(No Model.) 4 Sheets—Sheet 1.

H. W. GABBETT-FAIRFAX.

RECOIL OPERATED FIREARM.

No. 600,066. Patented Mar. 1, 1898.

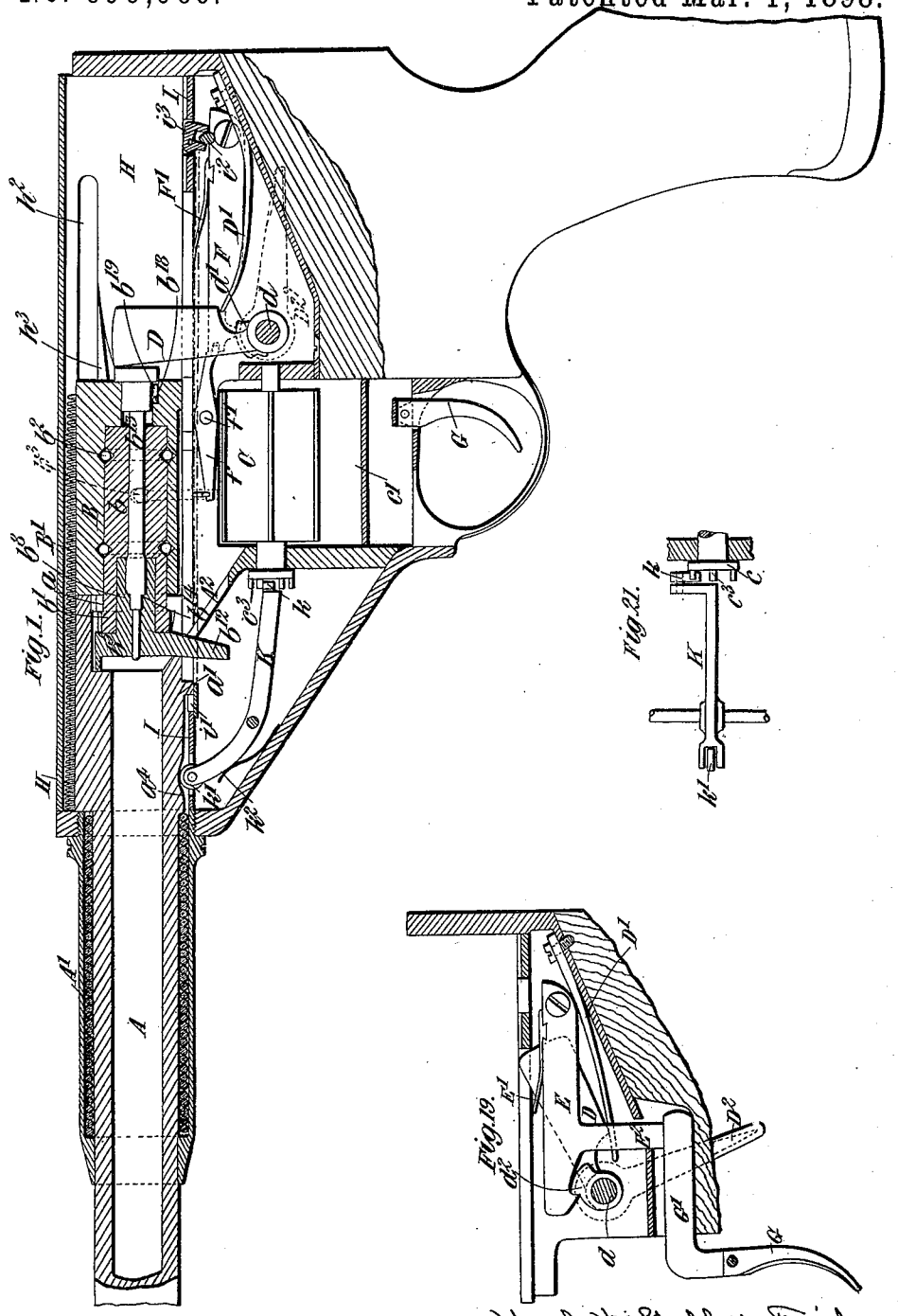


Fig. 1.

