No. 621,747. Patented Mar. 21, 1899.

J. M. BROWNING.

GAS OPERATED FIREARM.

(Application filed Dec. 28, 1897.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

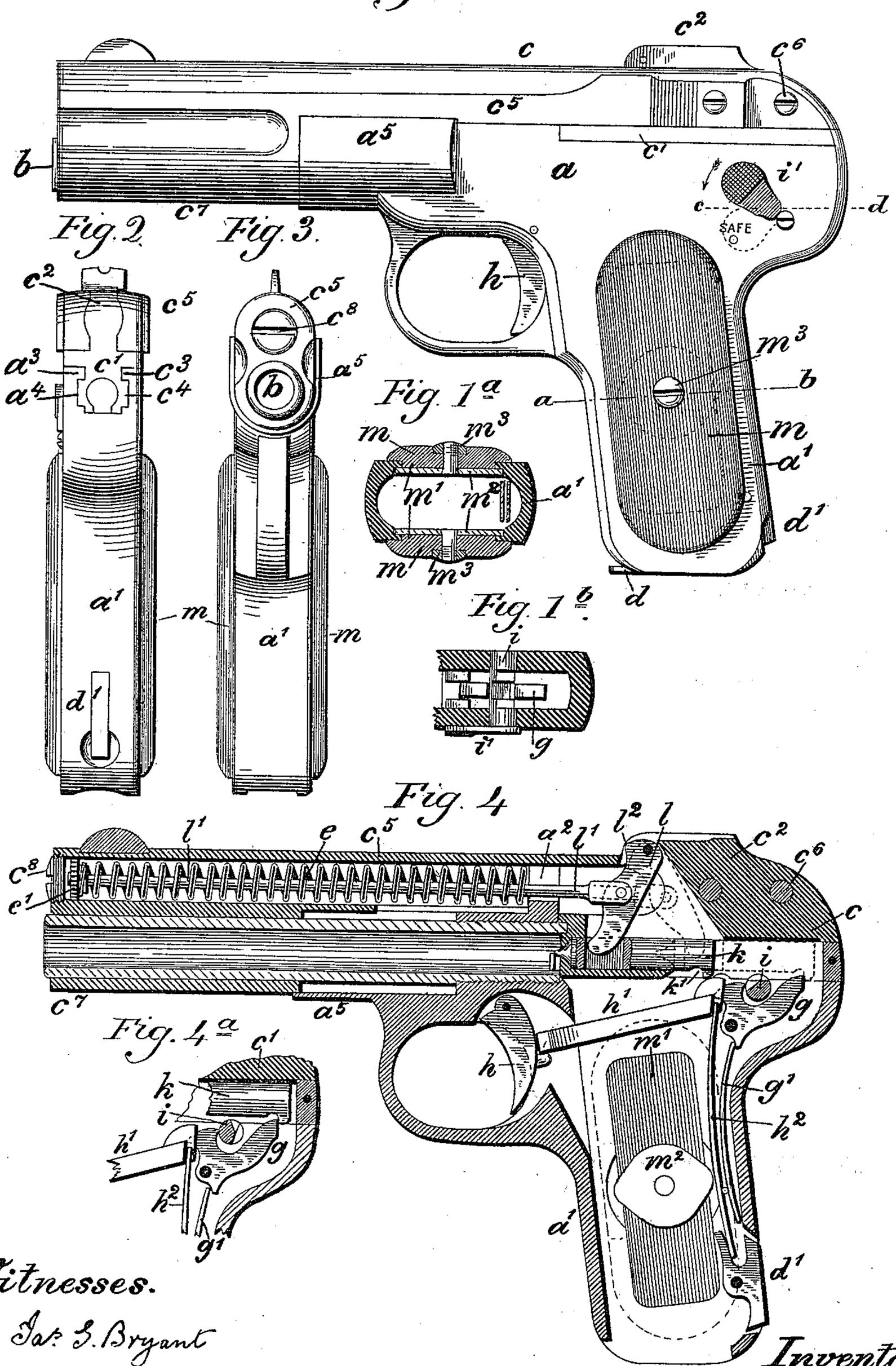

Fig. 2.

Fig. 3.

Fig. 1a.

Fig. 1b.

Fig. 4.

Fig. 4a.

Witnesses.

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Fig. 5.

