No. 818,739. PATENTED APR. 24, 1906.

J. M. BROWNING.

FIREARM.

APPLICATION FILED AUG. 18, 1905.

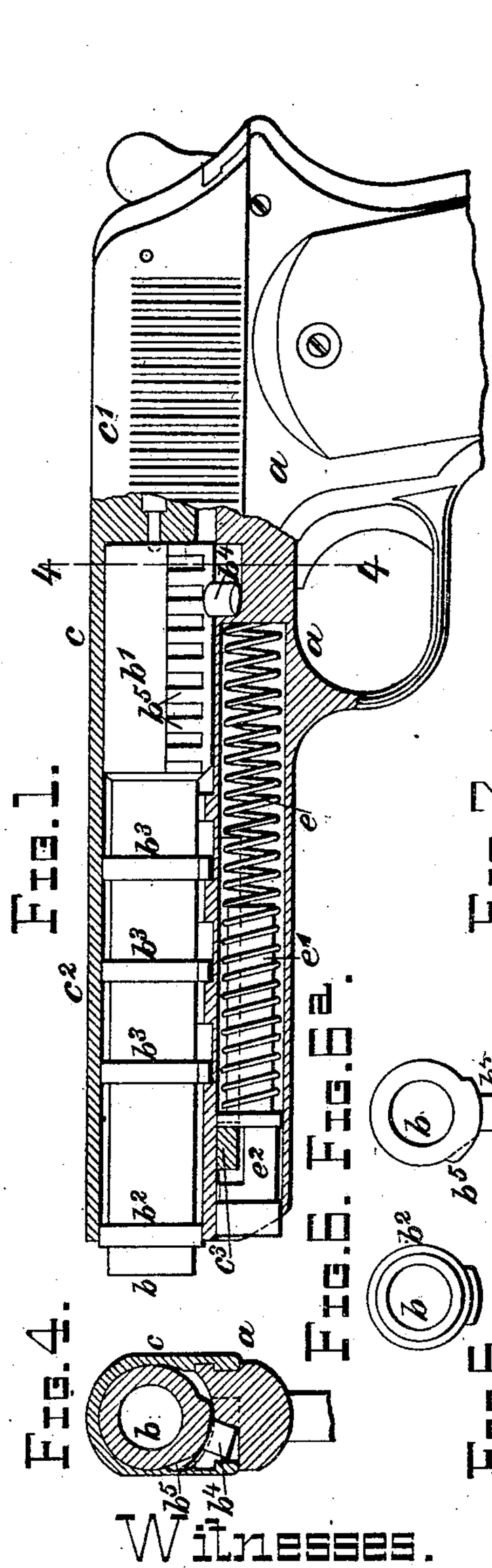

Fig. 1.

Fig. 4.

Fig. 6.

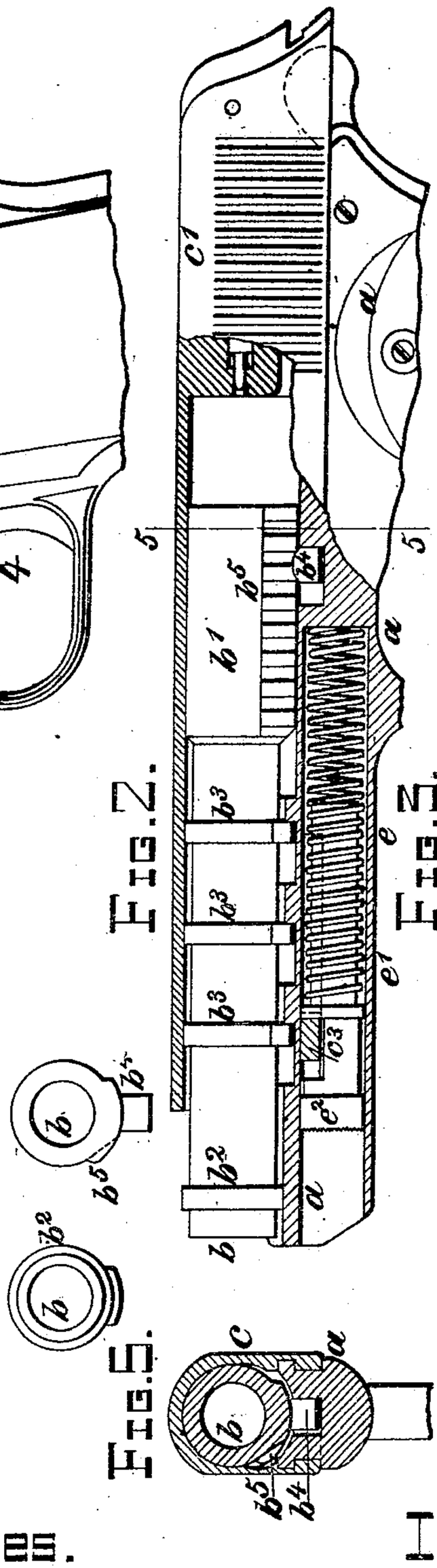

Fig. 2.

