J. M. BROWNING.

SAFETY DEVICE FOR FIREARMS.

APPLICATION FILED JUNE 21, 1909.

947,478. Patented Jan. 25, 1910.

Fig. 1.

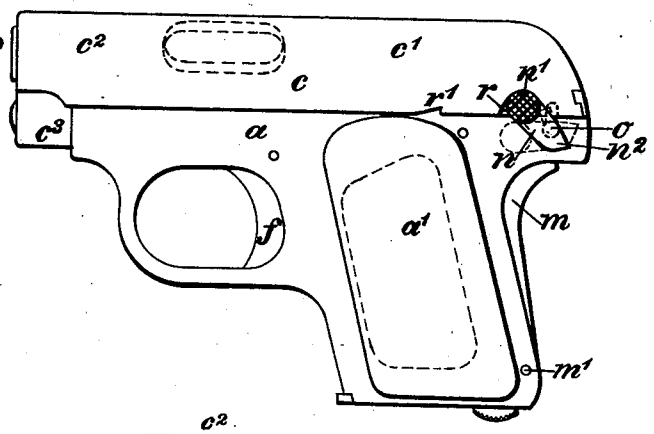


Fig. 2.

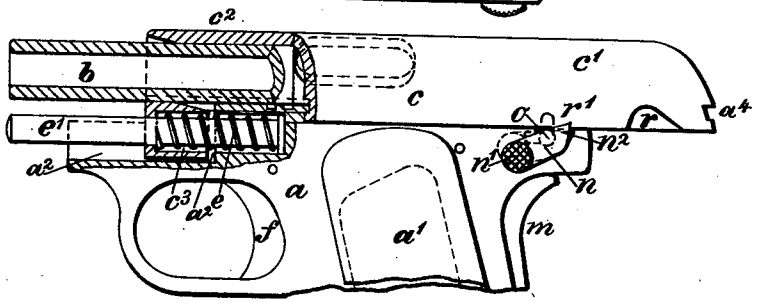


Fig. 3.

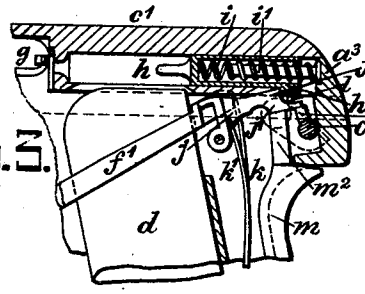


Fig. 4.

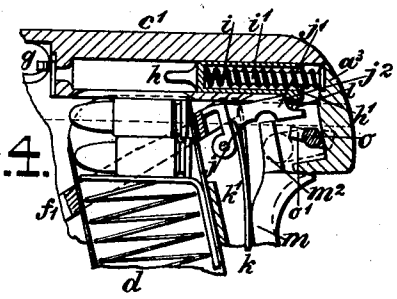


Fig. 5.

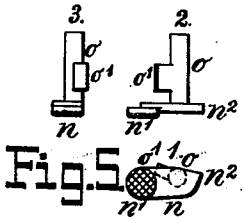


Fig. 6.

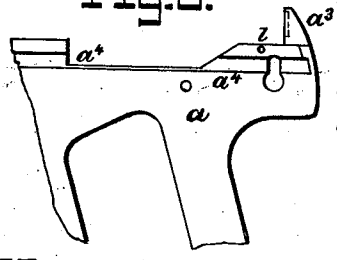


Fig. 7.

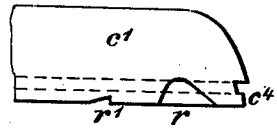
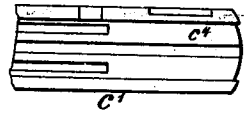


Fig. 8.



Witnesses.

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UNITED STATES PATENT OFFICE.

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SAFETY DEVICE FOR FIREARMS.

947,478. Specification of Letters Patent. Patented Jan. 25, 1910.

Application filed June 21, 1909. Serial No. 503,481.

To all whom it may concern:

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

The invention relates to safety devices for breech-loading firearms generally, and it is more especially applicable to automatic firearms 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 into the chamber of the barrel, and the closing of the breech—are automatically effected by the pressure in the barrel of the powder-gases generated by the explosion of the cartridge.