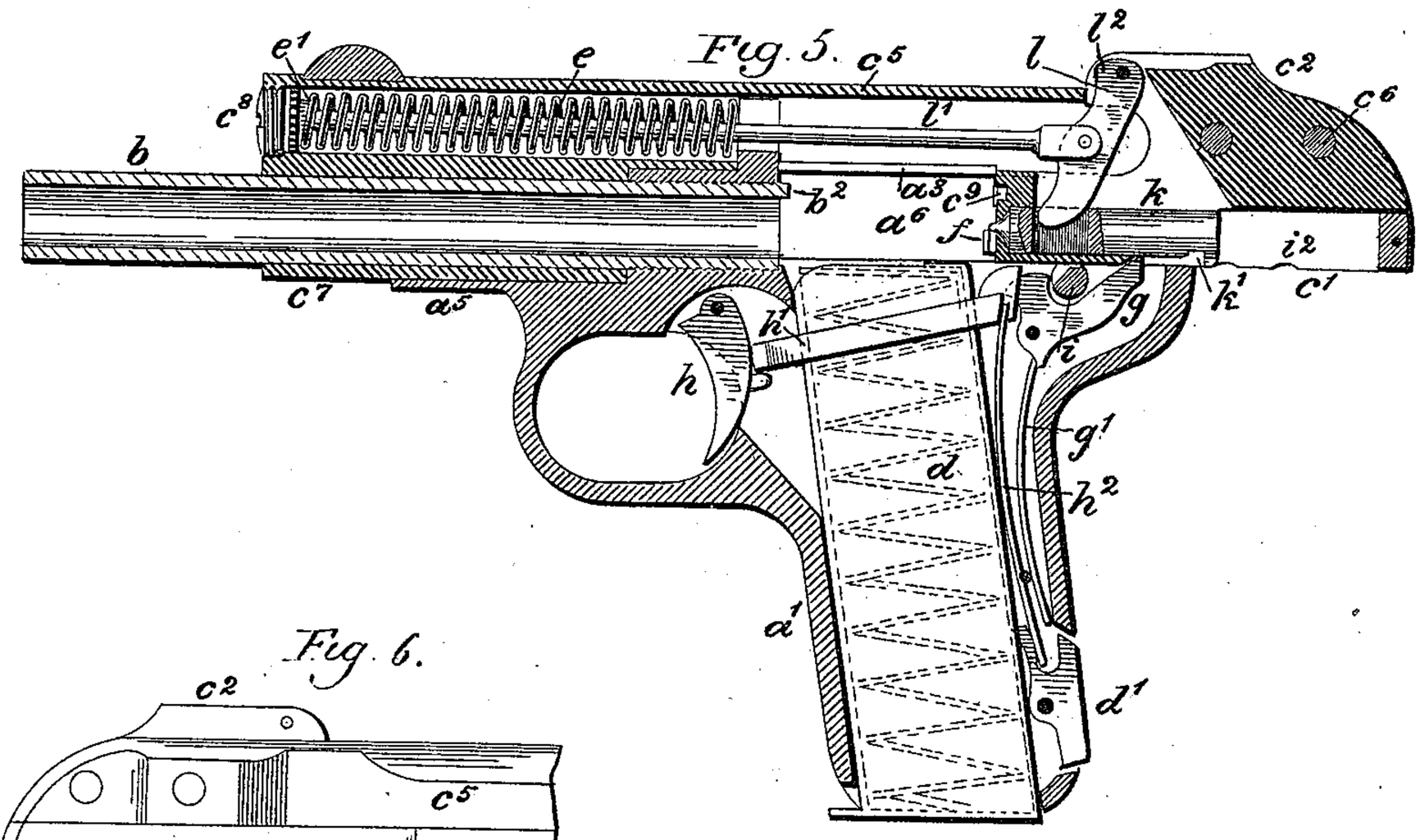


Fig. 6.

