J. C. WHITE.

FIREARM.

APPLICATION FILED MAY 22, 1912.

1,073,452.

Patented Sept. 16, 1913.

3 SHEETS—SHEET 1.

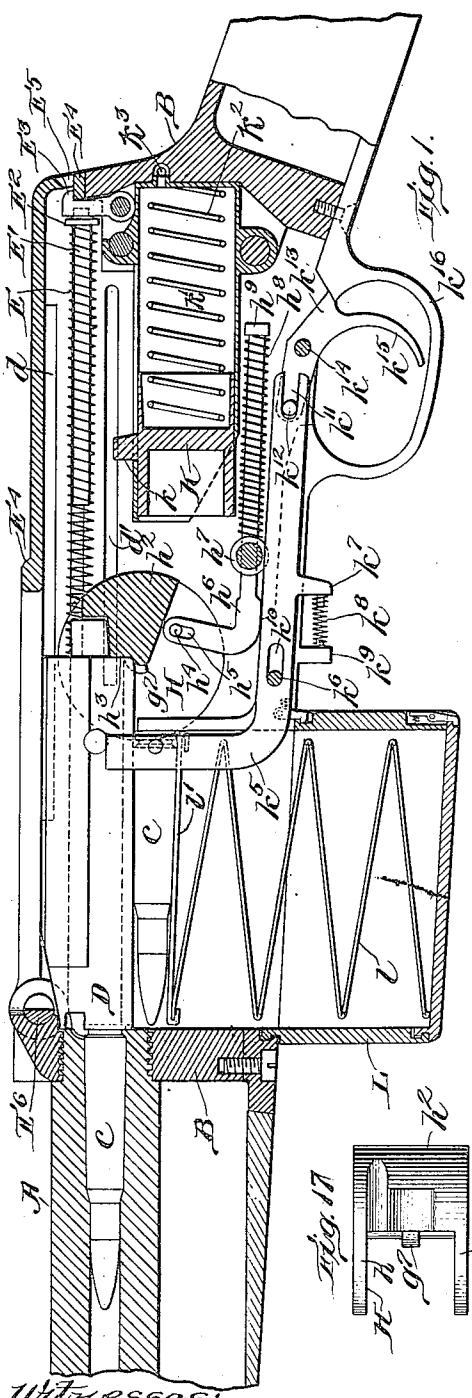

Fig. 1.

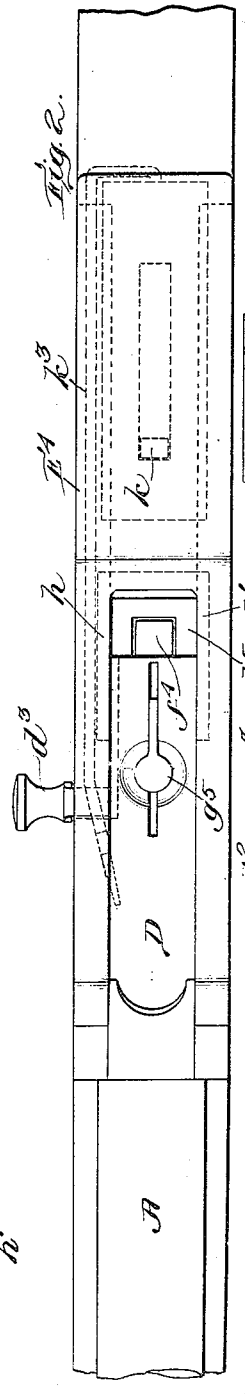

Fig. 2.

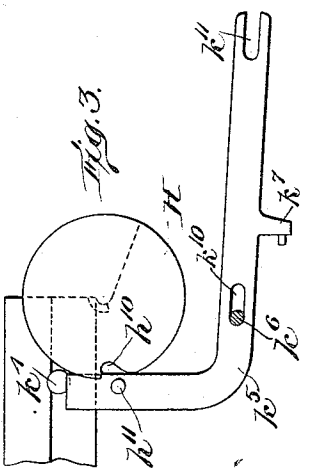

Fig. 3.

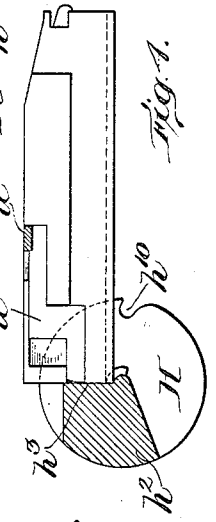

Fig. 4.

Fig. 17.

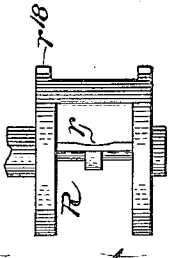

Fig. 18.

