponding in width and location with the groove *g*, and the said projection passes through the slot $g^\times$ into the groove *g*. The rear end of the slot $g^\times$ is cut away in a lateral direction sufficient to allow the sleeve to rotate without coming in contact with the carrier-lever or projection when the handle is turned.

My improved form of broken-jointed carrier is constructed as follows: The carrier lever V is pivoted to the rear end of the car

rier W with a joint somewhat resembling a rule-joint, which prevents the carrier from falling with its upper surface too far below the bottom of the magazine-tube, but allows it to be pressed inward in order to load the magazine from below when the breech is closed. A spring, *v*, keeps the carrier in place when not pressed upon from the outside. This carrier is raised and lowered by the engagement of the carrier-lever with the straight groove *g* in the breech-bolt. When the bolt is moved forward the rear end of the groove *g* strikes the lever N and depresses the carrier; and when the bolt is drawn back and the ejector strikes the lever and expels the shell, as before described, it also operates on said lever to elevate the carrier.

The front end of the guard-plate Z is provided with a lug or lugs, z^1, which hook over a projection, z^2, in the rear lower portion of the carrier-well, by which means said front end is securely held in place without the necessity for a screw at that portion. The rear portion of the plate may be held by a screw passing through it into the stock in the usual manner, and by another passing through the stock and an upper plate, and having its point entering the guard-plate, as shown.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the straps E^1 E^2 and their ribs or flanges *e*, with the edges *b* of the open-topped receiver B, as herein shown and described.

2. The locking device for the breech-bolt, consisting of the spring-bolt F and its operating lever F′, arranged and operating substantially as herein described.

3. The combination of the spring-bolt F with the shell-extractor, when arranged and operating substantially as and for the purpose herein described.

4. A shell-ejector, operating with an oscillating motion and provided with an arm or head, *h*, for holding it in place on the bolt, and serving as its center of oscillation, substantially as herein described.

5. A sear constructed with an arm or head, i^1, for attaching it, a hook, i^2, for engagement with nose of the trigger, and a nose, *i*, for engagement with the cock and half-cock notches, substantially as herein described.

6. A trigger constructed with an arm extending forward and a nose extending rearward, in combination with a sear constructed substantially as herein described.

7. The trigger-spring N, arranged as herein described, in combination with the trigger K, as specified.

8. The combination, with the hammer or firing-pin and a rear cap or collar, of a sliding pin, P, and cam $P^\times$, and equivalent device, for placing the gun at half-cock, substantially as herein described.

9. The combination, with a reciprocating breech-block carrying the lock or firing mechanism therein, of a swinging cocking-piece or lever, arranged and operating substantially as and for the purpose herein described.

10. The combination of the firing-pin R, the hammer R′ provided with the slot *s*, the spring S, and the pin or screw *c*, constructed and arranged as herein shown and described.

11. The leaf T, hinged or pivoted in the bottom of the carrier-well, and operating independent of the carrier, as herein shown and described.

12. The combination, with the reciprocating breech-bolt, of the carrier-lever V, carrier W, and spring *v*, constructed, arranged, and operating as herein shown and described.

13. The locking-sleeve D, having the depression $d^\times$ in its front end, in combination with the extractor G, substantially as and for the purpose herein described.

14. A straight groove in the breech-bolt, in combination with a projection in the receiver, substantially as and for the purpose herein described.

J. W. KEENE.

Witnesses:
E. R. BROWN,
F. MASON.