(No Model.) 2 Sheets—Sheet 1.

J. M. BROWNING.

FIREARM.

No. 580,926. Patented Apr. 20, 1897.

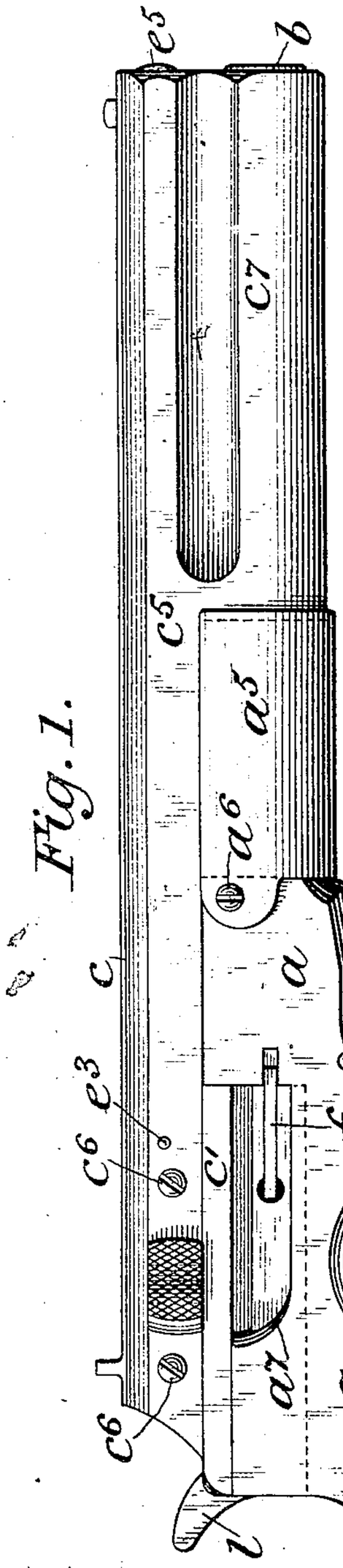

Fig. 1.