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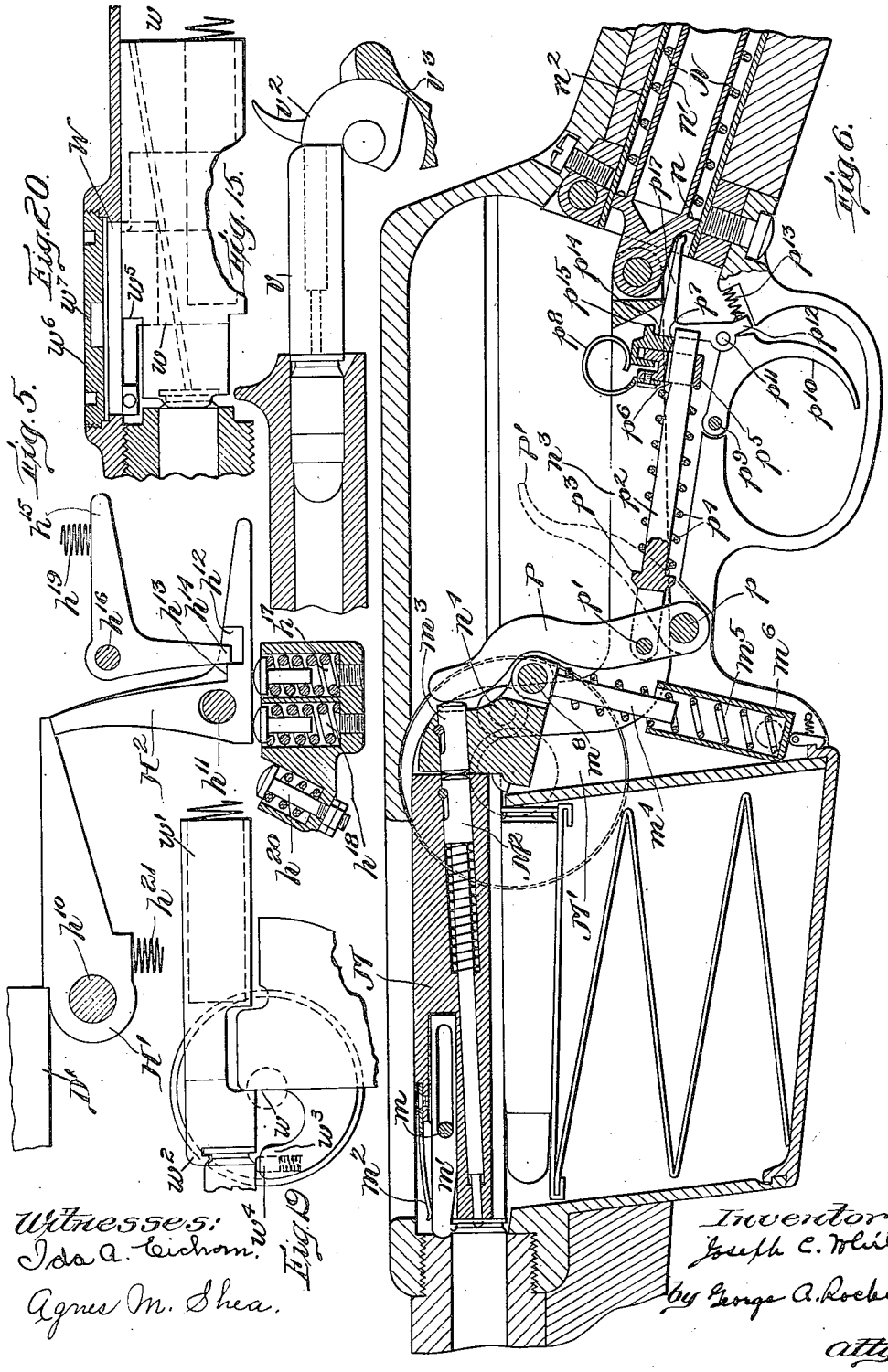
3 SHEETS—SHEET 2.