Fig. 21.

Fig. 19.

Witnesses

Dennis Sumby.

Hugh W. Gabbett-Fairfax

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(No Model.) 4 Sheets—Sheet 2.

H. W. GABBETT-FAIRFAX.

RECOIL OPERATED FIREARM.

No. 600,066. Patented Mar. 1, 1898.

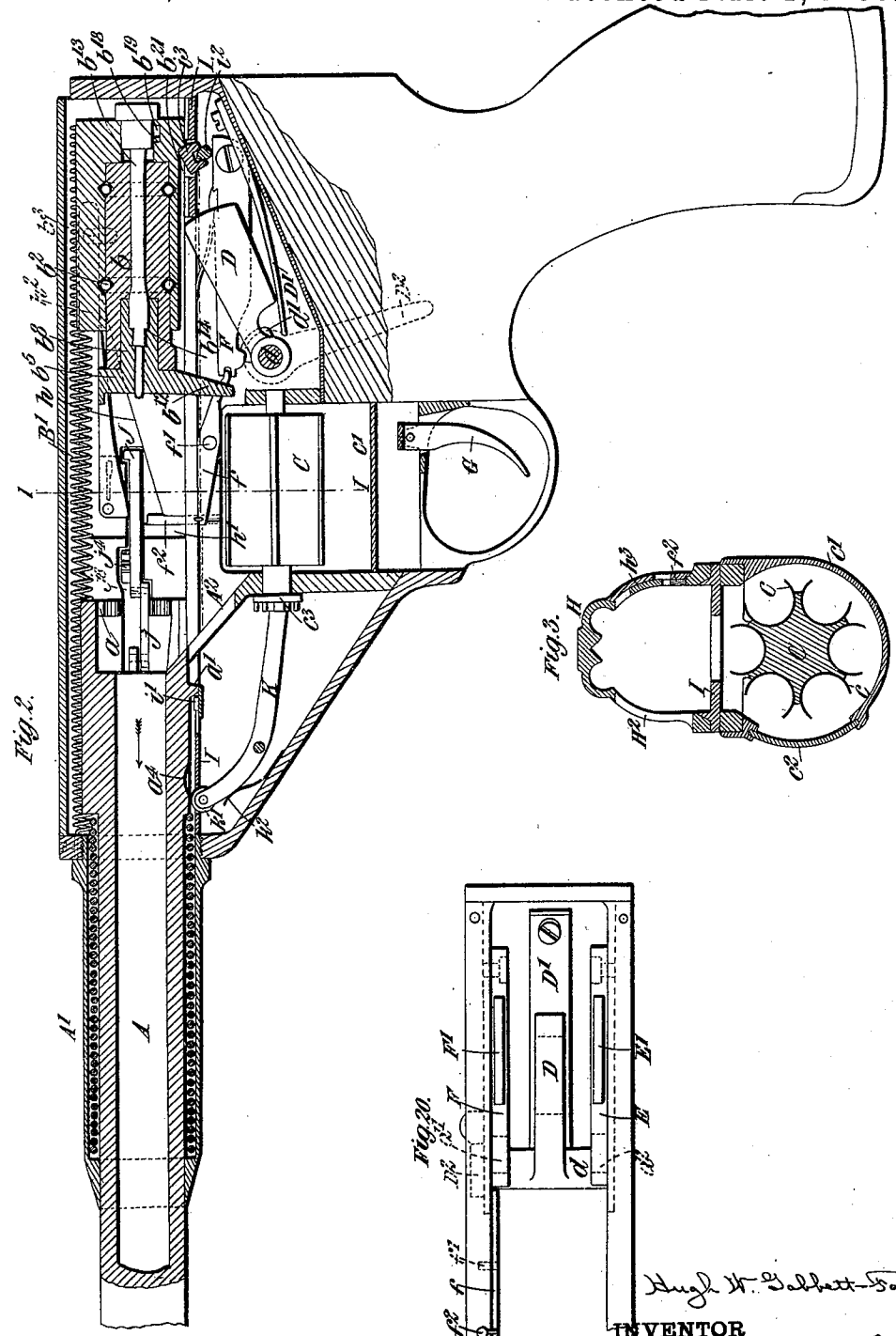


Fig. 2.