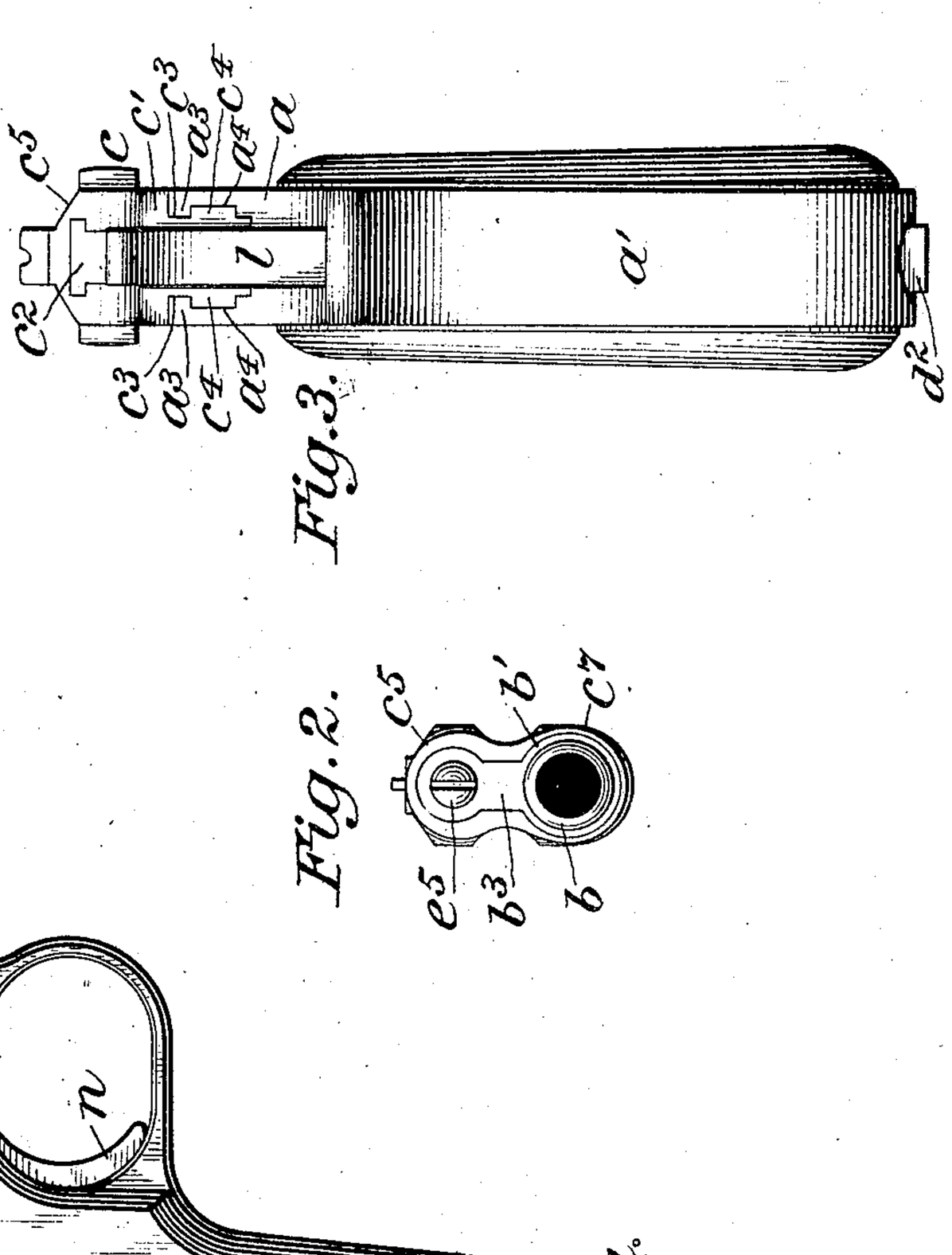

Fig. 3.

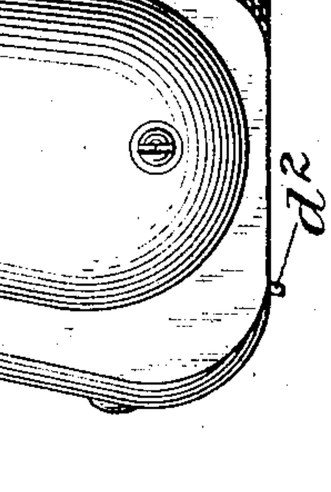

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

J. M. BROWNING.

FIREARM.

No. 580,926. Patented Apr. 20, 1897.

Fig. 4.

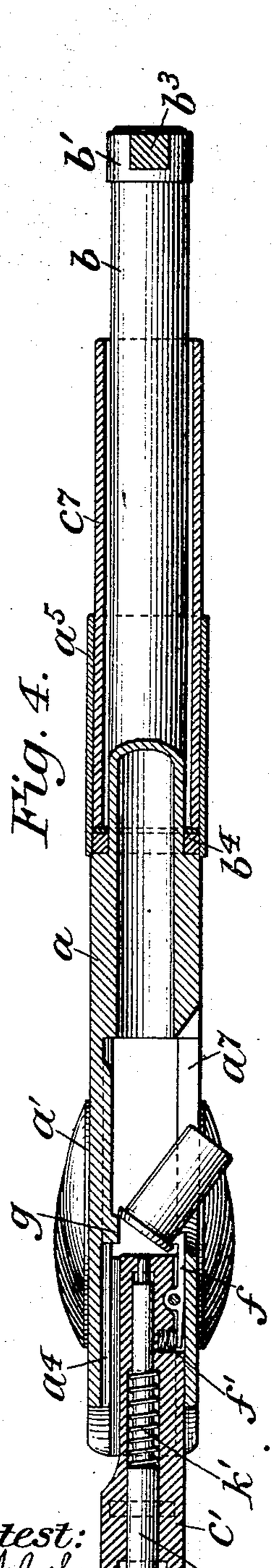

Fig. 5.

