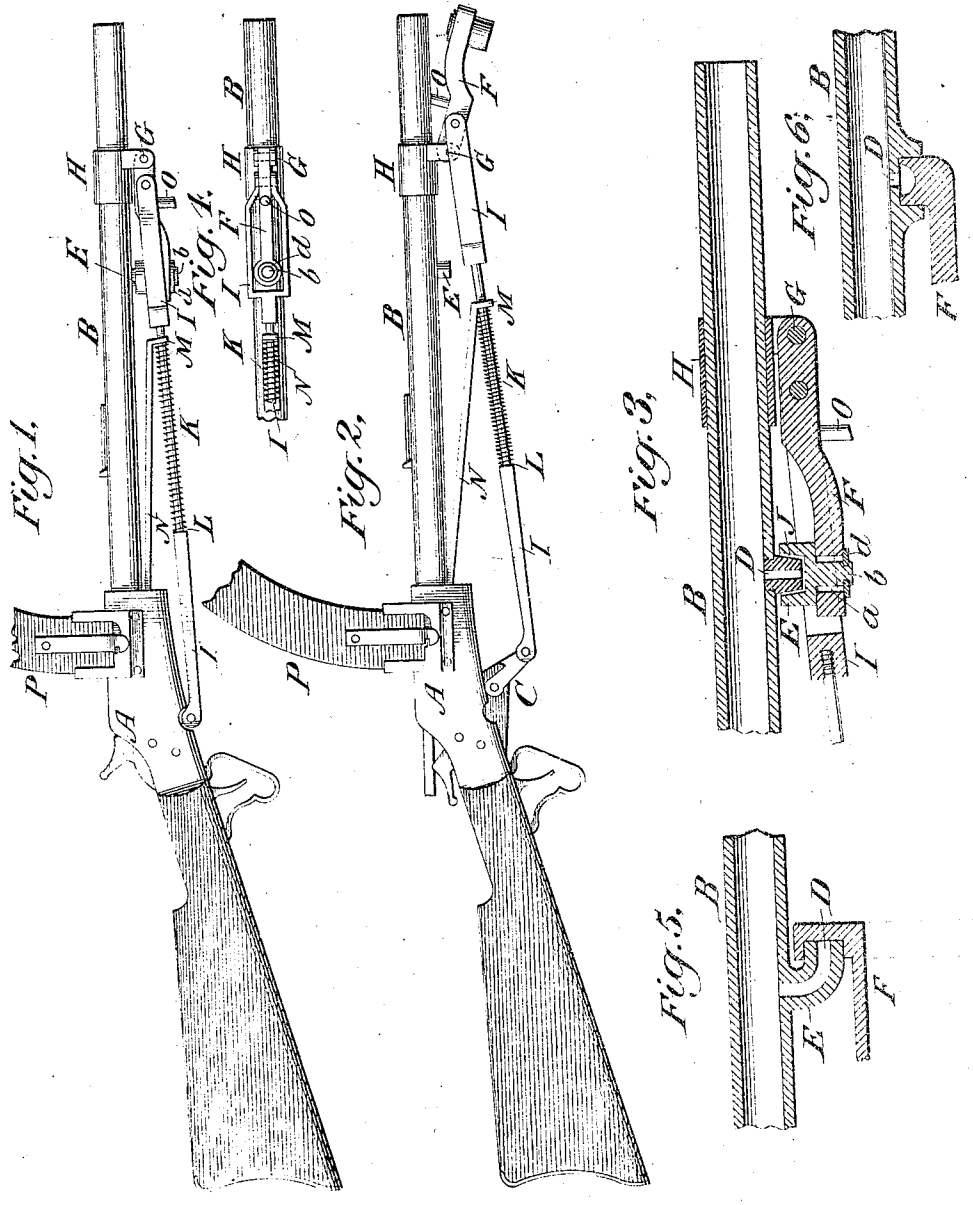
(No Model.)

J. M. BROWNING.

GAS OPERATED FIREARM.