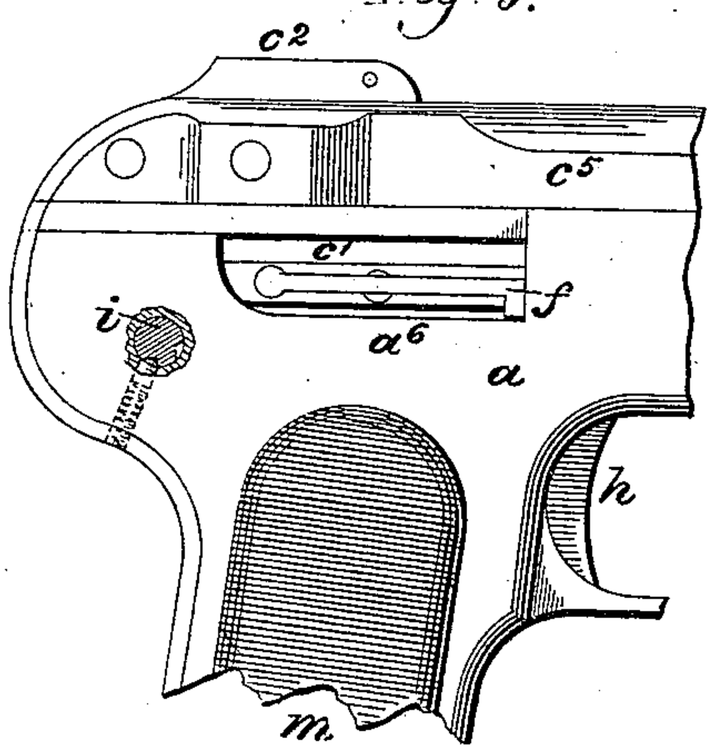


Fig. 7.

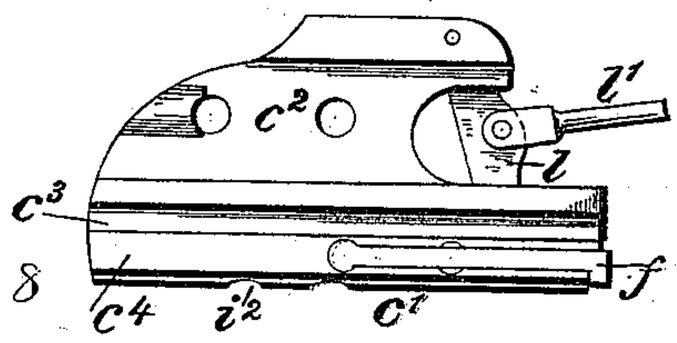
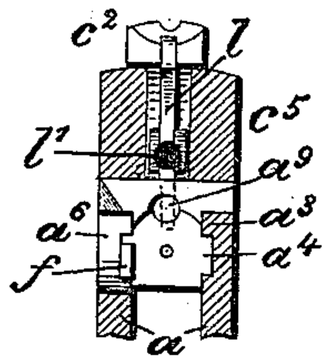


Fig. 8



Witnesses.

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UNITED STATES PATENT OFFICE.

JOHN M. BROWNING, OF OGDEN, UTAH.

GAS-OPERATED FIREARM.

SPECIFICATION forming part of Letters Patent No. 621,747, dated March 21, 1899.

Application filed December 28, 1897. Serial No. 663,845. (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 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.

My invention comprises, further, improvements in firearms of the class described in United States Patent No. 580,926, applied for by me and granted April 20, 1897, said patent 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 improvements 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 left-hand side elevation of the pistol with the breech closed. Figs. 2 and 3 are respectively rear and front end views of the same. Fig. 4 is a longitudinal section, on a vertical plane, with the breech closed. Fig. 5 is a longitudinal section, on a vertical plane, with the breech open. Figs. 6, 7, 8, and 4^a are detail views of parts to be referred to. Fig. 1^a is a horizontal section on the plane indicated by the line *a b* of Fig. 1. Fig. 1^b is a horizontal section on the plane indicated by the line *c d* of Fig. 1.

The pistol represented in the accompanying drawings comprises a frame *a*, a barrel *b*, fixed in the frame, and a sliding breech-piece *c*. The upper portion of the frame *a* forms the receiver and has a seat and suitable guides for the reciprocating breech-piece, 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, by which they are pushed upward into the receiver: It is conveniently retained in place within the grip by a spring-actuated latch *d'*. 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 engage the rim or flange of the topmost cartridge and 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. 2, to engage corresponding ribs and grooves c^3 c^4 of the breech-piece *c* or of that portion *c'* of it which may be more properly designated as the "breech-bolt," the said breech-bolt or breech-piece 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-piece is secured firmly by means of screws c^6, which pass transversely through said portion c^5 and the rib, the central portion of the rib being increased in width 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 part of the frame a supporting the barrel to allow for the longitudinal movement of the sleeve with the slide and breech-bolt. The slide c^5 is bored out to form a longitudinal chamber from the breech-bolt forward to receive the reaction-spring e, and at the front this chamber is closed by a screw-plug c^8.

The reaction-spring e is a strong spiral spring, the rear end of which stands against the shoulder a^2 of the frame, which at the breech end of the barrel projects upward into the chamber of the slide c^5. A plug e' is secured to the forward end of the spring e and is fitted to slide freely in the chamber of the slide.