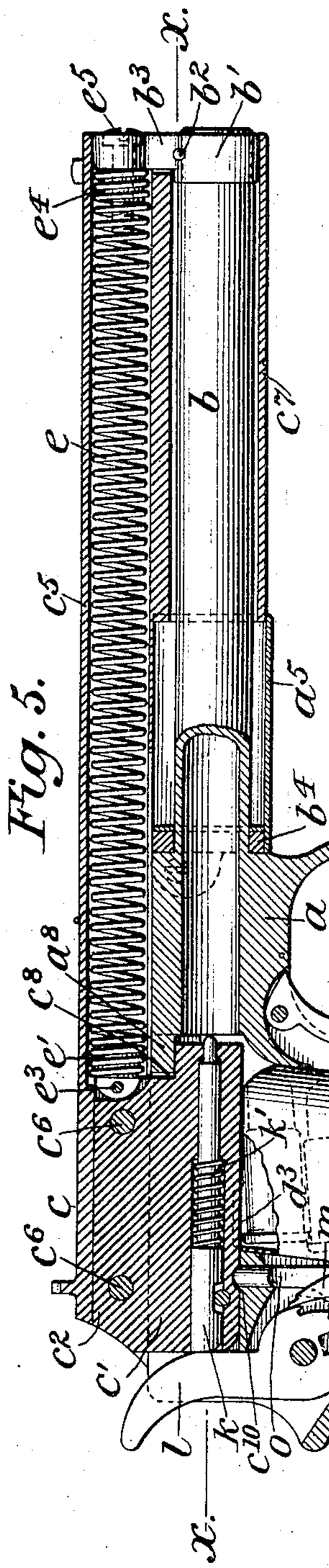

Fig. 7.

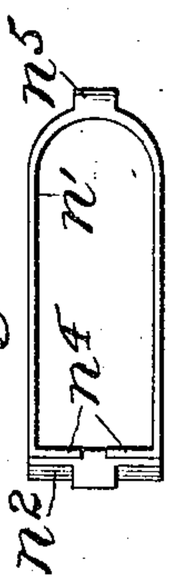

Fig. 9.

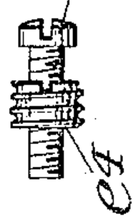

Fig. 8.

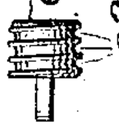

Fig. 6.

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UNITED STATES PATENT OFFICE.

JOHN M. BROWNING, OF OGDEN, UTAH.

FIREARM.

SPECIFICATION forming part of Letters Patent No. 580,926, dated April 20, 1897.

Application filed October 31, 1896. Serial No. 610,659. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. BROWNING, residing at Ogden, in the county of Weber and State of Utah, have invented certain new and useful Improvements in Firearms, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

This invention relates generally to the class of automatic breech-loading firearms, and more especially to firearms of this description in which the several operations, such as the opening of the breech after firing a shot, the ejection of the empty cartridge-shell, the cocking of the hammer, the presentation and introduction of a fresh cartridge into the chamber of the barrel, and the closing of the breech, are automatically effected by the pressure in the barrel of the gases generated by the explosion of the cartridge.

In another application for Letters Patent of the United States filed concurrently herewith and serially numbered 610,657 I have shown and described a firearm of the general class referred to and containing some of the features of the complete firearm which I have illustrated and described herein for the purpose of enabling my present invention to be understood. Such features as are common to the two constructions will be referred to herein so far as may be necessary to enable the present invention to be understood, but the description which follows will relate particularly to the novel features of this case.

The main object which I have had in view has been the production of a firearm of the class referred to which should be simple and inexpensive in construction, not liable to get out of order, and reliable and safe in operation under all conditions of use.

I have hereinafter shown and described my present improvement as adapted to a gas-operated magazine-pistol, but I have chosen this particular kind of firearm merely as a convenient illustration of an embodiment of my invention and do not intend to restrict my invention to an application thereof to a magazine-pistol nor to any particular kind of firearm; nor do I intend to restrict the invention to the use of the several features of improvement together in a common structure.

In the accompanying drawings, in which I have illustrated an embodiment of my invention, Figure 1 is a right-hand side elevation of the pistol with the breech closed and the hammer down. Figs. 2 and 3 are respectively front and rear end views of the same. Fig. 4 is a longitudinal section on a horizontal plane with the barrel shown partly in plan view. Fig. 5 is a longitudinal section on a vertical plane with some of the parts in side view. Figs. 6, 7, 8, and 9 are detail views of parts to be referred to.

The pistol represented in the accompanying drawings comprises a frame *a*, a barrel *b*, fixed in the frame, and a sliding breech block or bolt carrier *c*. The upper portion of the frame *a* forms the receiver and has a seat and suitable guides for the reciprocating breech block or bolt carrier, and below the receiver is the grip or handle *a'*, which is preferably made integral with the frame, but obviously may be formed separately and attached thereto in any suitable manner. Within the grip and extending through the same upward into the receiver is arranged a seat or chamber for the reception of the cartridge-magazine *d*. The latter is substantially of ordinary form and construction, and may consist of a sheet-metal tube in which the cartridges are laid one upon another, resting upon a spring-follower *d'*, by which they are pushed forward into the receiver. It is conveniently retained in place within the grip by a spring-actuated latch d^2. Its upper end is open to permit the escape of the cartridges, the side walls at the rear of the opening being turned in to form ears d^3, Fig. 6, which engage the rim or flange of the topmost cartridge to prevent the escape of the same from the holder except when it is pushed forward, as hereinafter described.