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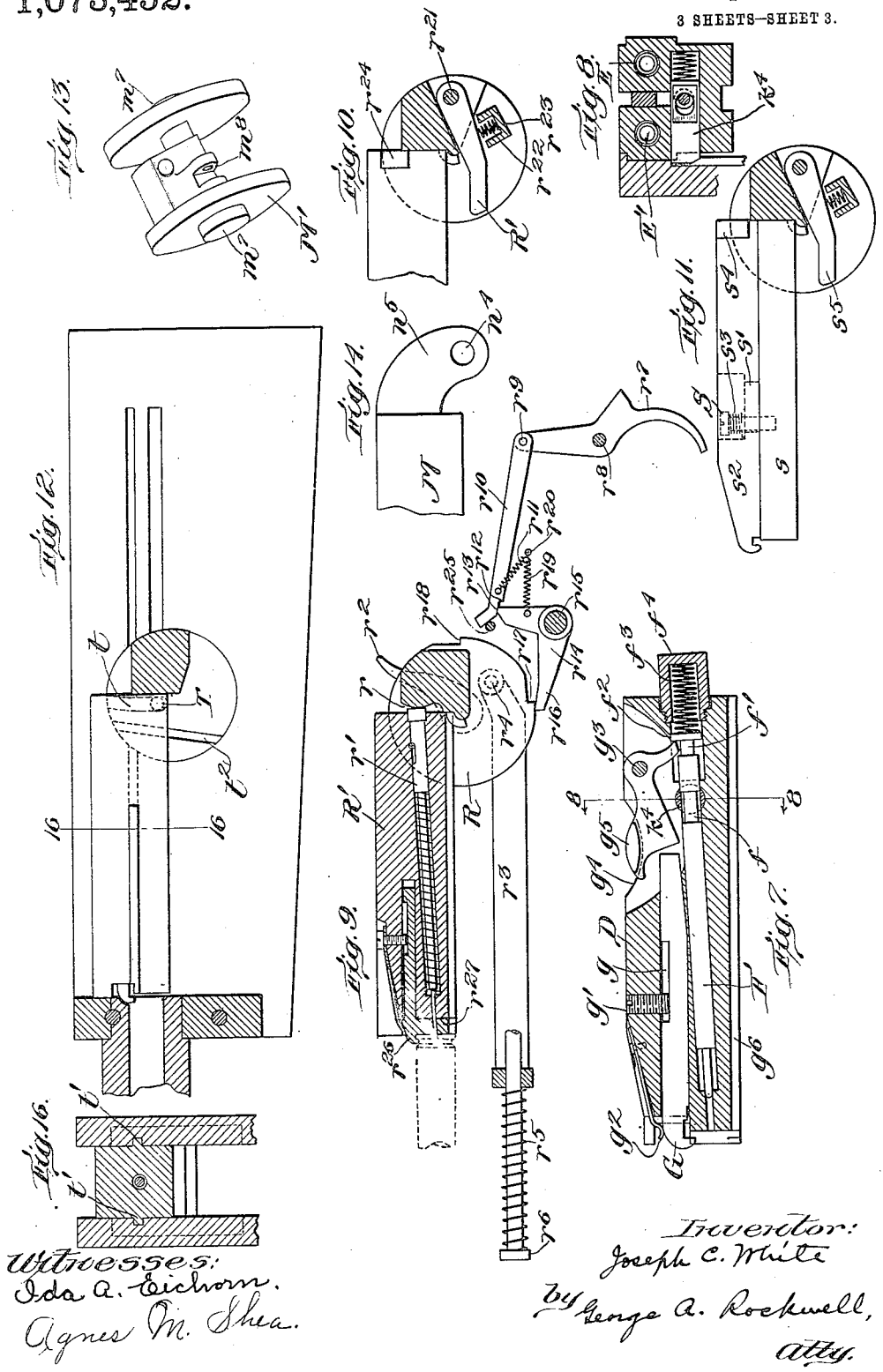
3 SHEETS—SHEET 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

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FIREARM.

1,073,452. Specification of Letters Patent. Patented Sept. 16, 1913.

Application filed May 22, 1912. Serial No. 698,939.

To all whom it may concern:

Be it known that I, JOSEPH C. WHITE, of Chelsea, in the county of Suffolk and State of Massachusetts, have invented a new and useful Firearm, of which the following is a specification.

Most firearms designated as automatic or semi-automatic which have been constructed hitherto have been distinguished by the characteristics of one of the following classes:

First, those having a barrel moving with reference to the frame. In these arms the barrel and breech closing member are locked together and are in motion while the bullet is receiving its first impetus, and are subsequently automatically unlocked, the barrel returning to its normal position, and the breech closing member retreating for the purpose of reloading. This movability of the barrel with reference to the frame affects injuriously the serviceableness of the arm and its accuracy of fire, especially in the case of military and sporting rifles.

Second, those having a "vented" barrel. In these arms a vent or gas port is provided not far from the muzzle, and through this port gas is driven by the internal pressure into a tube carrying a piston or against a lever, and thus operates the breech mechanism.

Third, those in which the backward movement of the breech closing member under the pressure of the gases in the barrel is checked momentarily by the inertia of the hammer and of the breech closing member itself. The backward movement being exerted directly against the mass which furnishes the required inertia, and moving in practically a straight line, it is necessary either to employ a cartridge of very limited power or an inertia member of excessive weight.

The system herein described is adapted for use with a barrel of ordinary type, without gas port, the barrel being rigidly attached to the frame, and employing cartridges of any type now in common use. The sights are attached to the barrel in the usual way, and the barrel having no movement with respect to the frame, accuracy of fire is secured in as high degree as in the case of any firearm yet constructed. The weight of a rifle constructed under this system, and employing cartridges of the highest power, would exceed by only a few ounces, if at all, the weight of a hand-operated magazine rifle employing the same cartridges.

In some classes of arms practical utility requires that the weight of the parts composing the breech closing mechanism should be kept at the lowest possible point. In such arms it is often desired to employ cartridges of the greatest power, in the use of which the pressure of the gases in the barrel at the moment of discharge is very great. In other arms the use of cartridges of moderate or low power admits the employment of breech closing mechanism of less weight and greater simplicity. In all these classes of arms the automatic breech mechanism herein described may be employed, the form of breech locking member shown in Fig. 9 or 15 for instance, being adapted for arms using cartridges of moderate power, while the form shown in Figs. 6 or 10 may be preferable where the use of ammunition of the highest power is desired in an arm of the least practicable weight.