Fig. 6.

Fig. 5.

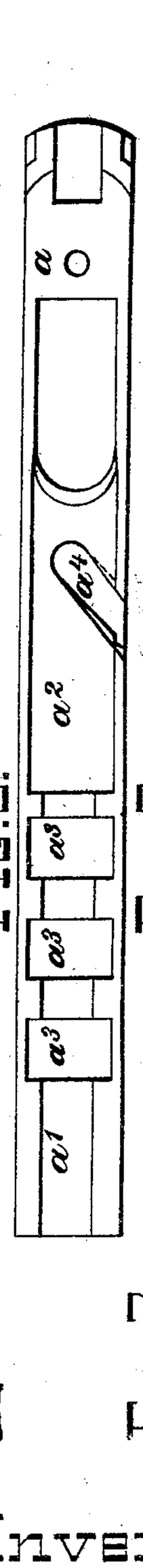

Fig. 3.

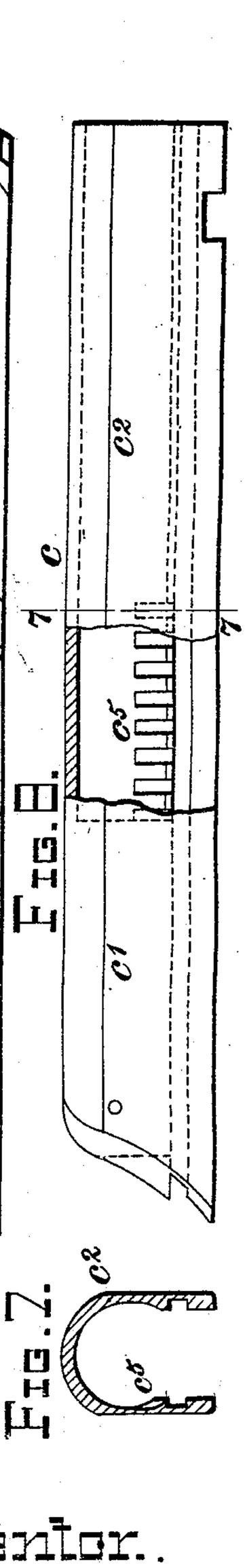

Fig. 8.

Fig. 7.

Witnesses.

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UNITED STATES PATENT OFFICE.

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FIREARM.

No. 818,739. Specification of Letters Patent. Patented April 24, 1906.

Application filed August 18, 1905. Serial No. 274,723.

To all whom it may concern:

Be it known that I, JOHN M. BROWNING, a citizen of the United States, 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 to automatic firearms of that 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 loaded cartridge to the chamber of the barrel, and the closing and locking of the breech—are automatically effected through or by the energy of the recoil of the breech-block or that part which at the time of firing the shot closes the breech of the barrel; and the invention more especially relates to firearms of this description, in which, in firing, the barrel and the breech-block are interlocked and recoil some distance together, and during this rearward movement the barrel has another movement imparted to it, whereby it is unlocked from the breech-block, and after its release the movements of the barrel are arrested, while the breech-block continues to recoil until the breech is fully opened and in which during the opening movement of the breech-block energy is stored in a spring, the reaction of which is utilized to effect the return or closing movement of the breech-block. It is essential for the proper operation of firearms of this class that the breech-block and the parts connected and moving with it should be made as heavy as is practical, so that it may store a maximum amount of energy in the short period of time during which on firing the rearward pressure of the powder-gases in the barrel acts upon the breech-block and initiates its recoil and so that the breech-block may continue to recoil under its momentum alone to complete the opening of the breech and the compression of the reaction-spring after the gas-pressure has ceased because relieved by the exit of the bullet from the barrel. On account of the limited total weight practical for a small-arm, and especially for a pistol, it is necessary, in order to be able to give a maximum weight to the breech-block, that the other parts of the arm be constructed as light as possible. This is especially important regarding the barrel of this class of arms, for the additional reason that at the commencing of the recoil the light barrel may readily yield to and move rearward with the breech-block while it remains interlocked therewith, and in order that when unlocked from the breech-block the movements of the barrel are arrested the stress caused by this sudden stopping may not be too great to be absorbed without injury to either the barrel or the frame of the arm. The importance of these relations as to their weight between the breech-block and the barrel remains the same when the caliber and weight of the projectile and the powder charge are increased; but experience has shown that in a small-arm of this class of large caliber, intended to fire powerful charges of powder, the additional strength required in the barrel in its connections with and attachment to the frame, and especially in the parts of the barrel and frame by which the movements of the one upon the other are arrested, is so much greater in proportion to the weight of these parts that the constructions heretofore used in arms of this class of smaller caliber cannot be relied upon as perfectly safe.