Fig. 3.

Fig. 2a.

Witnesses

A. B. Kelly

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THE NORRIS PETERS CO. PHOTO-LITHO., WASHINGTON, D. C.

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H. W. GABBETT-FAIRFAX.

RECOIL OPERATED FIREARM.

No. 600,066. Patented Mar. 1, 1898.

Fig. 4.

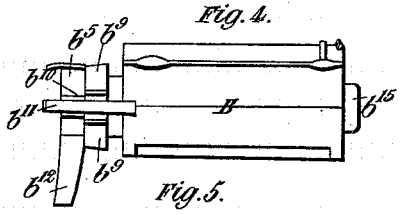


Fig. 5.

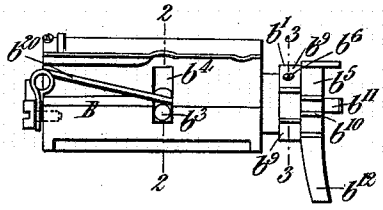


Fig. 6.

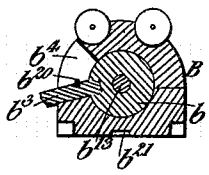


Fig. 7.

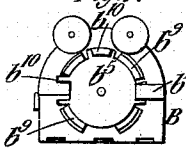


Fig. 8.

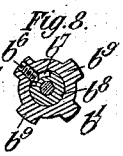


Fig. 9.

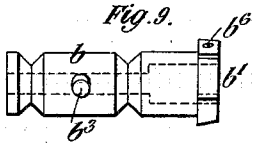


Fig. 10.

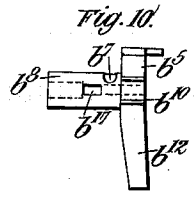


Fig. 11.

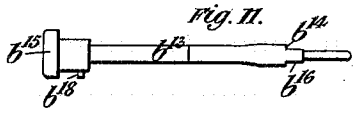


Fig. 12.

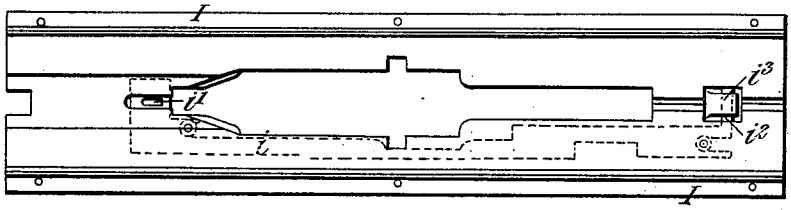
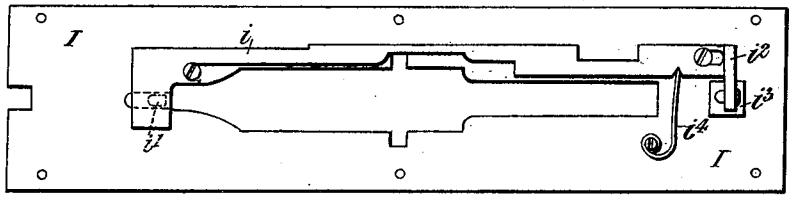


Fig. 13.



Witnesses

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H. W. GABBETT-FAIRFAX.

RECOIL OPERATED FIREARM.

No. 600,066. Patented Mar. 1, 1898.

Fig. 14.

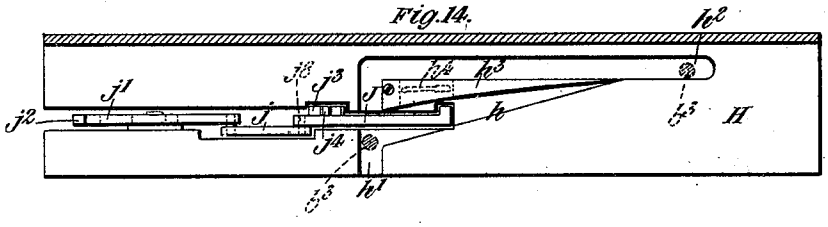


Fig. 15.