Inasmuch as the gas pressure following the ignition of the powder charge varies greatly in different arms, employing cartridges of different power, it may be desirable to delay the extraction of the empty cartridge shell in some cases more than in others, to await a partial abatement of the gas pressure. To effect this purpose I employ an extractor having a certain longitudinal movement with reference to the breech closer, which admits of the rearward movement of the breech closer for a predetermined distance before the withdrawal of the cartridge shell from the chamber is effected by the extractor. For the purpose of further delaying the extraction of the shell, in cases where it may be desirable, using the form of breech locking member shown in Fig. 10, I provide a striker attached to said member, the striker being so constructed that after the rotation of said member for nearly the entire distance which it is free to rotate the striker delivers a blow against an abutment provided on the breech closer, (or on the extractor, as in Fig. 11) and by the blow drives the breech closer backward, fully opening the breech mecha-

nism and extracting the shell. In addition to the delay of extraction incident to the necessity for the breech locking member to make its rotation before delivering its blow by means of the striker, I still further delay the extraction in some cases by the use of a spring attached to said striker as shown, or it may be attached to said abutment, or both. This delayed extraction is an important feature of my invention.

The invention is herein shown as embodied in a gas-operated magazine rifle, adapted for the use of a foot soldier or sportsman. It will be understood, however, that it is not intended to restrict the present invention to a rifle for such use, nor to any particular kind of firearm, nor to the combination of the several features in a single structure, but the invention is equally applicable to pistols and other hand weapons, as well as to firearms commonly designated as ordnance; and it is applicable to firearms in which the operations of reloading are accomplished in part automatically and in part by hand, as well as to firearms in which the operations of both reloading and firing are fully accomplished automatically.

In some arms the upper portion of the outer structure in rear of the barrel, sometimes called the receiver, is stationary, a breech block with usually a longitudinal movement being mounted movably within it; in others the upper portion of the said outer structure has a longitudinal movement of its own with relation to the frame. In view of the many forms of firearms to which my invention is applicable, and to avoid confusion of terms, I describe herein the stationary receiver, as well as the frame, as the "casing" and I describe the breech block, movable receiver, or other movable member which performs the function of closing the breech, or supporting the head of the cartridge at the moment of firing, as the "breech closer."

In the drawings: Figure 1 is a longitudinal sectional view of a portion of a firearm embodying features of my invention; Fig. 2 is a plan of the portion of the firearm shown in Fig. 1; Fig. 3 is a detail relating to the trigger mechanism shown in Fig. 1; Fig. 4 is a detail of the breech mechanism showing the side opposite to that shown in Fig. 1; Fig. 5 is a fragmentary elevation, partly in section, of a modified form of breech closer controlling devices; Fig. 6 is a longitudinal sectional view of a portion of a firearm embodying another form of my invention; Fig. 7 is a sectional detail of the breech closer shown in Figs. 1 and 2; Fig. 8 is a section on line 8—8 of Fig. 7; Figs. 9, 10, 11 and 12 are fragmentary views showing other forms of my invention; Fig. 13 is a perspective of the locking member shown in Fig. 6; Fig. 14 is a detail of the breech closer shown in Fig. 6; Fig. 15 is a view illustrating my invention applied to a pistol; Fig. 16 is a partial section on line 16—16 of Fig. 12; Fig. 17 is a plan of the roll of Fig. 1; and Fig. 18 is a plan of the roll of Fig. 9 provided with trunnions. Figs. 19 and 20 illustrate another form of my invention.

In Fig. 1 barrel A has screw threaded connection with casing B in which the breech closer D is mounted to reciprocate the latter being guided by grooves d and d' in the casing. The usual breech closing spring E partially encircles rod E′ which has collar E^2 to form one abutment for the spring, the other abutment being within the breech closer. The rod E′ extends into pivoted hook E^3 whose hook portion engages a shoulder on cover E^4, there being an aperture in the cover at E^5 to furnish access to the hook member for the purpose of unfastening the cover so that it may be swung on its pivot E^6 and this unhooking might readily be done by pressing the end of a cartridge through aperture E^5 to unhook the hook. It is desirable to use two breech closing springs like E as indicated in Fig. 8. Breech closer D is shown in detail in Fig. 7 and carries firing pin F having a contracted portion f for engagement with sear h^4 and also a contracted portion f' for engagement with one end of the thumb piece to be hereinafter described. At its rear end the firing pin has collar f^2 forming one abutment for spring f^3, the other abutment being the inner wall of cap f^4 which is screwed into the breech closer. Mounted in the breech closer is extractor G having a slot g in its upper edge to receive screw g', which is fixed to the breech closer, and thereby provide relative longitudinal movement between the extractor and the breech closer, the said movement being limited by the engagement between the screw and the end walls of said slot. Spring g^2 is provided to press the extractor normally downward but allowing it to snap over the head of the cartridge. Pivoted to the breech closer at g^3 is a lever to cock the firing pin, one end engaging collar f^2 and the other end being accessible through opening g^4 in the breech closer and having an enlarged portion g^5 for a bearing for the thumb in case hand cocking is desired. Groove g^6 is provided so that the lower portion of the cartridge shell may engage abutment g^7 for completing the ejection of the cartridge.