The barrel *b* is secured to the receiver in any usual or suitable manner and extends forwardly from the same to the desired length. The upper portion of the frame is provided interiorly with longitudinal ribs and grooves a^3 a^4, Fig. 3, to engage corresponding ribs and grooves c^3 c^4 of the breech block or bolt carrier *c* or of that portion *c'* of it which may be more properly designated as the "breech-bolt," the said breech-bolt or breech block or bolt carrier being thereby held to the frame and guided thereon in its reciprocation. On the

top of the breech-bolt c' is a strong longitudinal rib c^2, to which the portion c^5 of the breech block or bolt carrier is secured firmly by means of screws c^6, which pass transversely through said portion c^5 and the rib, the top of the rib being increased in width to make it T-shaped and the slot in the slide c^5 being correspondingly shaped to secure a stronger attachment, if desired. The part c^5 slides upon the frame and extends forwardly, so that when the breech-bolt is in closed position the front end of said part or slide c^5 stands over the muzzle of the barrel. In order that the slide may be accurately guided in its movement, its forward portion is extended downward, preferably in the form of a sleeve c^7, which embraces the forward portion of the barrel, an open space being left between the rear end of said sleeve c^7 and the front of the frame a to allow for the longitudinal movement of the sleeve with the slide and breech-bolt. The slide c^5 is bored out or chambered longitudinally from the breech-bolt forward to receive the reaction-spring e. This is a strong closely-coiled spiral spring, in the rear end of which a plug e' is secured by being grooved spirally, as at e^2, Fig. 8, to permit the spring e to be threaded thereon. The plug is secured to the forward end of the rib c^2 by means of a rearwardly-projecting tongue on the plug, which enters into a corresponding recess in the rib, and by a pin e^3, which passes transversely through the slide c^5 and the tongue of the plug e'.

To the front end of the barrel b is secured a collar b' by means of a pin b^2, and from the collar b' an arm b^3 projects upwardly into the line of the reaction-spring e in the slide c^5. A plug e^4, Fig. 9, to which the forward end of the reaction-spring may be secured in the same manner in which the rear end is secured to the plug e', is fixed to the arm b^3 by a screw e^5, thereby maintaining the reaction-spring e in a state of tension. When the breech-bolt is moved to the rear, either by hand or by the powder-gases, the breech is opened, the hammer l is cocked by contact with the rear end of the breech-bolt, and through the described connection the reaction-spring e is farther distended, so that on the release of the breech-bolt it returns the slide and the breech-bolt to their forward position and thereby closes the breech. The rear end of the sleeve c^7 and the front of the frame a limit the rearward movement of the sliding breech block or bolt carrier, or slide and breech-bolt; and in order to diminish the shock with which the sleeve strikes the frame I provide on the barrel in front of the frame a washer b^4, of leather or other suitable material, as a cushion or buffer. The space between the sleeve and the frame when the former is in its forward position is covered by a shield or cover a^5, which is attached to the frame by screws a^6 and extends forward from the frame to the sleeve without interfering with the movements of the latter. As described heretofore, cartridges are pressed upward from the holder or magazine d, but are held from escaping therefrom by the ears d^3. Nevertheless the rim or flange of the topmost cartridge rises above the holder as soon as the breech-bolt c' has passed to the rear of the holder, so that in the forward or closing movement of the breech block or bolt carrier the face of the breech-bolt engages the topmost cartridge, the upper edge of which then lies in the path of the breech-bolt and pushes it directly from the holder into the chamber of the barrel. When the cartridge is exploded, the breech-bolt is driven backward by the powder-gases, and in its movement it effects the extraction of the empty shell from the chamber of the barrel and its ejection from the receiver. For this purpose an extractor f, Fig. 4, of usual construction and acted upon by a spring f', as usual, is arranged in the side of the breech-bolt c' to engage the head or flange of the cartridge during the closing movement and to extract the shell from the chamber of the barrel during the opening movement. As the shell is drawn rearwardly by the extractor which engages the flange on the right-hand side the left-hand edge of the flange strikes a projection g on the left-hand side of the receiver, so that the shell is snapped out or ejected through the opening a^7, formed in the right-hand side of the frame a for that purpose.