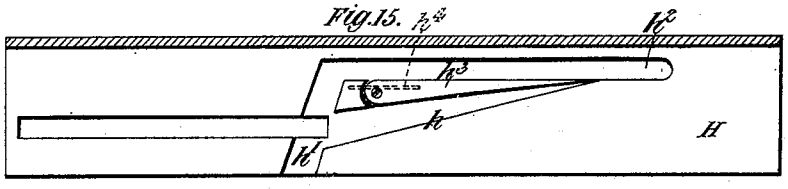


Fig. 16.

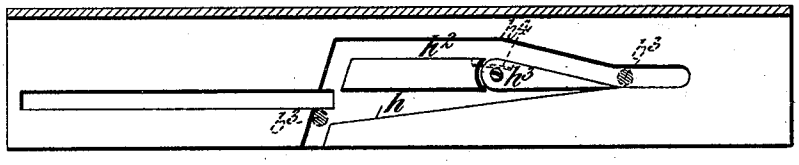


Fig. 17.

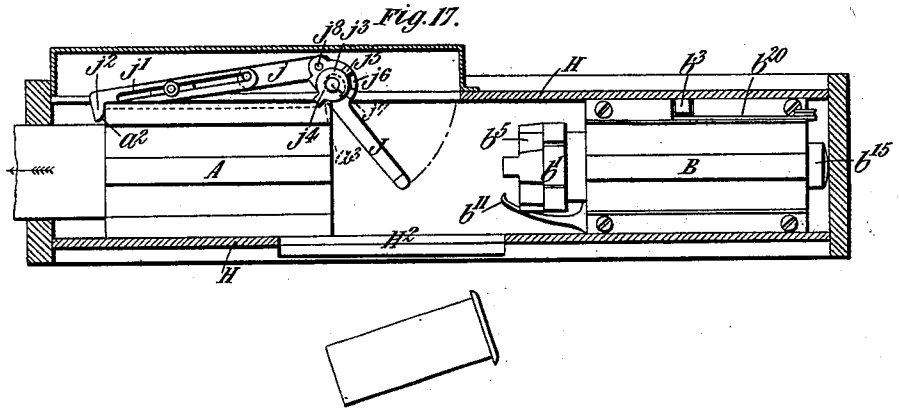
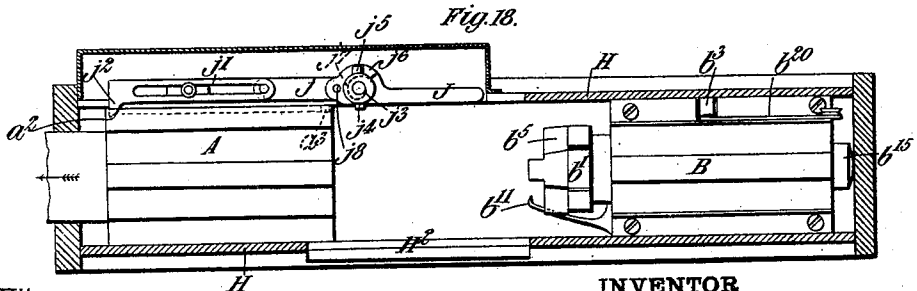


Fig. 18.



Witnesses

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Dennis Dunlap.

INVENTOR

Hugh W. Gabbett-Fairfax

by James L. Norris.

ATTORNEY

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HUGH WILLIAM GABBETT-FAIRFAX, OF LONDON, ENGLAND, ASSIGNOR TO THE "MARS" AUTOMATIC FIRE-ARMS SYNDICATE, LIMITED, OF SAME PLACE.

RECOIL-OPERATED FIREARM.

SPECIFICATION forming part of Letters Patent No. 600,066, dated March 1, 1898.

Application filed May 25, 1897. Serial No. 638,152. (No model.)