The locking roll H consists of two cylindrical parts h h' having between them portion h^2, this portion having a flat surface h^3 to engage the rear of the breech closer. This member H is mounted in cylindrical portions in or on the casing and its cylindrical parts frictionally engage the casing. The locking roll H has a pin h^4 engaging a slot h^5 in link h^6 which is mounted to slide on

pin h^7, said pin forming one abutment of spring h^8, the other abutment being a collar h^9 at the end of link h^6. In its rearward movement the breech closer strikes lug k on buffer K the latter being mounted to close one end of chamber k' said buffer sliding in chamber k' and engaging spring k^2 to yieldingly stop the rearward movement of the breech closer. Extending from the rear of the chamber is air conduit k^3 which leads to the breech chamber for the purpose of driving out the residuum of the powder charge after its explosion. Sear k^4 is operated (as will be more fully described below) by lever k^5 which is pivoted at k^6 and has a lug k^7 forming one abutment of spring k^8 the other abutment of which spring is lug k^9 on the casing. Slot k^{10} provides for movement of lever k^5 with reference to pin k^6 and said lever has an open slot k^{11} at its rear end to receive pin k^{12} at one end of trigger k^{13} said trigger being pivoted at k^{14} and having finger portion k^{15} within trigger guard k^{16}.

The magazine L is suitably connected to the casing and has within it spring l and follower l' to force the cartridge C upward in a well known manner. Slidably mounted on the breech closer is member d^2 connected through the casing with handle d^3 (see Figs. 2 and 4) said member d^2 having capacity for longitudinal movement with reference to the breech closer to engage face h^3 of member H considerably further from the axis of rotation than the engagement between the main portion of the breech closer and said face, the purpose of this construction being to make it easier to turn the roll in case the breech closer is to be withdrawn by hand, it being clear that a pull on handle d^3 will exert pressure on the roll at a considerable distance from its axis, which will easily turn the roll, whereupon the whole breech closer may be pulled back.

In Fig. 5 I have shown a portion of mechanism embodying my invention in which the breech closer D′ engages a shoulder on locking member H′, the latter being pivoted at h^{10} with its rear end bearing on top of lever H^2 loosely pivoted at h^{11} and having a recess h^{12} and a step h^{13} to receive one arm h^{14} of lever h^{15} pivoted at h^{16}. The lower face of lever H^2 bears upon two spring abutments h^{17} and h^{18} the former exerting its stress upwardly to the right of h^{11} and the latter to the left of said pivot. When the breech closer moves rearwardly it tends to turn member H′ and thereby forces lever H^2 downwardly on its pivot whereupon arm h^{14} will ride over upon step h^{13}, arm h^{15} being held down by spring h^{19}. The pivot of member H^2 is now at the point of engagement between said step and the end h^{14} and therefore spring abutment h^{17} has no opportunity to act but spring abutment h^{18} acts to raise member H^2 and force its upper end somewhat to the right allowing the end of member H′ to swing downwardly and allowing the breech closer to pass to the rear, spring abutment h^{20} acting as a buffer for member H′ which is returned to its former position by spring h^{21}. By raising arm h^{15} disengagement of end h^{14} and step h^{13} is had and member H^2 is free to resume the position shown in Fig. 5.

Fig. 6 shows another form of my invention and here the breech closer M has a pin m riding in a slot in extractor m' the end of the latter being pressed down by spring m^2 attached to the breech closer. The main firing-pin M^2 is mounted in the breech closer with provision for longitudinal movement with relation to the latter and I also provide an auxiliary or secondary firing pin mounted for longitudinal movement in locking roll M′, this secondary firing pin being indicated at m^3. The roll M′ has trunnions m^7 (see Fig. 13) which bear in the casing, and the outer surface of the roll does not bear against the casing in which member M′ is mounted to move about its axis so that the resistance to turning is relatively more due to inertia than with the roll mounted as in Fig. 1. Connected at m^8 to roll M′ is rod m^4 surrounded by spring m^5 the latter having one abutment within cap m^6 the latter being pivoted to the casing. The return spring for the breech closer, is shown at N and bears against collar n on member n' the collar being within tubular member n^2 and adapted to reciprocate therein. Member n' is pivotally connected to link n^3 which in turn is pivotally connected at n^4 to the projection n^5 of the breech closer M (see Fig. 14). Hammer P pivoted to shaft p is pivotally connected at p' with arm p^2 which has shoulder p^3 forming one abutment of spring p^4, the other abutment being portion p^5 of the casing. Arm p^2 is notched at p^6 and its end passes through an opening in portion p^5 so that when the arm is moved to the right in Fig. 6 the notch p^6 will engage shoulder p^7 to cock the hammer, shoulder p^7 being allowed to slide and be normally pressed downwardly by spring p^8. Pivoted at p^9 is trigger p^{10} which midway between its ends is pivotally connected at p^{11} to a lever p^{17} one of whose ends p^{12} engages spring p^{13} whose other abutment is the casing. The last-mentioned lever has a square shoulder p^{14} which engages a shoulder p^{15} on p^7, the outer end of said lever engaging member n' near the outer side of collar n. P′ is a member for cocking the hammer by hand, and is rigidly connected to the shaft p. When the trigger is pulled shoulder p^{14} on lever p^{17} engages shoulder p^{15} and raises shoulder p^7 out of engagement with notch p^6 whereupon spring p^4 is free to force arm p^2 forward and operate the hammer.

