K. A. BRÄUNING.

AUTOMATIC FIREARM WITH FIXED BARREL AND BREECH ACTION.

APPLICATION FILED NOV. 17, 1911.

1,020,596.

Patented Mar. 19, 1912.

3 SHEETS—SHEET 1.

Fig. 4.

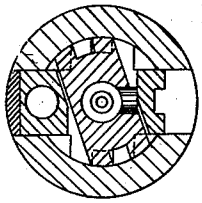


Fig. 1.

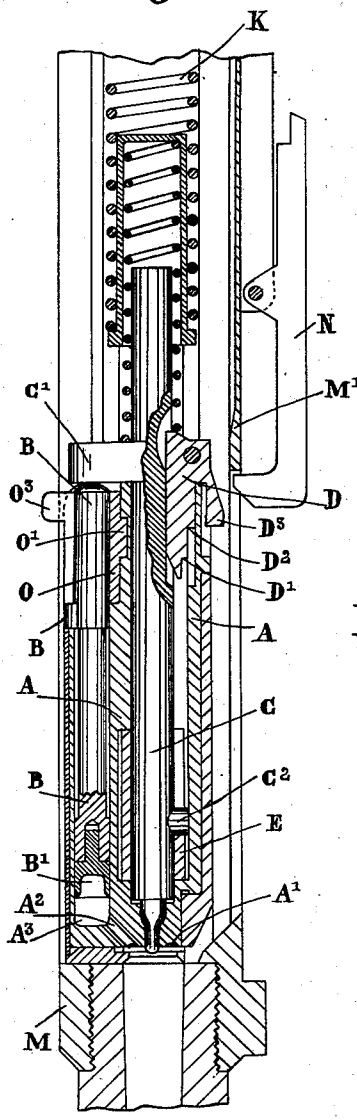
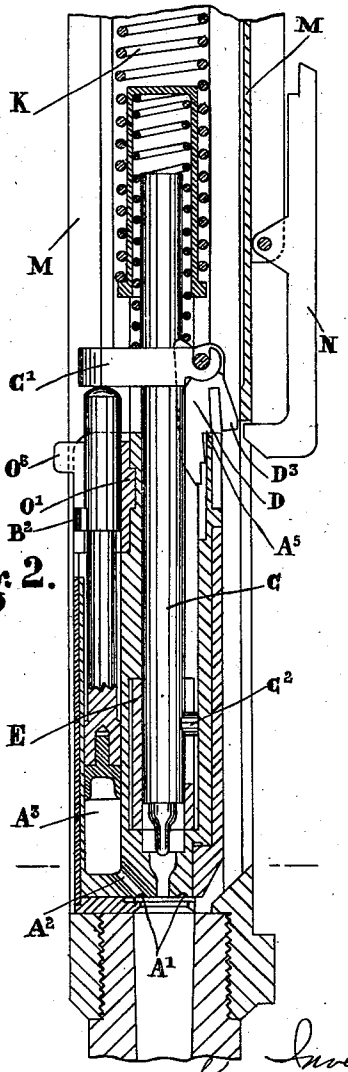


Fig. 2.



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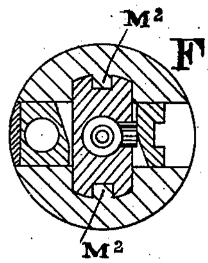

Fig. 5.

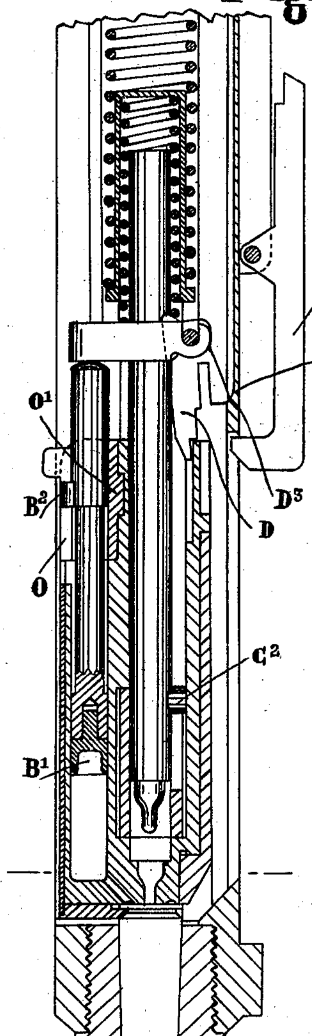

Fig. 3.