To all whom it may concern:

Be it known that I, HUGH WILLIAM GABBETT-FAIRFAX, engineer, a subject of the Queen of Great Britain, residing at 107 Lambeth Palace Road, London, England, have invented certain new and useful Improvements in Automatic and Similar Breech-Loading Firearms, of which the following is a specification, reference being had to the accompanying drawings.

My improvements relate to mechanism which is applicable to various classes of automatic or partly-automatic firearms—*i. e.*, to rifles, pistols, and shotguns—as well as to machine-guns and light ordnance.

The said invention relates generally to firearms wherein there exists the combination of a sliding barrel and breech-block so arranged that after the discharge of a cartridge in the barrel the latter and the breech-block recoil together against the resistance of a spring or springs till the block arrives at and is locked in its rearmost position. The barrel is then released from the breech-block and by the reaction of the springs returns or moves forward to open the breech and after assuming its firing position releases the block and permits it to move forward to close the breech and perform other functions hereinafter specified.

According to my invention the breech-block is provided with a fixed and a rotative head adapted to engage with and be locked to the barrel when the breech is closed, such locking being effected by a partial rotary movement imparted to the said rotative head as the breech-block reciprocates by a radial arm which is acted on by a switch and incline with which the casing of the firearm is provided. Acting in conjunction with the radial arm on the sliding block is a pin or bolt arranged on the frame in connection with a sear in such a position that at the moment when the block has fully closed the breech and not before this moment the said radial arm on the block is depressed by a spring, thereby rotating the locking-head to lock the bolt to the barrel and at the same time moving the sear to release the hammer to fire the weapon. A catch or detent is provided to retain the block in its rearward position until operated to release said block as the barrel completes its forward movement.

In order that my said invention may be fully understood and readily carried into effect, I will proceed to describe the same with reference to the accompanying drawings, in which—

Figure 1 is a longitudinal section of an automatic pistol constructed in accordance with my invention. In this figure the parts are shown in the position they occupy before the pistol has been fired. Fig. 2 is a similar view, but with the parts in the position they occupy after firing, the barrel being shown just about to complete its forward movement and release the breech-block. Fig. 3 is a transverse section taken substantially on the line 1 1 of Fig. 2. Figs. 4 to 10 are detail views of the breech-block, Fig. 4 being a side elevation, Fig. 5 another side elevation as seen from the other side, Fig. 6 a transverse section on the line 2 2 of Fig. 5, Fig. 7 a front end view, Fig. 8 a transverse section on the line 3 3 of Fig. 5, Fig. 9 a side elevation of the cylindrical portion carrying the rotative head, Fig. 10 a side elevation of the fixed head, and Fig. 11 a side elevation of the firing-pin. Figs. 12 and 13 are respectively a plan and an under side view of the under cover-plate. Fig. 14 is a longitudinal section of the detachable cover in which are mounted the ejector and the switch. Fig. 15 is a similar view, but shows a modification of the switch. Fig. 16 is likewise a similar view, but shows a further modification of the said switch. Figs. 17 and 18 are horizontal sectional views showing the manner in which the ejector operates. Figs. 19 and 20 are respectively a longitudinal section and plan view showing the trigger, the firing-sear, and the hammer. Fig. 21 is a fragmentary plan view of the mechanism for actuating the cartridge-carrier.

Like letters of reference indicate similar parts throughout the drawings.

A is the barrel, and A′ the spiral spring by which the said barrel is caused to assume its firing position after each discharge.

B is the breech-block.

C is the cartridge-carrier, which in the example illustrated is circular and provided with clips *c*, Fig. 3, to receive the cartridges

and is contained within a cylindrical chamber c', having a sliding or other door c^2 for enabling the cartridges to be placed in the clips.

D is the hammer, and D′ its mainspring.

E is the firing-sear, and F the safety-sear.

G is the trigger.

H is a detachable cover which incloses the breech end of the barrel and the breech-block.