No. 544,661. Patented Aug. 20, 1895.



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JOHN M. BROWNING, OF OGDEN, UTAH TERRITORY.

GAS-OPERATED FIREARM.

SPECIFICATION forming part of Letters Patent No. 544,661, dated August 20, 1895.

Application filed December 8, 1894. Serial No. 531,171. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. BROWNING, a citizen of the United States, and a resident of Ogden, in the county of Weber and Territory of Utah, have invented certain new and useful Improvements in Machine-Guns, of which the following is a specification, reference being had to the accompanying drawings, forming part hereof.

This invention relates to that class of firearms in which mechanism is arranged to be operated automatically by means of gases produced by the explosion or discharge of the arm, and particularly to firearms of this class in which the gas is brought to bear upon the mechanism in rear of the muzzle and so that the initial force occurs before the bullet escapes from the barrel, the objects of the invention being to avoid the fouling and clogging of the mechanism by the gases, and to prevent the escape of the gases until after the lever shall have commenced its opening movement and received its initial force, and to prevent the lateral spread of the gases, and to generally improve and simplify the construction of the gas-operated mechanism.

My invention is embodied in the construction hereinafter described, and is particularly recited in the claims.

The accompanying drawings illustrate embodiments of my invention in a shoulder arm or rifle.

Figure 1 is a side view of the rifle with the mechanism in the closed position. Fig. 2 is a similar view with the mechanism in the open position. Fig. 3 is a longitudinal section, enlarged, of a portion of the barrel with the plane of section cutting through the nipple and gas-operated lever. Fig. 4 is an underneath plan view of the gas-operated lever and adjacent parts. Figs. 5 and 6 are longitudinal sections similar to Fig. 3, but showing modifications in construction.

In illustrating the invention I show it as applied to a shoulder arm or rifle, in which A represents the frame containing the breech mechanism and B represents the barrel attached to the frame. The breech mechanism of the arm may be of any known construction whereby a forward and backward or vibrating movement of some part of the mechanism will produce the opening and closing of the breech-piece, and so that such opening of the breech-piece will force the hammer to the fully-cocked position, withdraw the exploded shell from the barrel, and present a new cartridge for introduction into the barrel, and so that as the breech-piece advances the cartridge so presented will be forced into the barrel and the hammer released; or a mechanism may be employed adapted to perform successively and continuously a less number of operations than those above mentioned. As here represented, the breech mechanism (which mechanism is not particularly shown, as any known form may be employed) is operated through a lever C, which lever is connected with a mechanism, so that a forward movement of the lever will produce the opening movement of the breech mechanism and the return movement of the lever will bring the parts to the closed position.

Through the barrel, preferably upon the under side and in rear of the muzzle, an aperture D is formed through which gases produced by explosion may escape from the bore of the barrel. This aperture is made through a nipple E, introduced into the under side of the barrel or which may be in one piece therewith, so that the nipple projects from the barrel, and the nipple is of slightly tapering form or cylindrical or of other suitable shape, the tapering form embodying my entire invention, as hereinafter set forth.

F represents a lever, which is hinged to the barrel forward or rearward of the aperture, according to the direction in which it is desired the lever shall swing. As here represented, the hinging-point is at G, forward of the nipple or aperture, and the lever is hinged to a band H, which surrounds the barrel, and so that the lever in opening may swing downward and forward from the nipple, from the position shown in Fig. 1 to that shown in Fig. 2. To lever F a rod I is pivoted, which rod extends rearward to connect the lever F with the lever C or breech mechanism of the gun, and so that as the lever swings downward and forward, as from the position shown in Fig. 1 to that shown in Fig. 2, it will draw the rod I forward and will correspondingly turn the lever C, and this movement will produce the opening of the breech and the corresponding movements of the other parts of the breech

mechanism of the arm. As the lever returns from the position shown in Fig. 2 to that shown in Fig. 1, the rod I is forced rearward, returning the lever C and bringing the breech mechanism of the arm to the closed position. The lever F is constructed with a recess J on its face, which corresponds with the nipple E, and so that in the normal position of the parts, as shown in Fig. 3, the nipple will be inclosed by the recess J of the lever and so that the nipple and the aperture are normally covered, but upon the explosion in the barrel, and after the bullet has passed forward of the aperture D, the gas will escape through the aperture D into the recess in the lever and will bring its force to bear upon the bottom of that recess and so as to produce the downward and forward swinging movement of the lever F.