The lock mechanism is substantially the same as that described in my said application, but will be briefly explained herein, so that the operation of the firearm may be fully and clearly understood. The breech-bolt c' is provided with the usual firing-pin k and its retracting-spring k', Fig. 5, and the hammer l is pivoted, as usual, in the frame and is acted upon by the usual mainspring l', the shape and position of the hammer being such that it is struck and brought to full-cock position by the breech-bolt c' in the rearward or opening movement of the latter. The sear m is pivoted in the frame in front of the hammer and is normally acted upon by the spring m' to cause it to engage the hammer and keep it cocked. The trigger n is pivoted, as usual, in the frame in front of the grip, and its rearward movement is transmitted to the sear by a connecting-piece n', Figs. 5 and 7. The front end of the latter is supported by the frame and carries a projecting lug n^5, which rests against the trigger. The rear of this piece n' is divided into two arms, which pass around the cartridge-holder without interfering with the same and in rear of it are united by a cross-bar n^2. The rear face of the cross-bar n^2 is beveled and the spring n^3, bent rearwardly at its upper end, bears against the cross-bar n^2, tending to raise it into the path of the sear m and to yieldingly hold the connecting-piece n' and the trigger n in their forward positions. Upon the top of the cross-bar n^2 is a lip or shoulder n^4, adapted to engage the extremity of the sear, so that the rearward

movement of the trigger may be communicated to the sear to cause it to release the hammer *l* when the trigger is operated. In order to prevent the release of the hammer unless the breech is fully closed, a safety-piece *o* is arranged between the breech-bolt *c'* and the connecting-piece *n'*. The top of the safety-piece *o* is guided in a hole in the frame adjacent to the breech-bolt and projects into a recess c^{10} in the latter when the breech is fully closed. The lower portion of the safety-piece passes through a slot m^2 in the sear *m* and is itself slotted, as at *o'*, to straddle the pin upon which the sear is pivoted, so that the longitudinal movement of the safety-piece is limited by said pin. The length of the safety-piece *o* is such that when its upper end stands in the recess c^{10} of the breech-bolt its lower end permits the cross-bar n^2 of the connecting-piece *n'* to be raised by the spring n^3 into position to engage the sear *m*. As soon as the breech-bolt commences to move rearwardly the inclined forward end of the recess c^{10} forces the safety-piece *o* downward against the pressure of the spring n^3 and depresses the cross-bar n^2 below the end of the sear *m*, so that even if the trigger is pressed when the breech block or bolt carrier is out of its closed position the sear cannot be operated thereby and the sear is at all times, except when the breech is closed and the trigger is pressed, free to reëngage the hammer as soon as it is cocked, even though the trigger has not been released.

The spring n^8 is conveniently formed as the middle leaf or member of a single spring-plate, which is trifurcated and whose outer leaves or members *m'* bear upon the sear. This spring-plate may also be secured to the latch d^2 for the cartridge-holder and thereby operate the latter without requiring an additional spring.

For the better lateral support of the breech-bolt in its closed position a tongue a^8 projects from the frame *a* above and in the rear of the barrel and enters a corresponding recess c^8 in the face of the breech-bolt *c'* when the latter is in its forward position. The tongue a^8 also assists in the proper introduction of each cartridge into the barrel, as it guides the bullet end of the cartridge.

From the foregoing description it will be understood that the breech-bolt is not positively locked in the closed position, but is yieldingly held in such position by the reaction-spring *e* and by the pressure of the main-spring *l'*, exerted on the breech-bolt *c'* through the hammer *l*. On firing, the breech-bolt yields to the pressure of the powder-gases in the barrel, which pressure forces the cartridge-shell and breech-bolt rearward. By my construction I am enabled to make the frame and the barrel of such lightness that the breech-bolt and the breech-slide, together constituting the "breech block or bolt carrier," as it has been denominated herein, may be of great strength and weight, and as the inertia of these parts has to be overcome in opening the breech their weight serves as a safeguard by retarding the opening of the breech until the bullet has passed from the muzzle. The momentum of the heavy breech bolt and slide completes the rearward movement after the pressure in the barrel has been relieved, insures the extraction and ejection of the cartridge-shell, and stores energy in the reaction-spring for the closing movement without exposing this spring to the shock which would be occasioned if the breech block or bolt carrier was of lighter weight. The strength of the movable parts and the fact that the front of the frame serves as a stop to arrest their rearward movement insure the safety of the arm even if the reaction-spring should break. It will be observed also that the mainspring, acting through the hammer, which is cocked by the rearward movement of the breech block or bolt carrier, coöperates to retard the rearward movement of the breech block or bolt carrier, but leaves it free to be moved forward by the reaction-spring alone.