The main object of the invention is to provide for the firearms of this class, in which for safety in handling and carrying the members of the firing-mechanism, with the exception of the trigger, are entirely inclosed and concealed in the arm, a safety device for at will and readily locking the breech-mechanism in its closed forward position, and at the same time positively locking the concealed firing-mechanism when cocked; or for at will and as readily unlocking these parts, and thereby adapting the arm for instant use. For safety and convenience, while examining and cleaning the arm and while charging it with cartridges, said safety device shall, further, be adapted for at will locking the breech-mechanism in its open rearward position; or for as readily unlocking said mechanism and allowing the same to close.

Another object of the invention is to produce a safety device which shall be simple and inexpensive in construction, strong, reliable and safe under all conditions of use.

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

The invention is shown herein as embodied in a gas-operated magazine pistol, but it will be understood that the invention is applicable to other firearms. Therefore it is not intended to restrict the present invention to a magazine pistol, nor to any particular kind of firearm.

In the accompanying drawings, wherein is illustrated an embodiment of the invention, Figure 1 is a left-hand side elevation of the pistol with the breech closed, and with the safety device turned to the operative locking position; the non-operative unlocked position of the same being indicated in dotted lines. Fig. 2 is an elevation similar to Fig. 1, but partly in section and with the breech open, and with the safety device turned to lock the breech-slide in the open rear position. Fig. 3 is a longitudinal section of the upper rear portion of the pistol, with the breech closed and the firing-mechanism cocked and locked by the safety device. Fig. 4 is a section similar to Fig. 3, but with the safety device turned to unlock the breech-slide and the firing-mechanism. Fig. 5 shows detail views of the safety-locking-lever detached, respectively at 1 a side elevation, at 2 a top view, and at 3 a front view. Fig. 6 is a side elevation of the upper rear portion of the frame of the pistol detached, with the breech-slide and other mechanisms removed. Fig. 7 is a side view of the rear portion of the breech-slide detached. Fig. 8 is a bottom view of the rear portion of the breech-slide detached.

Similar letters refer to similar parts throughout the several views.

In the pistol represented in the drawings *a* is the frame, *b* the barrel, and *c* the breech-slide. The top of the frame *a*, upon the forward portion of which the barrel *b* is mounted, forms the seat for the reciprocating breech-slide *c*. In rear of the barrel *b*, the upper portion of the frame forms the receiver and below it is the grip or handle a^1, preferably made integral with the frame, and the hollow inside of which forms the seat for the reception of the cartridge-magazine *d*, which is a tube holding a number of cartridges one upon the other resting upon a spring-pressed follower, the magazine is inserted into the grip from below, so that its top communicates with the receiver and with the rear of the barrel, and at each opening

of the breech-slide a cartridge is fed from the magazine to the barrel. The barrel is fixed upon the frame against lengthwise movement, and the rear of the barrel is closed by the breech-bolt c^1 which forms the rear portion of the breech-slide c, forward of the breech-bolt c^1 the breech-slide extends in semi-tubular form c^2, inclosing the barrel b on top and sides; at the bottom the sides of the breech-slide overlap those of the frame and each side is provided with an internal longitudinal rib c^4 for engagement with a corresponding groove a^4 on each side of the frame, cations and vertically lock it upon the frame, and the forward portion of the breech-slide vertically confines the barrel upon the frame. In front of the breech-bolt c^1 an opening in the top of the extension c^2 of the breech-slide permits the ejection of the empty cartridge-shells. The forward end of the breech-slide is closed at the bottom by the depending front abutment c^3, tubular in form and parallel to the axis of the barrel. In front of the grip a^1 the top of the frame extends forward beneath the barrel and in it is provided a longitudinal seat a^2 for the reaction-spring e, the guide-rod e^1, and for the depending abutment c^3 of the breech-slide. In rear the reaction-spring e and the head of the guide-rod e^1 are supported by the frame, while the front end of the spring e rests against a shoulder in the abutment c^3, and the tension of the spring e thus yieldingly keeps the breech-slide in forward closed position; while the abutment c^3 positively prevents the breech-slide from being thrown rearwardly from the frame.

In front of the grip a^1 and beneath the seat a^2 is the trigger-guard, in which the trigger f is located.