The construction of the lever F with the recess surrounding the nipple prevents to a very considerable extent the escape of gases between the aperture and lever until after the lever shall have commenced its opening movement and received its initial force, for were there no such protecting recess between the aperture and the lever the gases would escape laterally between the aperture and the lever, and thereby a considerable portion of the initial force would be lost, and, further, the gases so escaping would be in the form of a flame which would be objectionable, if not dangerous; but by protecting the apparatus by the recess between the aperture and the lever the gases are confined to their initial operation, so that such an escape is prevented, and after the lever starts the gases will then follow the lever and without the lateral spread of the gases which would otherwise occur.

The force of the gases is brought to bear only in producing the opening movement. The return of the lever may be produced by mechanical means and after the gases have ceased to act. To accomplish this result a spring is provided, which will be compressed in the opening movement of the lever, so that the reactive force of said spring will be sufficient to return the lever and the mechanism of the arm to the closed position. As here represented, the spring K is of spiral or helical form and is arranged around the rod I, one end of the spring bearing against a shoulder L on the rod I and the other end of the spring bearing against a loop or shoulder M, which loop or shoulder is made fast to the barrel or frame, and, as here represented, is at the end of the rod N, which rod is hung to the frame at the rear, and so that the rod N will yield upward and downward to accommodate itself to the swinging movement of the rod I. Normally, the spring K is extended as shown in Fig. 1; but as the lever F is thrown forward and the rod correspondingly drawn forward, the spring is compressed between the shoulder L on the rod I and the loop M on the rod N, and so that, as soon as the force of the gases upon the lever F is exhausted or neutralized, the spring reacts and returns the lever, together with the breech mechanism of the arm, to the closed position. A stop should be provided to arrest the lever when it has swung as far from the nipple as is required to produce the opening movement of the breech mechanism of the arm. As here represented, this stop is in the form of a stud O on the back of the lever F, which will strike the barrel when that extreme open position is reached, as shown in Fig. 2, and by varying the length or position of this stop O the time of arrest in the movement of the lever F may be adjusted. The magazine P is here represented as adapted to be attached to the frame and extending upward therefrom so as to contain a column of cartridges to be automatically supplied to the arm. The upper part of this magazine is broken away in the drawings. This is a common and well-known magazine, for which any other suitable magazine or feed device may be substituted. It will be understood that the lever will be hung forward or rearward of the aperture, accordingly as the active movement required for the opening and closing of the breech mechanism is forward or backward.

In some cases it may be desirable to bring the force of the gases to bear upon a longitudinal slide instead of upon a swinging lever. This may be done, as shown in Fig. 5, by turning the nipple accordingly and forming the recess in the arm or slide upon which the gases are brought to bear, and so that the movement may be in a longitudinal line either forward or backward, as the case may be; or the nipple may be directed forward or backward onto a swinging lever, broken lines indicating such a lever in Fig. 5.

While the construction with a nipple in the barrel and corresponding recess in the moving part embodies my entire invention, this order may be reversed in a construction broadly embodying my invention, as shown in Fig. 6, and the recess may be formed in the barrel around the aperture and the lever or moving part constructed with a projection to enter said recess. It will be observed that in this construction there is the same protection between the moving part and the aperture at the initial action of the gases on such moving part.