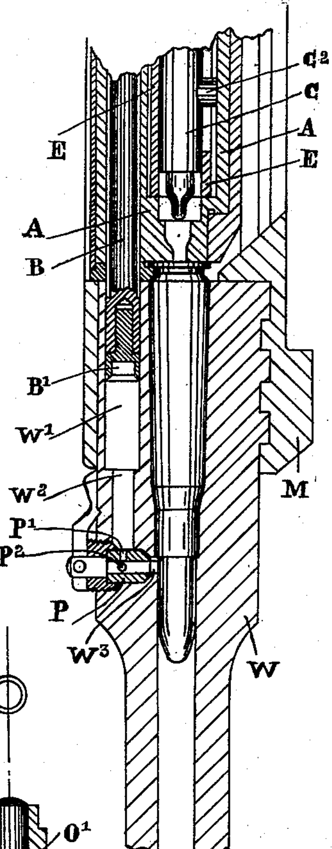

Fig. 11.

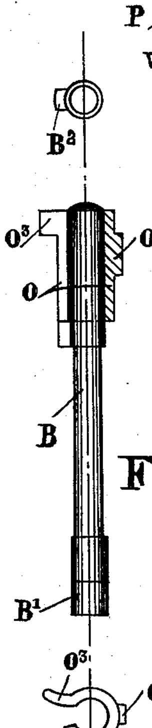

Fig. 10.

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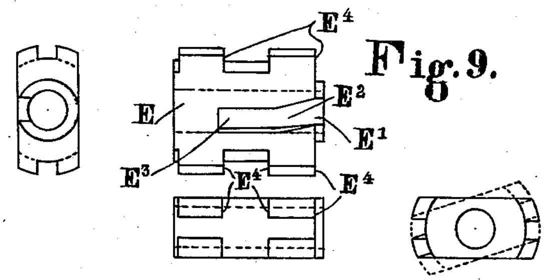

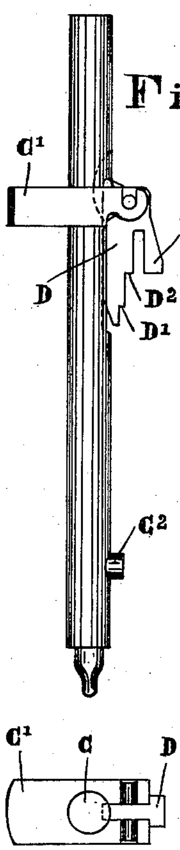

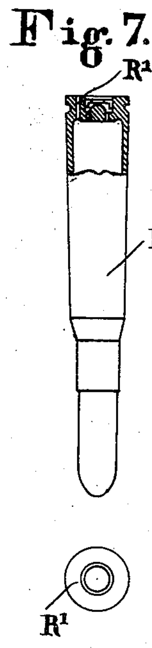

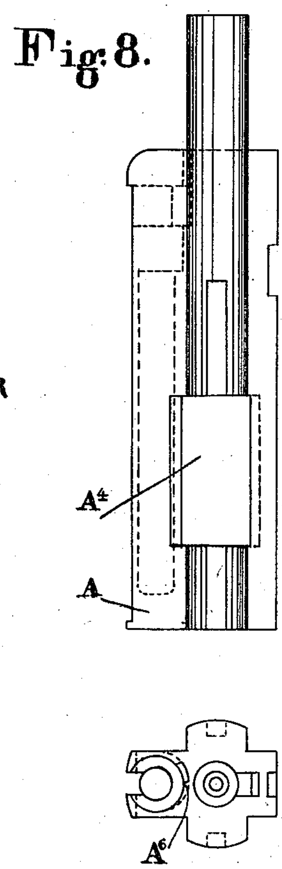

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UNITED STATES PATENT OFFICE.

KARL AUGUST BRÄUNING, OF HERSTAL, NEAR LIEGE, BELGIUM.

AUTOMATIC FIREARM WITH FIXED BARREL AND BREECH-ACTION.

1,020,596. Specification of Letters Patent. Patented Mar. 19, 1912.

Application filed November 17, 1911. Serial No. 660,891.

To all whom it may concern:

Be it known that I, KARL AUGUST BRÄUNING, engineer, a subject of the Emperor of Germany, and resident of Herstal, near Liege, in the Kingdom of Belgium, have invented certain new and useful Improvements in Automatic Firearms with Fixed Barrels and Breech-Actions; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked therein, which form a part of this specification.

The present invention relates to an automatic fire-arm with fixed barrel and breech-action, in which the breech-action is controlled by a lock rotating in the movable breech.

The motion of the lock is obtained by the displacing of the firing-pin under the action of gas pressure. In the forms of construction here represented, the action of the gases is transmitted to the firing-pin by a piston guided in an opening in the movable breech.

The fire-arm can be employed with ordinary cartridges (Figure 11) or with special cartridges having a hole in the back end of the shell (Figs. 1 to 10).