In Fig. 9 I have illustrated a modification

in which the locking roll R has a portion r to act as a hammer to strike the firing pin r', the locking roll carrying finger piece r^2 which is outside of the casing and accessible for hand turning of the locking roll. Link r^3 is pivoted at r^4 to the locking roll and its forward end is an abutment for spring r^5 whose other abutment is at r^6, the spring tending to turn the roll to the position shown. In this form it will be noted that the roll spring is to be located beneath the barrel (not shown). The trigger r^7 is pivoted at r^8 and one end is pivotally connected at r^9 to push bar r^{10} connected by spring r^{11} to a fixed point r^{20}. The forward end of push bar r^{10} is sloped to ride upward on pin r^{25} and the lower side is notched at r^{12} to engage one end r^{13} of lever r^{14} pivoted at r^{15} whose other end r^{16} engages notch r^{17} or r^{18} in roll R. End r^{13} is connected by spring r^{19} to fixed point r^{20}.

Mounted for longitudinal movement on breech closer R′ is extractor r^{26} having an integral offset portion r^{27} which acts as a backing for the primer to prevent it being driven from its pocket by the pressure of the gases.

When the trigger r^7 is pulled push bar r^{10} is advanced and forces r^{16} out of the notch in roll R and when the trigger is released push bar r^{10} is drawn back by spring r^{11} so that spring r^{19} may act on end r^{13} and thereby swing end r^{16} into position to engage the notches on the roll R.

In Fig. 10 I have illustrated a striker R′ pivoted to the locking roll at r^{21} and bearing against a spring r^{22} whose abutment is r^{23} fixed to the roll so that when the roll revolves the striker will strike a yielding blow on lug r^{24} fixed on the breech closer and thereby give a sharp blow, which will be communicated to the extractor and thereby operate the latter, and in the preferred form the arm R′ strikes lug r^{24} before the breech closer has completed its independent movement relatively to the extractor and thereby causes relative movement between the breech closer and extractor.

In Fig. 11 I have illustrated a modification in which screw S is fixedly attached to the breech closer s and slides in slot s' in the extractor s^2, spring s^3 allowing for slight vertical play between the extractor and breech closer. Lug s^4 is provided on the extractor to be struck by the striker s^5, which is substantially the same as striker R′ already described. In the form of Fig. 11 it will be seen that there is relatively more inertia in the mass of the extractor than in the extractor of Figs. 7 or 9 and this is desirable with some cartridges in order to accomplish the best results.

In Fig. 12 I show a modification in which pin T on the breech closer rides in slot t on the locking-roll and thereby makes sure that when the breech closer is in its forward position the roll will be in the position shown. Moreover ribs t' on the breech closer ride in slots t^2 on the roll (only one being shown), the said ribs entering the slots t^2 before the pin T has left the slot t, and thus holding the locking roll stationary during the further retreat of the breech closer. On the return forward of the breech closer the pin T engages slot t, and thus turns the roll into the position shown.

In Fig. 3 I show a detail of the trigger mechanism, of Fig. 7. Locking roll H has a notch h^{10} to engage pin h^{11} on lever k^5 so that when the trigger is pulled the slotted end of lever k^5 will be lowered, said lever turning on its pivot k^6 and pin h^{11} moving upward and to the right entering notch h^{10}, its upward movement operating sear k^4 to release the firing pin. If however the locking roll is not in the position shown the pin h^{11} will engage the periphery of the roll and it therefore cannot move farther to the right and consequently can not move upward to engage the sear, with the result that the arm can not be fired unless the locking roll is in the position shown.

In Fig. 15 I show my invention applied to a pistol in which the breech closer v abuts against rotary locking member v^2 pivoted in the casing and frictionally engaging the latter at v^3.