One object of the present invention is to provide in a firearm of this class a simple but strong and reliable means of attachment and connection between the barrel and the stationary frame of the arm which shall leave the barrel free to recoil a limited distance interlocked with the breech-block and which shall during this rearward movement guide the barrel and impart to it at the same time another movement by which it will be unlocked from the breech-block and which shall at the last of the return or forward movement of the breech-block guide the barrel while it is moved forward by the breech-block and impart to it another movement by which the barrel and the breech-block will be interlocked when they arrive at the forward firing position.

Another object of the invention is to provide in a firearm of this class a means which shall positively limit the rearward movement of the barrel with the breech-block, arrest the movements of the barrel as soon as the same has become unlocked from the breech-block, and which shall be adapted in form and in strength to transmit to the frame the stress due to the sudden arrest of the movements of the barrel without injury resulting therefrom to either the barrel or the frame.

These objects are attained by mechanism of simple and practical construction which is efficient, perfectly safe, and not likely to get out of order.

The embodiment of my improvements represented in the accompanying drawings is a magazine-pistol; but it will be understood that I do not intend to restrict the present invention to a magazine-pistol nor to any particular kind of firearm.

In the accompanying drawings, Figure 1 is a left-hand side elevation of the pistol with the breech closed, but showing the forward part of the breech-slide and of the frame in section and the lower portion of the grip as being broken away. Fig. 2 is a view similar to Fig. 1, but showing the barrel in its rearward position and the breech-slide moved somewhat farther rearward. Fig. 3 is a plan of the frame as it appears after the removal of the breech-slide and the barrel from it. Fig. 4 is a vertical cross-section through the breech-slide, barrel, and frame on the line 4 4 of Fig. 1 seen from the rear. Fig. 5 is a vertical cross-section through the breech-slide, barrel, and frame on the line 5 5 of Fig. 2 seen from the rear. Figs. 6 and 6^a represent the barrel detached, respectively, in a front end view and in a rear end view. Fig. 7 represents a cross-section of the breech-slide, detached, on line 7 7 of Fig. 8. Fig. 8 represents a right side elevation of the breech-slide partially in section to expose to view the locking-recesses on the interior left side wall.

Similar letters refer to similar parts throughout the several views.

In the pistol represented in the drawings the barrel b is arranged upon the top of the frame a, the upper surface of which is concave in cross-section corresponding to the under side of the barrel to receive the same and to allow it to slide lengthwise and to rotate upon the frame. The breech end or rear portion b' of the barrel inclosing the cartridge-chamber and the part of the bore adjoining the chamber which are exposed to the maximum pressure of the powder-gases generated by the explosion therein of a cartridge is cylindrical in the greater part of its circumference. Forward of this rear portion the barrel has an exterior taper shoulder and from the shoulder to the muzzle the outside diameter of the barrel is considerably reduced, thus lessening the weight of the barrel. On this reduced part of the barrel between the muzzle and the shoulder a series of annular collars b^2 and b^3 is provided. These collars, the outside diameter of which is equal to that of the rear portion of the barrel, serve to strengthen the same. The collar b^2 nearest to the muzzle of the barrel is cylindrical in its entire circumference. The remaining collars b^3, of which three are shown on the barrel in the drawings, and also the rear portion b' of the barrel in rear of the shoulder are increased in diameter on the under side nearest to the frame, each of them being provided with a projecting segment. On the rear portion b' the projecting segment occupies substantially ninety degrees of the circumference, while the projecting segment on each of the collars b^3 is of less width. (See Figs. 4, 5, 6, and 6^a.)

The concave upper surface a' of the frame a at the front end and rearward for a distance nearly equal to the length of the reduced portion of the barrel corresponds in diameter with that of the collar b^2 near the muzzle of the barrel and forms a seat upon which this collar rests and supports the front end of the barrel. The seat a' extends from the front of the frame rearward nearly to the taper shoulder on the barrel at which the larger rear portion b' begins. From there rearward the concave upper surface a^2 of the frame is shouldered down to correspond with the projecting segmental surface under the rear portion b' of the barrel and provides a seat upon which the breech end of the barrel is supported. Beneath each of the collars b^3 on the barrel a recess a^3 is provided in the top of the frame, into which the segmental projection on the collars b^3 depends and which allows them a limited lengthwise and a limited rotary movement.