In order to provide against longitudinal expansion and contraction of the barrel from the heat produced in firing, it is desirable to make the nipple or projection tapering and the recess correspondingly tapering, so as to insure the unobstructed return of the moving part, and to accommodate the lever or moving part to such incidental expansion or contraction the recess portion of the lever may be made separate from and movable upon the body of the lever, as particularly shown in Fig. 3, the lever being constructed with a slot *a* and the recess portion constructed with a shank *b*, which shank extends through the slot and through a collar *d* on the reverse side of the lever, and the shank is riveted

down over the collar, or otherwise secured, so that the recess portion E of the lever will be held by frictional contact and will not change its position in ordinary working, but yet so that under the force resulting from expansion or contraction applied longitudinally of the lever the recess portion may slide upon the lever; and variations of the length of the barrel would produce such sliding of the recess portion by reason of the tapering shape of the nipple and of the recess, the nipple operating as a cam to produce such sliding movement of the recess portion according to the expansion or contraction.

The representation of the self-adjustment when the recess is on the lever and the nipple on the barrel will be sufficient to indicate that the same sliding or self-adjustment may be employed when the order is reversed and the projection is on the lever and the recess is on the barrel. This self-adjustment construction is an embodiment of my entire invention, but may be departed from in structures broadly embodying my invention.

It is, of course, evident that various modifications may be made of the construction above described within my invention, and I do not, therefore, limit myself to the specific construction above described and shown in the drawings.

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

1. In a fire-arm, the barrel constructed with an aperture from the inside outward, and in rear of the muzzle, combined with a moving part adapted to cover said aperture, the barrel around said aperture and the said moving part being constructed, the one with a projection and the other with a corresponding recess, whereby in the normal condition the said projection will be substantially inclosed by the said recess, but so that the said projection and recess will wholly separate as the said moving part is thrown from said aperture, under the action of the gases of explosion with mechanism between said moving part and the breech mechanism of the gun whereby the opening movement of the said moving part will produce the opening movement of the breech mechanism, and a spring adapted to be operated by such opening movement, and whereby the reaction of the said spring will return the parts to the normal position, substantially as set forth.

2. In an automatic fire-arm, the barrel constructed with an aperture from the inside outward and in rear of the muzzle, combined with a lever arranged to swing toward and from and adapted to cover the said aperture, the barrel around said aperture and the said moving part constructed, the one with a projection, and the other with a corresponding recess, adapted to stand one within the other when in the closed position, and the said projection or recess, as the case may be, made longitudinally adjustable on the said lever, with mechanism between the said lever and the breech mechanism of the gun, whereby the opening movement of the said lever under the action of the gases of explosion will produce the opening movement of the breech mechanism, and a spring adapted to be operated by such opening movement, and whereby the action of said spring will return the parts to the normal position, substantially as set forth.

3. In a fire arm, the barrel constructed with an aperture in rear of the muzzle combined with a moving part adapted to cover said aperture, the barrel around said aperture and the said moving part constructed the one with a projection and the other with a corresponding recess, whereby in the normal condition the said projection will be substantially inclosed by said recess but so that said projection and recess will separate as the said moving part is thrown from said aperture, under the action of the gases of explosion with mechanism between said moving part and the breech mechanism of the gun whereby said moving part actuates the breech mechanism, substantially as set forth.

4. In an automatic fire-arm, the barrel constructed with an outwardly projecting tapering nipple and an aperture through said nipple, combined with a lever hung to the barrel and so as to swing toward and from said nipple, the lever constructed with a recess adapted to inclose said nipple when the parts are in closed position, said recess being longitudinally self adjusting on said lever under the effects of expansion and contraction of the barrel, with mechanism between said lever and the breech mechanism of the gun whereby the opening movement of said lever under the action of the gases of explosion will produce the opening movement of said breech mechanism, and a spring adapted to be operated by such opening movement and whereby the reaction of said spring will return the parts to the normal position, substantially as set forth.

This specification signed and witnessed this 1st day of December, A. D. 1894.

JOHN M. BROWNING.

In presence of—

M. J. HALL,

JOHN E. RAMSDEN.