The aforesaid breech-block is chambered to receive a rotary cylindrical piece b, having at its forward end the locking-head b', which rotates with and is a part of the said piece b. This cylindrical piece and the interior of the breech-block may be formed with grooves for the reception of antifriction-balls b^2, which serve as bearings on which the cylindrical piece turns within the block. Extending laterally from the said cylindrical piece is a radial arm b^3, which projects through a slot b^4 in the breech-block. Immediately in front of the rotative head b' is a fixed head b^5. The head b^5 is provided with a rearwardly-extending cylindrical stem b^8, which is fitted loosely in a corresponding shaped recess or socket formed in the forward end of the cylindrical piece b and is connected to the said cylindrical piece b by means of a pin b^6, (see Fig. 8,) passing through the rotative head b' and entering a segmental slot b^7, formed in a stem b^8 of the fixed head. By these means the fixed head is prevented from becoming detached or shifting longitudinally without, however, impeding the free rotary movement of the cylindrical piece b. The fixed and the rotative heads are formed with segmental projections b^9 b^{10}, which are adapted to engage with corresponding grooves in the barrel, the locking of the breech-block to the barrel being effected by the said rotative head partially rotating and thereby bringing its segmental projections behind internal segmental projections a in the barrel.

b^{11} is the extractor, which is carried by the breech-block. The aforesaid fixed head b^5 is slotted to receive the extractor, so that any tendency to rotary movement by the fixed head is thus prevented. b^{12} is a lug or arm which extends downwardly from the said fixed head and serves to push the cartridges from the carrier up an inclined surface A^2 into the cartridge-chamber of the barrel each time the breech-block performs its forward movement.

b^{13} is the firing-pin, having near its front end a shoulder b^{14} and at its rear end a collar or head b^{15}, against which the hammer D strikes to fire a cartridge. The said shoulder b^{14} is flattened at b^{16}, and the stem b^8 of the head b^5 is formed with a transverse slot b^{17}, (see Fig. 10,) with which the said flattened portion b^{16} engages when the firing-pin is in place, whereby the said firing-pin is prevented from turning about its axis. Near the rear end of the firing-pin is a pin or projection b^{18}, which engages with a longitudinal slot b^{19} in the breech-block and limits the extent of the rearward movement of the firing-pin.

b^{20} is a spring which acts upon the radial arm b^3 and normally tends to keep it pressed in a downward direction—that is to say, into the position represented in Figs. 5 and 6.

I is a cover-plate for the bottom of the receiver which supports the breech end of the barrel and the breech-block, the latter traveling on this plate during its to-and-fro movements. The said plate I is provided on its under side with a sliding rod or bar i, (see Figs. 12 and 13,) having at its front end a stump or projection i' and at its rear end a transverse piece i^2, that engages with a pivoted catch i^3. (See Figs. 1 and 2.) The aforesaid stump i' protrudes through a slotted opening in the said plate and occupies such a position that it can be acted upon by a projection a' on the under side of the barrel. The said sliding bar is controlled by a spring i^4, which keeps the said bar in its rearward position and causes the catch i^3 to protrude through the said plate and occupy a position to engage with a notch or recess b^{21} in the under side of the breech-block.

The detachable cover H (see Figs. 14 and 15) has formed on its interior an inclined surface or ledge h, extending upwardly from a vertical slot h' to a horizontal groove h^2. Above the inclined ledge h is situated a pivoted switch h^3, which is of triangular shape and normally held by a spring h^4 in such a position that its upper edge constitutes a continuation of the horizontal groove h^2, as shown in Fig. 14. The said switch is free to move upwardly about its pivot against the tension of the aforesaid spring h^4, but cannot move in the opposite direction. The aforesaid arm b^3 on the cylindrical portion b of the breech-block projects into the slot h', and consequently when the sliding barrel and breech-block recoil together the said arm ascends the inclined ledge h and reaches the horizontal groove h^2, thereby turning the rotative head b' in a direction to unlock the block from the barrel. Therefore when the said block reaches its rearmost position the barrel is able to return without the block, which is held back by the pivoted catch i^3 engaging the shoulder b^{21}, and thus the breech is opened. Just prior to the termination of the forward movement of the barrel the projection a' thereon strikes against the stump i' on the sliding bar i, whereby the latter is shifted forward and by acting on the said catch i^3 disengages it from the breech-block and allows the latter to advance under the influence of springs B′ and close the breech. During this advance of the block the aforesaid arm b^3 travels along the horizontal portion of the switch, and consequently the rotative head remains in its unlocked position until the arm arrives over the vertical slot h'—that is to say, until the segmental projections on the rotative head have resumed their proper position to again engage with the in-