The breech-bolt c^1 is provided with a cartridge-shell extractor g of usual form, and carries in a central seat the combined firing-pin and hammer h, the hammer is hollow and in it the forward portion of the spiral mainspring i is seated, the rear end of which is supported upon the guide-rod i^1, the head of which rests in a shallow recess in the face of the upwardly projecting abutment a^3 upon the rear end of the frame, which closes the hammer-seat in the breech-bolt when the latter is in the forward position, see Figs. 3, 4 and 6. The hammer h has under its rear end a rib h^1 guided in a corresponding longitudinal slot in the bottom of the breech-bolt.

Below the breech-bolt and in rear of the grip a^1 the sear j is mounted upon a pivot-pin in the frame, and a connector f^1 extends from the trigger f upward and rearward to the front of the sear and serves to transmit the movement of the trigger f to the sear j; a flat bifurcated spring is arranged in the grip, the upper end of one of its leaves k yieldingly holds the connector and the trigger in the forward position, while the other leaf k^1 rests against the sear and yieldingly holds the rearwardly extending arm j^1 of the sear in the raised position. This rear arm of the sear corresponds in thickness and in central location with the longitudinal slot in the bottom of the breech-bolt, and in its raised position the sear-arm j^1 projects into the slot and into the path of the rib h^1 of the hammer h, the shoulder j^2 of the sear-arm thus forming the sear-point for engagement with the hammer, while the forward end of the rib h^1 forms the cock-notch of the hammer. The lower portion of the arm j^1 of the sear extends some distance rearward beyond the point j^2, and a transverse pin l, located in the frame above the rearmost portion of the sear-arm serves to limit the upward movement of the sear-arm under the pressure of the spring k^1.

In the rear face of the grip the automatic safety grip-lever m is seated in a vertical mortise, being pivoted at the bottom upon a pin m^1, and pressed outward by the lower end of the spring k, the upper portion of the lever m normally protrudes some distance from the rear of the grip; on grasping the grip of the pistol, as in the act of holding the same for firing, the lever m yields to the pressure of the hand grasping it, and is pressed into the grip without requiring thought or attention. At the upper extremity the grip-lever m carries within the frame an upward extension m^2, the end of which normally stands below the sear-arm j^1 so as to lock the sear, see Fig. 3; when, however, the lever m is pressed into the grip, the extension m^2 is moved forward into the position shown in Fig. 4, where it stands below a recess in the under side of the sear-arm j^1, so as to unlock the sear and allow it to release the hammer if the trigger is pulled.

All the parts thus far referred to are of the same construction and mode of operation as those of the well-known Colt automatic pistol, and, forming no part of the present invention, require no further description or illustration herein, except as far as certain features will be referred to hereinafter.

For at will, readily and positively locking the breech-slide in the closed firing position, and at the same time positively locking the firing-mechanism against operation, even though the grip should be grasped and the trigger pulled, or for at will locking the breech-slide in the open rear position, and for at will and as readily releasing the locked breech-slide and firing-mechanism, a manually operable safety-lever of novel construction and operation has been provided.

In rear of the sear j and of the top m^2 of the grip-lever m, the safety-lever n is pivotally attached on the left side of the frame, convenient to be operated by the

thumb of the hand grasping the grip of the pistol. The horizontal pivot or arbor o of the safety-lever n is an integral part of the same and passing transversely through the frame a, it has a bearing in each side-wall slightly below the longitudinal grooves a^4 in the frame by which the breech-slide is held and guided upon the same. From its arbor o the safety-lever n extends forward and rearward, the rounded end of its forward arm n^1 being provided with a knurled boss or thumb-piece, while the shorter rear arm n^2 ends in a pointed heel, see Figs. 1, 2 and 5.

When the breech-slide c is in its place upon the frame a, it fills and covers the grooves a^4, and the straight lower edges of the breech-slide coincide with those of the grooves, though laterally the breech-slide projects beyond the frame. When the safety-lever n stands in the non-operative position, indicated in dotted lines in Figs. 1, 2 and 4, the upper edge of the lever clears the breech-slide and the lever does not interfere with the movements of the same.