For the purpose of further explaining the method of operation of a firearm constructed on the system herein described, let it be assumed that a rifle of the form shown in Fig. 6 is ready to be fired, the magazine containing cartridges and a cartridge being in place in the chamber of the barrel. The hammer being released by pressure on the trigger the firing pin communicates a blow to the primer and the powder charge is exploded. The pressure of the powder gases in the barrel imparts a forward impulse to the bullet, and at the same time a rearward movement to the breech closer against the breech locking member. The normal tendency of the breech locking member under this pressure is to rotate on its trunnions, but this tendency is momentarily overcome in part by the friction between the trunnions and the casing under the pressure and in part by the inertia of the breech locking member. It will be readily understood that if the lowest point of contact between the breech closer and the breech locking member is too near the axis of the latter the breech mechanism will not open under the pressure of the gases; on the other hand, if it is too high the mechanism will open prematurely and with violence. It is easy by experiment to ascertain the proper and safe point of contact in the case of any given cartridge, taking into consideration the combined resistance of friction and inertia on

the part of the breech locking member as factors in the operation.

The momentary delay in the rotation of the breech locking member being overcome by the continued pressure of the breech closer against it, the breech locking member turns a portion of a revolution, and the locking surface which has hitherto supported the rear end of the breech closer swings backward and downward, leaving the breech closer free to retreat to its rearmost position. Meanwhile the bullet has been driven forward by the gas pressure and has left the barrel of the rifle.

In its retreat the breech closer extracts and ejects the empty cartridge shell, cocks the hammer, and passes to the rear of the head of the topmost cartridge in the magazine, compressing the retractor spring as it moves backward. After its retreat is arrested by the frame or buffer, the breech closer is driven forward by the retractor spring, pushing the topmost cartridge from the magazine into the chamber. The breech locking member returns to its normally closed position by the action of its spring, leaving the weapon ready to be fired again by another pressure on the trigger.

In Figs. 19 and 20 I show a form of my invention in which two rolls W are used (one only being shown), each roll having a portion w to retard the opening of the breech closer w' having the extracting lug w^2 and having portion w^3 carrying spring pin w^4 to strike shoulder w^5 on the breech closer when the roll has partially rotated, this striking giving a rearward impulse to the breech closer.

Roll W has a flange to prevent inward movement and is held against outward movement by cover w^6 which has a recess to receive trunnion w^7.

I show two rolls which I consider the preferred form but the use of one roll would be clearly within the scope of my invention.

The practical advantages of this form are the reduction of length required for the breech mechanism, and also the reduction of weight of the firearm.

What I claim is:

1. A firearm comprising a breech closer; a member to retard the opening of the breech closer and rotatable to strike the breech closer to aid in opening the latter, after the pressure of the gases in the barrel has fallen to the desired point.

2. A firearm comprising a breech closer; a member to retard the opening of the breech closer and rotatable to yieldingly strike the breech closer to aid in opening the latter, after the pressure of the gases in the barrel has fallen to the desired point.

3. A firearm comprising a breech closer; an extractor operated by the breech closer but having provision for longitudinal movement with relation thereto; and a member to retard the opening of the breech closer and rotatable to strike the breech closer and thereby cause relative movement between the breech closer and extractor.

4. A firearm comprising a breech closer; a rotary member to retard the opening of the breech closer, the engagement between the breech closer and said member being near the center of rotation of the latter; and a hand-operated member movably mounted on the breech closer and engaging said member farther from its center of rotation than the engagement first mentioned.

5. A firearm comprising an exterior having an offset backing for a primer; and a breech closer to operate the extractor and having provision for longitudinal movement with relation thereto.

6. A firearm comprising an extractor having an offset backing for a primer; and a breech closer to operate the extractor but leaving the latter stationary during a portion of the opening movement of the breech closer.

7. A firearm comprising a breech closer; an extractor operated by the breech closer, but remaining stationary during a portion of the opening movement of the breech closer; and a member to retard the opening of the breech closer but rotatable to strike the latter and thereby operate the extractor after the pressure of the gases in the barrel has fallen to the desired point.

8. A firearm comprising a breech closer; an extractor operated by the breech closer but remaining stationary during a portion of the opening movement of the breech closer; and a member to retard the opening of the breech closer but movable to actuate the latter in its operation of the extractor after the pressure of the gases in the barrel has fallen to the desired point.

9. A firearm comprising a casing; a breech closer mounted to reciprocate on the casing and adapted to be moved to its open position under the influence of gas pressure; a member to momentarily lock the breech closer against opening, said member having relatively small trunnions upon which it rotates on said casing and having also a passage for the breech closer; means to move the breech closer to its closed position; and means to move the rotatable member to its locking position.

10. A firearm comprising a casing; a breech closer mounted to reciprocate on the casing and adapted to be moved to its open position under the influence of gas pressure; a firing pin movably mounted in the breech closer; a member to momentarily lock the breech closer against opening, said member having relatively small trunnions upon which it rotates upon said casing and having also a passage for the breech closer; means

to operate the firing pin; means to move the breech closer to its closed position; and automatic means to move the rotatable member into its locking position.