ternal segments a in the barrel. The said arm then immediately descends in this vertical slot under the action of the spring b^{20} and turns the rotative head in a direction to again lock the breech-block to the barrel.

Pivoted at f', just below the plate I, is a lever f, which engages at one end with the safety-sear F and carries at its opposite end a pin f^2, which projects vertically into the slot h'. (See Fig. 2.)

The spindle d of the hammer D is provided with two bents d' d^2, one on each side of the hammer, with which, when the hammer is fully cocked, the safety and firing sears respectively engage under the action of their springs F' and E'. When the aforesaid arm b^3 of the breech-block descends in the vertical slot h', it forces down the said pin f^2, thereby turning the lever f about its pivot and raising the safety-sear out of engagement with the bent d'. The weapon is then in a condition to be fired when the trigger is pulled to raise the firing-sear E. This firing-sear E has a finger E^2, Fig. 19, which rests upon the leaf or extension G' of the trigger, so that when the trigger is pulled the said extension raises the firing-sear to release the hammer, provided the safety-sear has been previously disengaged, as above stated.

The cocking of the hammer is effected automatically by the recoil of the breech-block; but in order to enable the hammer to be cocked by hand an external arm D^2 is mounted on the spindle d.

J is the ejector, which is pivoted in the side of the cover H (see Figs. 14, 17, and 18) and is connected by a link j to a lever j', having at its free end a cam or projection j^2, against which a shoulder a^2 on the barrel strikes as the said barrel assumes its firing position.

j^3 is a boss having lugs j^4 j^5 projecting laterally therefrom, one of them being kept abutting against a lug j^6 on the ejector J by a spiral spring j^7. The barrel has a projection a^3 thereon, which, when the breech-block and barrel recoil, strikes against the lug j^4 and turns the boss j^3 backwardly against the tension of the spring j^7 without operating the ejector, the aforesaid spring returning the boss to its original position as soon as the projection a^3 has passed. Then on the return movement of the barrel (the breech-block remaining behind with the cartridge-case held by the extractor b^{11}) the projection a^3 strikes the lug j^4 and causes the boss j^3 to turn forwardly and jerk the ejector forcibly inward into the position represented in Fig. 17, whereby the cartridge-case receives a smart lateral blow that ejects it through the opening H^2 in the cover H. The barrel continuing its forward movement next brings its shoulder a^2 against the curved projection or cam j^2 on the lever j', whereby the latter is caused to shift about its pivot and turn the ejector into its original position, as shown in Fig. 18.

The rotary carrier C receives its intermittent rotary movement by a pivoted lever K, Figs. 1, 2, and 21, one end of which carries a spring-controlled driving-pawl k, engaging with a pin-wheel c^3 on the carrier. The other end of the said lever carries an antifriction-roller k', which projects through a slot formed in the plate I. This end of the lever is kept pressed upwardly into a recess a^4 in the barrel by a spring k^2, so that when the barrel recoils the lever K will be rocked and its pawl k caused to engage with a fresh pin on the pin-wheel c^3. Therefore as the barrel regains its firing position and brings its recess a^4 opposite the roller k' on the lever K the latter will be rocked in the reverse direction by the spring k^2 forcing the roller into the said recess a^4. The carrier will thus be revolved one step to bring the next cartridge uppermost just before the breech-block is released by the removal of the catch i^3, as hereinbefore explained.

As the breech-block advances in closing the breech the lug or arm b^{12} forces the uppermost cartridge from the carrier up the incline A^2 into the barrel, as already stated, and the weapon is then ready for the next discharge. So long as the trigger is kept pulled the weapon will continue firing automatically until all the cartridges in the carrier are spent.