From the under side of the projecting segmental surface at the breech end b' of the barrel a stud b^4 extends downward into a cam-groove a^4 in the frame and secures the barrel longitudinally upon the frame. The rear end of the cam-groove is central in the top of the frame, and from it the cam-groove inclines forward and to the left side.

When the barrel b is in the forward firing position, the muzzle projects slightly in front of the frame, the projections on the collars b^3 occupy the front end of the recesses a^3, and the stud b^4 stands in the front end of the cam-groove a^4. As the barrel moves rearward the stud passing through the cam-groove forces the barrel to make a partial rotation on its longitudinal axis, and on the return or forward movement of the barrel it is rotated in the opposite direction.

On top of the frame the breech-slide c is fitted to slide rearward and forward. The rear portion of the breech-slide forms the breech-bolt c', adapted to close the chamber of the barrel, and the forward part c^2 of the breech-slide extends in semitubular form and incloses the barrel, the interior diameter of the slide corresponding with the exterior diameter of the collars and of the breech end of the barrel, so that the slide secures the barrel vertically in its seat upon the top of the frame, but leaves it free for limited longitudinal and rotary movements thereon.

The sides of the breech-slide overlap those of the frame. Longitudinal ribs and grooves in the slide engaging corresponding grooves

and ribs on the frame serve to hold the breech-slide to the frame and to guide it in its reciprocation thereon.

In rear of the barrel the frame *a* forms the receiver and has an opening for the ejection of the cartridge-shells, and the breech-bolt is provided with a firing-pin and an extractor, and an ejector is fitted to the receiver, all of the usual construction.

Below the receiver the frame forms the grip or handle, in rear of which the hammer and other parts of the firing mechanism are mounted in the frame, while the trigger is located in front of the grip. The interior of the grip forms the seat for the cartridge-magazine, in which cartridges are held one upon the other upon a spring-follower by which they are fed upward to the receiver, the topmost cartridge being presented in front of the breech-bolt when the same is in the open position, and by the forward movement of the breech-bolt this cartridge is transferred to the chamber of the barrel.

Beneath the barrel the reaction-spring *e* is seated in a chamber in the frame *a*, and a transverse key c^3 is inserted through rectangular recesses in the sides of the breech-slide and passes transversely through the chamber in the frame. A longitudinal slot through the frame allows the key to travel freely therein. The rear end of the slot forms an abutment for the key, positively limits the rearward movement of the breech-slide on the frame, and prevents the breech-slide from flying back from the frame. Through the key c^3 the reaction-spring *e* acts upon the breech-slide to return it and the breech-bolt forward to the closed position after the recoil has moved them to the rear. The rear end of this spring *e* bears against the end of the chamber in the frame, and the front end of the spring *e* is fitted upon a piston *e'*, the head e^2 of which bears against the key c^3, a slight recess in the rear face of the key providing a seat for the head e^2, thereby securing the key against accidental displacement. The head of the piston *e* extends forward from the key to the front of the frame, a transverse recess in the piston-head being provided for the key, this recess being somewhat longer than the key. To enable the key c^3 to be at will withdrawn from the frame and from the breech-slide, thereby to disengage the breech-slide from the reaction-spring, and to enable the slide and the spring to be removed from the frame rearward pressure is exerted upon the front end of the piston-head sufficiently to overcome the tension of the spring *e* and to force the piston-head out of the recess in the key. Thus released, the key c^3 may be readily withdrawn, thereby releasing the breech-slide and the reaction-spring for removal without requiring the use of any tools. These parts being of well-known construction and mode of operation and forming no part of the present invention, require no further description.

On the left side of the rear portion *b'* of the barrel a series of vertical locking-ribs b^5 is formed by a series of cuts between the said ribs at the junction of the downwardly-projecting segment with the cylindrical side of the barrel. (See rear end view of barrel, Fig. 6ª.) In the left side wall of the breech-slide in front of the breech-bolt a corresponding series of locking-recesses c^5 is provided. (See Figs. 7 and 8.)