In the drawings showing the invention as applied with special cartridges Fig. 1 is a vertical longitudinal section of the breech with the firing-pin in the position after firing. Fig. 2 is a vertical longitudinal section of the breech with the firing-pin in the position ready for firing. Fig. 3 is a vertical longitudinal section of the breech with the firing-pin in the unlocking position. Fig. 4 is a vertical transverse section of the rotating lock in the locking position. Fig. 5 is a vertical transverse section of the rotating lock in the unlocking position. Fig. 6 represents the firing-pin and the sear in side and end view. Fig. 7 is a side view partly in section of the cartridge with the small hole in its back-end. Fig. 8 is a side and an end view of the movable breech. Fig. 9 is a side view, a plan view, and two end views of the rotating lock. Fig. 10 is a detail of the piston and of the lock. Fig. 11 is a view similar to Fig. 2 showing a modification.

After the deflagration of the cartridge in the barrel, a part of the gases pass through a small opening R^1 in the cartridge-shell R (Fig. 7) to the back of this shell and thence, for any position of the cartridge, through the annular groove A^1 and the passage A^2 into the opening of the breech bolt A in which slides the piston B. By the high pressure of the gases the cartridge shell and its back-end are pressed against the fore-end of the breech bolt, thus producing a tight closing to the exterior. The piston B is provided at its fore-end with a brass-piece B^1 by which the tightness is insured under the pressure of the gases, so that no gas can leak out to the back through the opening A^3. The pressure of the gases pushes backward the piston B and at the same time the firing-pin C which bears with its jaw C^1 against the back-end of the piston B. The rotating-lock E is forced to rotate during this backward movement of the firing-pin C thus causing the unlocking. The rotating-lock E is placed in a chamber A^4 of the breech-bolt and is centered by the cylindrical part of the firing-pin C. A stud C^2 of the firing-pin C, which cannot rotate, extends downward and slides in a curved guide E^1, E^2, E^3 of the rotating lock. The rectilinear fore-part E^3 of this curved guide of the rotating lock corresponds to the locking position (Fig. 4) of the lock, which it occupies during the recoil of the firing-pin in the position for firing (Fig. 2), *i. e.*, as long as the sear D presses with its notch D^2 against the salient piece A^5 of the bolt A. By continuing its backward movement the firing-pin reaches the position Fig. 3, *i. e.* when the fore-notch D^1 of the sear D reaches the salient piece A^5. During this movement of recoil of the firing-pin C the stud C^2 enters the oblique part E^2 of the curved guide of the lock which is forced to rotate and thus to unlock the breech bolt (Fig. 5). The unlocked breech bolt is compelled to follow the pieces already in motion and the breech is completely unlocked. The empty cartridge-shell is then ejected in the usual way; a new cartridge comes up from the magazine to the front of the breech bolt, which when pushed forward by the closing-spring K introduces the new cartridge into the barrel.

When the breech bolt, in its initial forward movement, reaches the position shown in Fig. 3 the lower arm D^3 of the sear D, pivoted to the firing-pin, meets an abutment M^1 of the casing M, which gives a small lift to the sear D and frees the firing-pin C until

by a short movement, the notch D^2 of the sear reaches the salient piece A^5. The short movement of the firing-pin C is sufficient to allow the stud C^2 to slide through the oblique part E^2 of the curved guide of the lock E; the lock will rotate and thus reëstablish the locking. The firing-pin C is maintained in the position for firing by the notch D^2 of the sear D until it is lifted during the firing by the trigger (not represented) by the intermedium of the lever N. The firing-pin can then move forward freely, the stud C^2 slides in the rectilinear part E^3 of the curved guide of the lock, thus preventing its being unlocked during the firing. The particular disposition of the rotating lock behind the fore-face of the breech bolt is remarkably in opposition with the usual disposition of the rotating lock or of the movable breech-head at the fore part of the breech. In order to obtain the maximum bearing surface of the breech bolt for a minimum displacement of the lock, the surface of the frame presents a longitudinal groove and a transverse groove. In the first one slides a rib M^2 of the casing M and serves to reduce the necessary rotation for the locking; the second one offers at each side of the lock four bearing surfaces, that is to say in all eight surfaces E^4 (Fig. 9).