The forward part of the top rib c^2 of the breech-bolt is divided by a vertical cut, forming a seat for the lever l, which is pivotally attached to the rib c^2 and depends through a vertical opening in the body of the breech-bolt c'. To the central part of the lever l is attached the connecting-rod l', which extends forward from the lever through a cut in the part a^2 of the frame and through the spring e to the plug e', which is firmly attached to the forward end of the rod l', thereby maintaining the reaction-spring e in a state of compression. When the breech-bolt is moved to the rear, either by hand or by the powder-gases, the breech end of the barrel is opened, and through the described connection the reaction-spring e is further compressed, so that on the release of the breech-bolt the spring e returns the slide and the breech-bolt to their forward position, and thereby closes the barrel. The rear end of the sleeve c^7 and the face of that portion of the frame a which supports the barrel limit the rearward movement of the sliding breech piece or slide and breech-bolt. 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 I prefer to make integral with the frame, and which 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. 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-piece the face of the breech-bolt engages the topmost cartridge 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 of usual construction 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 on the left-hand side of the receiver, so that the shell is ejected through the opening a^6, formed in the right-hand side of the frame for that purpose.

My improved firing mechanism varies in part from that described in my said patent and will be briefly explained herein, so that the operation of the firearm may be fully and clearly understood. The breech-bolt c' is chambered, as usual, forming a seat for the hammer k, the forward part of which forms the firing-pin, and the lever l, passing, as described above, through an opening in the body of the breech-bolt, extends into a vertical slot in the hammer k, and under the action of the spring e and the rod l' the lever forces the hammer to its forward position, and the forward movement of the rod l' is transmitted to the breech-bolt c' by the lever l at its pivot and also at its point bearing against the hammer. Below the receiver and the breech-bolt the sear g is pivoted in the frame in rear of the grip and is provided with the usual sear-spring g', and the breech-bolt is slotted, and the hammer k is provided with the usual cock-notch k'. In front of the grip the trigger h is pivoted in the frame, and from the trigger a connecting-piece h' extends to the sear and serves to transmit the rearward movement of the trigger to the sear without interfering with the cartridge-magazine. The spring h^2 returns connecting-piece h' and the trigger h to the forward position when the latter has been released. When the breech-bolt is moved to the rear in opening the breech end of the barrel, the hammer k moves with it and the notch k' passes to the rear of the sear-nose, Fig. 5. On the release of the breech-bolt the extension of the spring e, transmitted through the rod l' to the lever l, causes the latter to return the breech-bolt forward; but when the notch k' arrives above the sear-nose the latter enters the notch and retains the hammer at full-cock, as shown in Fig. 4^a and in Fig. 4 in dotted lines. During the remainder of the closing movement the extension of the spring e is transmitted to the

breech-piece through the lever *l* at its pivot only, and when the breech-bolt arrives fully forward the lever *l* assumes the position shown in dotted lines in Fig. 4, inclining rearward from its pivot and its point resting against the forward portion of the hammer. If now the trigger is pulled rearward, the sear-nose is moved down out of the path of the hammer and the latter is thrown forward by the lever *l* under the force of the spring *e*. In this manner the spring *e* not only serves to close the barrel, but also causes the hammer to strike the firing blow upon the cartridge and thus makes the addition of the usual mainspring for this purpose unnecessary.

For perfect safety in handling and carrying this pistol even when loaded and with the hammer at full-cock I have provided a strong horizontal bolt *i*, which passes transversely through the frame below the breech-bolt and between the sear and the hammer, Figs. 1, 1[b], 4, 4[a], 5, and 6. On the outside of the frame the safety-bolt *i* has a handle *i'*, by which it may be turned through an angle of about ninety degrees, Figs. 1 and 1[b], and segments of the bolt *i* are cut away, so that if it is turned to the position shown in Figs. 4 and 5 the breech-bolt may be moved rearward and the sear may be moved to release the hammer. In the bottom of the breech-bolt I provide a transverse recess i^2, which stands above the safety-bolt *i* when the breech-bolt is closed, Figs. 4 and 4[a], and into which a portion of the bolt *i* enters if it is turned from the position shown in Fig. 4 to that shown in Fig. 4[a], thus securely locking the breech-bolt in its forward or closed position. In this position the central part of the safety-bolt *i* bears against a shoulder formed on the sear *g* above its pivot, Fig. 4[a], and positively locks the sear and prevents it from releasing the hammer, if the latter is in the full-cocked position. As the hammer cannot be seen when the breech is closed, I provide a projecting point l^2 on the lever *l* in front of its pivot. This point can be seen in the lever's seat from the outside when the hammer is forward, but disappears when the latter is cocked, thus serving as an index to show the position of the hammer, Fig. 4.