In the left side of the breech-slide two recesses r, r^1 are provided, with the breech-slide in the closed firing position the recess r stands above the forward arm n^1 of the safety-lever, and the lever-arm may be turned upward into the recess r, as shown in Fig. 1; in this position the safety-lever positively locks the breech-slide in the firing position, as the rounded end of the lever-arm n^1 bears against the correspondingly shaped forward wall of the recess r, thus acts as a stop and holds the breech-slide against movement. On account of the upward and forward inclined position of the raised lever-arm n^1, rearward pressure applied to the breech-slide will prevent the lever-arm from dropping and cause it to hold the breech-slide the more securely.

The arbor o of the safety-lever n carries a tongue or radial projection o^1, extending in the forward direction, see Fig. 5; when the safety-lever n is in its place on the side of the frame, the tongue o^1 is located in the frame below the sear-arm j^1. With the safety-lever n turned to the non-operative horizontal position, indicated in dotted lines in Figs. 1, 2 and 4, the tongue o^1 is outside of the reach of the sear-arm j^1 and does not interfere with the movements of the sear, see Fig. 4. If, however, the safety-lever n is turned so that the raised lever-arm n^1 locks the breech-slide in the forward position, as hereinbefore explained, the tongue o^1 is raised until its end stands below the end of the sear-arm j^1, and thus positively locks the sear against movement, as shown in Fig. 3, and, therefore, prevents the sear from being operated to release the cocked hammer. By this arrangement the locking of the breech-slide in firing position by means of the safety-lever n, simultaneously locks the firing-mechanism against operation. The tongue o^1 performs an additional function besides that of locking the sear. The tongue o^1, like the lever n, is integral with the arbor o, and the hole in the left side of the frame, which forms the bearing for the arbor o nearest to the lever, is enlarged vertically into the groove a^4, so as to resemble a key-hole in form, and so as to enable the tongue o^1 to pass through it into the frame, see Fig. 6. The space on the arbor o which separates the lever n from the tongue o^1 is equal in width to the thickness of the wall of the frame, and after turning lever and tongue up and entering the arbor and tongue o^1 into the frame until the lever n rests against the outside of the same, the lever n is turned down until it stands horizontally below the groove a^4, and the tongue o^1 bears inside against the wall of the frame and thus secures the lever and arbor movably in the frame, from which they cannot be removed unless lever and tongue are again turned to the vertical position. In the regular operation of the pistol the lever cannot be brought to the vertical position. When the breech-slide is in place upon the frame it fills the grooves a^4 and covers the enlargement of the hole, and as the breech-slide is somewhat wider than the frame its lower edges project laterally beyond the same, and, therefore, the safety-lever n can be turned upward out of the horizontal position only when the recess r stands above the lever-arm n^1, and then only so far as to stand inclining in the recess. By this simple and inexpensive arrangement the safety-lever is movably secured in the frame without any additional means such as are usually required to secure it in the frame.

The forward recess r^1 in the edge of the breech-slide stands above the pointed heel n^2 of the safety-lever when the breech-slide is in the open rear position, and if the breech-slide is brought to the open position and downward pressure is exerted upon the thumb-piece, the heel n^2 of the lever will enter the recess, and serve as a stop or pawl and hold the breech-slide in the rear position, until by raising the thumb-piece the heel is withdrawn from the recess and the breech-slide is released, when it will at once be closed by the reaction-spring. The forward recess r^1 is vertically much smaller than the recess r, because the pointed heel will lock the breech-slide securely without a greater hold, as the tension of the compressed reaction-spring is exerted in tending to move the breech-slide forward, and thus it also tends to keep the point of the heel in the recess.

As will be seen in Figs. 7 and 8, the recess r^1 is cut laterally entirely through the edge of the breech-slide, and the heel n^2 is in

thickness equal to the part of the breech-slide which projects beyond the frame, thereby strengthening the hold of the heel on the breech-slide.