When the fire-arm is to be used as an ordinary repeating arm, *i. e.* when the automatic action of the locking and unlocking of the breech is omitted, use is made of a locking device which keeps the gas piston B from moving from its fore-position notwithstanding the pressure of the gases acting upon it. To this end, a casing O is disposed at the back-end of the breech bolt A. This casing is maintained in the annular groove A^6 (Fig. 8) by the stud O^1, so that the casing O cannot move longitudinally, but can have a certain rotation. The piston B guided at its back-end in the casing O has a lug B^2 extending upward, which slides in a slot extending the length of the casing and whose width is that of the button B^2. When the casing O is rotated by its arm O^3 the width of the slot the button B^2 of the piston B will be locked and the piston cannot move. The breech will then have to be opened by a handle (not represented) after each firing to unlock the firing-pin. In this construction as in others, the action of the gases upon the breech and the locking of the piston could be effected otherwise without modifying the principle of the invention, as for example, by omitting the piston and by utilizing the firing-pin as a piston.

Without any essential modifications of the fire-arm, the invention could be used in automatic firing with blank cartridges. To adapt this invention to the low pressure of the gases of these cartridges, the hole in the back-end of the cartridge shells is made larger, or more holes are provided. To avoid the penetration of humidity into the cartridges by the gas-holes at the back-end, they can be stopped up with lac or by other appropriate means.

When it is desired to use ordinary cartridges the fore-part of the mechanism is disposed as particularly represented by Fig. 11. The groove A^1 of the former arrangement is omitted. The piston B is extended forward and penetrates partly in an opening W^1 formed at the back-end of the barrel W. This opening communicates with the opening W^3 through the passage W^2. The passage of the gases is regulated by a valve. The cone P of the valve can occupy three positions: 1 to close the passage of the gas, when the fire arm is to be used as a repeating fire arm. 2. To give a small passage P^1, when the fire-arm is to be used for the normal automatic firing, and 3, to give a wide passage P^2, when the fire arm is to be used for the automatic firing with blank cartridges.

When the charge has left the cartridge-shell the gases pass through the opening W^3 into the passage W^2 thence into the opening W^1 and there they act upon the piston B which can slide in the cylinder of the breech bolt A. The action of the piston will then be the same as that described above for the construction represented by Figs. 1 to 10.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent is:

1. In automatic fire-arms with fixed barrels and breech-action, the breech-action controlled by a lock rotating in a movable breech bolt, the combination of a firing-pin with a rotating lock centered by the cylindrical part of the firing-pin, means by which the firing-pin is displaced backward, means by which the rotating lock is acted upon by the firing-pin and a sear pivoted to the firing-pin, substantially as described.

2. In automatic fire-arms with fixed barrels and breech-action, the breech-action controlled by a lock rotating in a movable breech bolt, the combination of a firing-pin with a rotating lock centered by the cylindrical part of the firing pin, a piston acting upon a jaw of the firing pin, openings for the gases to reach the fore-end of the piston, means by which the lock is rotated by a longitudinal movement of the firing-pin and a sear pivoted to the firing-pin, substantially as described.

3. In automatic fire-arms with fixed barrels and breech action, the breech action controlled by a lock rotating in a movable breech bolt, the combination of a firing-pin with a rotating lock centered by the cylindrical part of the firing-pin, a piston acting upon the firing-pin, an annular groove at the fore-part of the movable breech bolt, a

passage for the gases to reach the fore-end of the piston, means by which the lock is rotated by a longitudinal movement of the firing-pin and a sear pivoted to the firing-pin, substantially as described.

4. In automatic fire-arms with fixed barrels and breech action, the breech-action controlled by a lock rotating in a movable breech bolt, the combination of a firing-pin with a rotating lock centered by the cylindrical part of the firing-pin, a piston acting upon the firing-pin, openings through which the gases from the barrel at the fore-end of the cartridge-shell are led to the fore-end of the piston, means by which the lock is rotated by a longitudinal movement of the firing-pin and a sear pivoted to the firing pin, substantially as described.

5. In automatic fire-arms with fixed barrels and breech-action, the breech-action controlled by a lock rotating in a movable breech, the combination of a firing-pin with a rotating lock centered by the cylindrical part of the firing pin, a piston acting upon the firing-pin, openings through which the gases from the barrel at the fore-end of the cartridge-shell are led to the fore-end of the piston, a valve regulating the opening area for the gases led from the barrel to the fore-end of the piston, means by which the lock is rotated by a longitudinal movement of the firing-pin and a sear pivoted to the firing-pin, substantially as described.

6. In automatic fire-arms with fixed barrels and breech-action, the breech-action controlled by a lock rotating in a movable breech bolt, the combination of a firing-pin with a rotating lock centered by the cylindrical part of the firing pin, means by which the firing-pin is displaced backward, a stud fixed to the firing-pin, a curved groove in the rotating lock, a sear with notches pivoted to the firing-pin, an abutment of the casing for engaging the said sear, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

KARL AUGUST BRÄUNING.

Witnesses:
GEORGES VANDERT-CAUGHEN,
LÉONARD LEVA.