The operation of the improved firearm will be readily understood from the foregoing. A filled cartridge-holder is inserted in the grip and the breech-slide is drawn rearward once by hand. This opens the breech, cocks the hammer, presents a cartridge in front of the breech-bolt, and distends the reaction-spring. When the breech-slide or breech block or bolt carrier is released, the reaction-spring returns it to the forward position and transfers the topmost cartridge from the holder to the barrel. If now the trigger is pulled and a shot fired, the breech is automatically opened, the hammer is again cocked, the empty shell is extracted and ejected, and a new cartridge is presented, energy being at the same time stored in the reaction-spring to effect the forward movement of the breech block or bolt carrier. These operations are repeated so long as cartridges are supplied. The automatic opening and closing of the breech and cocking of the hammer follow so rapidly upon the pulling of the trigger that several successive shots would be fired before the trigger could be released by the finger, but, as above explained, the first of the opening movement releases the sear from the trigger, leaving the sear free to reëngage the hammer when it is again cocked and to retain it in its cocked position until the trigger is released and again pulled. This insures perfect control of the arm.

It will be understood that the features of improvement which I have described herein are not necessarily combined in the same structure with the other features of the firearm which, for purposes of explanation, I have shown and described herein, nor are they necessarily employed in a firearm of the particular character of that shown. Obviously also various changes in form and arrangement of parts may be made within the scope of my invention.

What I claim, and desire to secure by Letters Patent, is—

1. In a firearm, the combination with a frame and a barrel carried by said frame, of a sliding breech-bolt, and a forward extension or arm attached to said breech-bolt and extending forward alongside the frame and barrel, said extension or arm having a sleeve surrounding the barrel, whereby the movement of said extension and breech-bolt is guided by the barrel and is limited rearwardly by contact of the rear end of said sleeve with the front of the frame.

2. In a firearm, the combination with a frame and a barrel carried by said frame, of a sliding breech-bolt, a forward extension or arm attached to said breech-bolt and extending forward alongside the frame and barrel, said extension or arm having a sleeve surrounding the barrel, and a buffer or cushion interposed between the front of the frame and the rear end of said sleeve.

3. In a firearm, the combination with a frame and a barrel carried by said frame, of a sliding breech-bolt, a forward extension or arm attached to said breech-bolt and extending forward alongside the frame and barrel, said extension or arm having a sleeve surrounding the barrel, and a shield attached to the frame and covering the space between said sleeve and the front of the frame.

4. In a firearm, the combination with a frame and a barrel carried by said frame, of a sliding breech-bolt, a forward extension or arm attached to said breech-bolt and extending forward alongside the frame and the barrel, and bored out or chambered longitudinally, and a reaction-spring disposed within said extension or arm and having its rear end connected to said breech-bolt and its forward end connected to the barrel near its muzzle.

5. In a firearm, the combination with a frame having a grip or handle to receive a magazine, and a barrel, of a sliding breech-bolt, a forward extension or arm attached to said breech-bolt and extending forward alongside the frame and barrel, said extension or arm having a sleeve surrounding the barrel, a reaction-spring secured to said breech-bolt and to said barrel, and cartridge-exploding, shell-extracting and shell-ejecting devices carried with said breech-bolt.

6. In a firearm, the combination with a frame having a grip or handle to receive a magazine, and a barrel, of a sliding breech-bolt, a forward extension or arm attached to said breech-bolt and extending forward alongside the frame and barrel, said extension or arm being bored out or chambered longitudinally and having a sleeve surrounding the barrel, a reaction-spring disposed within said extension or arm and connected at one end to said breech-bolt and at the other end to the barrel near its muzzle, and cartridge-exploding, shell-extracting and shell-ejecting devices carried with said breech-bolt.

7. In a firearm, the combination with a frame, a barrel carried by said frame, and a sliding breech-bolt, of a spiral reaction-spring and a plug detachably secured to said frame or barrel and spirally grooved or threaded to engage said reaction-spring.

This specification signed and witnessed this 17th day of October, A. D. 1896.

JOHN M. BROWNING.

In presence of—

MATTHEW S. BROWNING,

M. J. HALL.