In Fig. 6 a convenient method of yieldingly retaining the safety-bolt *i* in either of its positions is shown. For this purpose I arrange in the side of the frame a hole radial to the bolt *i* and in it a short piston, a spiral spring and screw-plug closing the hole. The piston has a conical point, and two correspondingly-shaped recesses in the safety-bolt *i* serve to yieldingly hold the latter in its two positions.

In Figs. 1 and 1[a] I have shown a novel, simple, and efficient way of removably attaching the cheek-pieces upon the pistol-grip when the interior of the latter is utilized as a magazine-seat. On the inner surface of each cheek-piece *m* I form a part *m'*, which slightly projects into the opening in each side of the grip, thus preventing the cheek-pieces from moving in any direction but outward. Upon the part *m'* each cheek-piece has a plate m^2 of oblong shape and attached to the cheek-piece, so that it may be readily turned from the outside, as by a stud and a nut m^3, provided on the outside with a slot. Within each side of the grip a shallow partly-circular recess forms a seat for the oblong plate, which in the position shown in Figs. 1[a] and 4 securely locks the cheek-piece in place, while to remove it the nut m^3, and with it the plate m^2, is turned through an angle of ninety degrees, whereby plate and cheek-piece are released.

For the better lateral support of the breech-bolt in its closed position a stud b^2 projects from the barrel *b* and enters a corresponding recess c^9 in the face of the breech-bolt *c'* when the latter is in its forward position. The stud b^2 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*. 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-piece," 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 barrel their weight serves as a safeguard by retarding the opening 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-piece were 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 insures the safety of the arm even if the reaction-spring should break.

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 barrel, cocks the hammer, presents a cartridge in front of the breech-bolt, and compresses the reaction-spring. When the breech-slide or breech-piece 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 barrel 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-piece. These operations are repeated so long as cartridges are supplied.

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, a forward extension attached to said breech-bolt and extending alongside the frame and barrel, and chambered longitudinally, a shoulder on said frame projecting into the chamber of said extension, a reaction-spring disposed within said extension, having its rear end supported by said shoulder on the frame and having its forward end fitted to freely slide in said extension, and a connecting-rod having its forward end secured to the forward end of said reaction-spring, and passing through said reaction-spring and through said shoulder on the frame, and having its rear end pivotally connected with said breech-bolt.

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 of the frame and the barrel, and bored out or chambered longitudinally, a reaction-spring disposed within said extension or arm and having its rear end supported by said frame, a hammer arranged within said breech-bolt, a lever pivoted in said breech-bolt and extending into a recess in said hammer, and a rod having its rear end connected to said lever and having its forward end connected to the forward end of said reaction-spring.

3. 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 attached to said breech-bolt and extending alongside the frame and barrel, and chambered longitudinally, said extension having a sleeve surrounding the barrel, a shoulder on said frame projecting into the chamber of said extension, a reaction-spring disposed within said extension and having its rear end supported by said shoulder on the frame and having its forward end fitted to freely slide in said extension, a connecting-rod having its forward end secured to the forward end of said reaction-spring, and passing through said reaction-spring and through said shoulder on the frame and having its rear end pivotally connected with said breech-bolt, and cartridge-exploding, shell-extracting and shell-ejecting devices carried with said breech-bolt.

4. 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 having its rear end supported by said frame, a hammer carried by said breech-bolt, a lever pivoted in said breech-bolt and connected with said hammer, a connecting-piece between said lever and the forward end of said reaction-spring, and shell-extracting and shell-ejecting devices carried with said breech-bolt.

5. In a firearm the combination with a frame, a barrel carried by said frame, a sliding breech-bolt and a hammer arranged within said breech-bolt, of a lever pivoted in said breech-bolt and engaging said hammer, and a reaction-spring supported at one end by said frame and having its other end connected with said lever.

6. The combination with the grip of a pistol-frame, of a cheek-piece, having a projection to enter the opening in the side of the grip, an oblong plate movably attached to the cheek-piece, a recess within the grip for the reception of the ends of said oblong plate, and means for turning said plate to engage said recess, and to disengage it therefrom.

This specification signed and witnessed this 15th day of December, A. D. 1897.

JOHN M. BROWNING.

In presence of—
KATE LINEHAM,
M. J. HALL.