When the barrel and the breech-slide are in their forward closed position, the locking-ribs b^5 on the barrel occupy the recesses c^5 in the breech-slide and barrel and slide are securely interlocked, Figs. 1 and 4. When on firing a shot the breech-slide recoils on the frame, it draws the barrel rearward also. As the barrel moves rearward the stud b^4 of the barrel moves through the cam-groove a^4 in the frame, and, rotating the barrel, turns the locking-ribs b^5 downward until as the stud arrives at the rear end of the cam-groove the locking-ribs have been withdrawn downwardly from the locking recesses in the breech-slide. (See Figs. 2 and 5.) The breech-slide, thus released from the barrel, continues to recoil under its momentum, completes the opening movement, and stores energy by compressing the reaction-spring *e*. During the rearward movement of the barrel the segmental downward projections of the collars b^3, standing in the recesses a^3 in the frame freely allow the rearward and simultaneously rotatory movements of the barrel; but as the stud b^4 arrives at the rear end of the cam-groove a^4 the collars b^3 come into contact with the frame at the rear end and at the right side of the recesses a^3, and thus the movements of the barrel are positively arrested. The shock due to the sudden checking of the motions is transmitted to the frame of the arm at each of the several places of contact specified, and thus divided the stress is prevented from causing injury to either the barrel or the frame of the arm. At the end of the return or closing movement of the breech-slide under the reaction of the spring *e* the breech-bolt encounters the rear end of the barrel and forces the barrel forward and causes the stud b^4 to move forward through the cam-groove a^4 in the frame. The resulting rotation of the barrel turns the locking-ribs b^5 upward into the locking recesses c^5, and as barrel and breech slide arrive in the forward closed position they are again securely interlocked.

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

1. In a firearm, the combination with a frame having a forward extension, an uncovered seat upon the top surface of said frame, and a cam-groove in said seat, a barrel mounted from above upon said seat over

said frame to slide and to rotate thereon, said barrel having a fixed stud to engage said cam-groove, and means movably carried upon said frame for confining the barrel vertically upon said frame.

2. In a firearm, the combination with a frame having an uncovered seat upon the top thereof and a cam-groove in said seat, and a barrel mounted from above upon said seat to slide and to rotate thereon, said barrel having a fixed projection to engage said cam-groove to limit the lengthwise and the rotatory movements of said barrel in both directions, of a breech-slide embracing said frame and sliding thereon, and having a forward extension to cover and to vertically confine said barrel upon said frame.

3. In a firearm, the combination with a frame having a forward extension, an uncovered seat upon the top thereof, a cam-groove and a recess in said seat, of a barrel mounted from above upon said seat to slide thereon, said barrel having a fixed stud to engage said cam-groove and an integral projection to depend into said recess, and a breech-slide movably held upon said frame and carrying an extension to cover said barrel and to hold the same vertically upon said frame, whereby said barrel is attached to said frame for lengthwise and rotatory movements, limited in all directions by a plurality of points of contact.

4. In a firearm, the combination with a frame having a forward extension, a seat upon the top surface thereof, a cam-groove in said seat, and a recess in said seat forward of said cam-groove, of a barrel mounted to slide upon said seat, having a stud to engage said cam-groove and having a projection depending into said recess, whereby the lengthwise and rotatory movements of said barrel upon said frame are limited by a plurality of points of contact, and a breech-slide embracing said frame and sliding thereon, said breech-slide comprising a breech-bolt and a forward extension inclosing said barrel, and means for interlocking said barrel and said breech-slide by the rotatory movement of said barrel.

5. In a firearm, the combination with a frame having a forward extension, a seat upon the top surface thereof and a cam-groove in said seat, of a barrel to engage said cam-groove whereby said barrel may have limited lengthwise and rotatory movements upon said frame, a breech-slide embracing said frame and sliding thereon, said breech-slide comprising a breech-bolt and a forward extension inclosing said barrel, and locking-ribs on said barrel and locking recesses in said breech-slide for interlocking said barrel and said breech-slide by the rotatory movement of said barrel.

6. In a firearm, the combination with a frame having a forward extension, a seat upon the top surface thereof, a cam-groove in said seat and a series of recesses in said seat forward of said cam-groove, of a barrel mounted to slide upon said seat, having a stud to engage said cam-groove, and having a series of projections depending into said recesses, whereby the lengthwise and rotatory movements of said barrel upon said frame are limited by a plurality of points of contact, and a breech-slide embracing said frame and sliding thereon, said breech-slide comprising a breech-bolt and a forward extension inclosing said barrel, and locking-ribs on said barrel and locking recesses in said breech-slide for interlocking said barrel and said breech-slide by the rotatory movement of said barrel.

This specification signed and witnessed this 14th day of August, A. D. 1905.

JOHN M. BROWNING.

In presence of—

HENRY J. WELLENKAMP,

THEO. D. W. MOORE.