The aforesaid switch h^3 may sometimes be constructed as shown at Fig. 15, and the slot h' instead of being vertical may be inclined, as illustrated in this figure.

In the arrangement of the switch shown at Fig. 16 the unlocking of the breech-block from the barrel is only partially effected during the recoil, the completion of the unlocking taking place as the barrel advances to regain its firing position. This is effected by arranging the switch h^3 so that its upper edge normally occupies an inclined position, the inclination of the ledge h being correspondingly reduced. When the breech-block retires in recoiling, its radial arm b^3 by traveling up the said ledge h is first lifted to partially turn the rotative head and afterward further lifted by the inclined upper surface of the switch to complete the turning movement of the rotative head as the barrel advances to close the breech. The breech-block being thus unlocked from the barrel the latter continues its forward movement and leaves the breech-block behind. The breech is thus opened to be subsequently closed by the release and advance of the breech-block, as already explained above.

I would state that I am aware that it has before been proposed to employ in automatic firearms a breech-block that is locked and unlocked by means of a rotary movement obtained by suitably-arranged inclines, and to such I make no claim, except as described with reference to my improvements.

What I do claim is—

1. The combination, in an automatic firearm, of a breech-block, a rotative head secured to said block, a fixed head in front of

said rotative head, a radial arm on said rotative head, a recess or path of approximately the form of a right-angled triangle in which the arm works, a switch in such recess for guiding the arm in said recess or path, and means for causing the head when turned to lock and unlock the breech-block, substantially as described.

2. The combination, in an automatic firearm, of a breech-block, a rotative head secured to said block, a radial arm connected with said head, a right-angled triangular recess or path in which said arm works, a switch for guiding the arm in such recess or path, segmental projections on the said head, and corresponding segmental projections in the barrel with which those on the head are adapted to engage, substantially as described.

3. The combination, in an automatic firearm of a breech-block, a rotary and a fixed head on said block, an arm connected with the rotary head, a safety-sear which normally prevents the firing of the gun, a lever engaging the said safety-sear, a pin connected with said lever and projecting into the path of said arm, and means for causing said arm to operate the pin and lever to disengage the sear, substantially as described.

4. The combination in an automatic firearm, of a reciprocating barrel and breech-block, a pivoted catch for holding said breech-block in its rearmost position, a sliding bar or rod for rocking said catch, a spring operating to thrust said bar or rod in a direction to normally hold said catch in position to engage and hold the breech-block in its retracted position, a projection on the barrel for engaging the bar or rod at the end of its forward movement to release said catch, and springs for moving forward the barrel and breech-block, substantially as described.

5. The combination, in an automatic firearm, of a reciprocating breech-block, a pivoted ejector at the side of the breech, a spring-actuated boss free to turn in one direction but operating the ejector when turned in the other direction, levers connected with said ejector and adapted when operated to restore it to its normal position, a projection on the rear end of the barrel for operating the boss, and a shoulder in advance thereof for actuating the levers, substantially as described.

6. The combination, in an automatic firearm, of a reciprocating breech-block, a rotary head thereon, an arm carried by said head, a pivoted hammer, a pair of bents on the hammer-spindle, a pair of sears engaging said bents and means for causing said arm to disengage one of said sears when the breech is properly closed, and a trigger for disengaging the other sear, substantially as described.

7. The combination, in an automatic firearm, of a reciprocating breech-block, a rotary locking-head on said block, an arm connected with said head, a casing or cover for said breech-block and its connected parts, an incline on said casing by which the arm is moved upward, a switch pivoted to said casing with its free end resting at the upper end of said incline, a groove into which said arm is directed by said switch, and a slot connecting the forward ends of the incline and groove for permitting the downward movement of the arm, substantially as described.

In testimony whereof I have hereunto set my hand this 5th day of January, 1897.

HUGH WILLIAM GABBETT-FAIRFAX.

Witnesses:
ARTHUR A. BERGIN,
G. WINLO HOAR.