The rearward recess r, though of greater height, is laterally cut less deep than the recess r^1, and a solid web is left uncut which separates the recess r from the inside of the breech-slide, see Figs. 7 and 8. With the breech-slide in place upon the frame in the forward position with the recess r above the lever n, this web covers and conceals the enlarged hole in the frame. The outer surface of the web forming the bottom of the recess r stands slightly above the side of the frame laterally, and the forward portion of the lever-arm n^1 is correspondingly undercut on the inner side nearest to the frame, see Fig. 5, at 2 and 3, so that this portion of the lever-arm can pass above the bottom of the recess when the lever n is turned to the locked position. The rear arm or heel n^2 of the lever n is not undercut and while it may be turned into the forward recess r^1 when the breech-slide is in the rear position, the raised bottom of the recess r prevents the heel n^2 from entering this recess. This arrangement, at all times except when the breech-slide is at the rear, positively prevents the turning of the lever down and the entrance of the heel into the large recess, which might occur if both recesses were of the same depth, either by wrong manipulation, or by the action of gravity on the longer and heavier forward lever-arm, should it overcome the frictional fit or arrangement which supports lever and arbor in their positions in the frame.

The forward recess r^1 is so small, and during the regular rapid operation of the arm the breech-slide, acted upon by the fully compressed reaction-spring, remains so short a time at the extreme rearward limit of its reciprocation, that there is no danger of the heel of the safety-lever accidentally entering the recess and locking the open breech-slide. But when the breech-slide during the closing movement approaches the forward limit, its movement becomes slower on account of the resistance opposed by the cartridge in entering the chamber of the barrel and because the reaction-spring is then only partly compressed, so that there is a longer space of time in which the heel of the safety-lever might be turned into the recess r; moreover the length of the recess r is such that there is a much greater chance for the heel to enter the recess between the front end and the rear end. For these reasons the different depths of the recesses are important for preventing the unintentional blocking of the breech-slide by the heel of the safety-lever.

I claim as my invention—

1. In a firearm, the combination of a frame, a reciprocating breech-slide, and a safety-lever pivoted on said frame, said safety-lever having two arms, one of said arms adapted to engage and hold said breech-slide in forward position, the other arm adapted to engage and hold said breech-slide in rearward position.

2. In a firearm, the combination of a frame, a reciprocating breech-slide and a safety-lever pivoted on said frame, said breech-slide having recesses and said safety-lever having two arms for engagement with said recesses, whereby the breech-slide is held in its forward position on the frame by one of said lever-arms, or in its rearward position by the other lever-arm.

3. In a firearm, the combination of a frame, a reciprocating breech-slide and a safety-lever pivoted on said frame, said breech-slide having recesses of different depth and said safety-lever having arms of different thickness for engagement with said recesses, whereby the breech-slide is held in its forward position on the frame by one of said lever-arms, or in its rearward position by the other lever-arm.

4. In a firearm, the combination of a frame, a reciprocating breech-slide, a pivoted safety-lever having two arms, one arm adapted to engage and hold said breech-slide in its firing position, the other arm adapted to hold the breech-slide in the open position, and a sear, the pivot of said safety-lever having a projecting tongue and said sear having a coöperating projecting arm, whereby the movement of the saftey-lever to engage and hold the breech-slide in firing position locks the sear against movement.

5. In a firearm, the combination of a frame, a reciprocating breech-bolt carrying a hammer, a sear, and a safety-lever pivoted on the frame, said sear and the pivot of said safety-lever having coöperating projections, and said safety-lever having two arms to engage and hold said breech-bolt in firing position or in the open position, whereby, when the hammer is cocked, the movement of the safety-lever to engage and hold the breech-bolt in firing position, locks the sear against releasing the cocked hammer.

6. In a firearm, the combination of a frame, a breech-slide movably secured on said frame, and a safety-lever pivoted on the frame for engagement with said breech-slide, the pivot of said safety-lever having a projection and said frame having an opening to permit the passage of said pivot and said projection, whereby said safety-lever is held by the breech-slide against removal from the frame, and the breech-slide is held either in forward or rearward position by the movement of said safety-lever.

7. In a firearm, the combination of a frame, a breech-bolt secured for reciprocation on said frame and carrying a hammer, a safety-lever pivoted on the frame to en-

gage and hold said breech-slide either in firing position or in the open position, and a sear, the pivot of said safety-lever having a projection and said frame having an opening to permit the passage of said pivot and said projection, whereby said safety-lever is held from removal by the breech-slide, and the sear is held against releasing the hammer by said projection when the safety-lever is moved to engage and hold the breech-bolt in firing position.

This specification signed and witnessed this second day of June, A. D. 1909.

JOHN M. BROWNING.

In the presence of—
A. L. ULRICH,
K. POWERS.