11. A firearm comprising a casing; a breech closer mounted to reciprocate on the casing and adapted to be moved to its open position under the influence of gas pressure; a firing pin movably mounted in the breech closer; a member to momentarily lock the breech closer against opening, said member having relatively small trunnions upon which it rotates on said casing and having also a passage for the breech closer; means to operate the firing pin; means to move the breech closer to its closed position; automatic means to move the rotatable member into its locking position; and an extractor mounted on the breech closer and operated thereby but having provision for longitudinal movement with relation thereto.

12. A firearm comprising a casing; a breech closer mounted to reciprocate on the casing and adapted to be moved to its open position under the influence of gas pressure; a main firing pin movably mounted in the breech closer; a member to momentarily lock the breech closer against opening, said member having relatively small trunnions upon which it rotates on said casing and having also a passage for the breech closer; a secondary firing pin movably mounted in said member and adapted to engage the main firing pin when said member is in its locking position; a hammer to engage said secondary firing pin; trigger mechanism to operate the hammer; spring mechanism to move the breech closer to its closed position; spring mechanism to move the rotatable member into its locking position; and an extractor mounted on the breech closer and operated thereby but having provision for longitudinal movement with relation thereto.

13. A firearm comprising a movable breech closer; and a member rotatably mounted on the casing in such wise as to continuously swing clear of said breech closer as the latter approaches its rearward position, said breech closer engaging said member between its axis and its center of inertia of rotation at the instant of discharge and the inertia of said member momentarily locking the breech closer against opening.

14. A firearm comprising a breech closer; an extractor; a member movably mounted on the casing to momentarily lock the breech closer against opening and carrying a striker to operate the extractor.

15. In a firearm the combination of a casing; a barrel fixed to the casing; a breech closer movably mounted on the casing; and a rotary member mounted on the casing and acted upon by the back pressure of the gases in the barrel when the piece is fired to momentarily lock the breech closer against opening.

16. In a firearm the combination of a casing; a barrel fixed to the casing; a longitudinally reciprocating breech closer; a rotary member mounted on the casing with its axis crosswise of the casing, said member being acted upon by the back pressure of the gases in the barrel when the piece is fired to momentarily lock the breech closer against opening.

17. A firearm comprising a breech closer; an extractor operated by the breech closer; and a member to retard the opening of the breech closer and rotatable to strike the breech closer and thereby operate the extractor.

18. A firearm comprising a casing; a breech closer mounted to reciprocate on the casing and adapted to be moved to its open position under the influence of gas pressure; a member mounted independently of the breech closer to rotate on relatively small trunnions, said breech closer engaging said member near its axis of rotation at the instant of discharge and the inertia of said member momentarily locking the breech closer against opening.

19. A firearm comprising a fixed barrel; a hammer to explode the cartridge, said hammer being mounted independently of the breech closer, and having relatively small trunnions upon which it rotates; and a reciprocally movable breech closer mounted on the casing and engaging said hammer near its axis to maintain momentary closure of the breech by means of inertia and friction when the piece is fired.

20. A firearm comprising a fixed barrel; a hammer to explode the cartridge, said hammer being rotatably mounted independently of the breech closer; and a reciprocally movable breech closer mounted on the casing and engaging said hammer near its axis to maintain momentary closure of the breech by means of inertia and friction when the piece is fired.

21. A firearm comprising a fixed barrel; a movable breech closer; and a member mounted in the casing; having an axis upon which it rotates, and having a relatively large portion of its mass remote from its axis, said breech closer engaging said rotary member between its axis and its center of inertia to maintain momentary closure of the breech by means of inertia and friction when the piece is fired and turning said rotary member out of the path of said breech closer as the inertia and friction are overcome.

22. A firearm comprising a fixed barrel; a movable breech closer; and a member rotatably mounted independently of the breech closer, and having a relatively large portion of its mass remote from its axis, said

breech closer engaging said rotary member near its axis to maintain momentary closure of the breech by means of inertia and friction when the piece is fired.

23. A firearm comprising a fixed barrel; a movable breech closer; and a member mounted independently of the breech closer, having relatively small trunnions upon which it rotates, and having a relatively large portion of its mass remote from its axis, said breech closer engaging said rotary member near its axis to maintain momentary closure of the breech by means of inertia and friction when the piece is fired.

24. In a firearm, a barrel having a breech opening; an air chamber; a conduit leading from said chamber to said breech opening; a reciprocally movable breech closer; a hammer; and a movable buffer separate from said hammer forming a closure for said chamber, to retard the rearward movement of said breech closer, and to force air through said conduit for the purpose of blowing the residuum of the powder charge from the vicinity of said breech opening when the piece is fired.

25. A firearm comprising a breech opening; an air chamber; a conduit leading from said chamber to said breech opening; a movable buffer forming a closure for said chamber and having a projection extending through a wall of said chamber; and a movable breech closer to engage said projection and force air through said conduit.

26. A firearm comprising a breech opening; a breech closer; an air chamber located out of the path of the breech closer; a conduit leading from said chamber to said breech opening; a movable buffer forming a closure for said chamber and having a projection extending through a wall of said chamber, said breech closer engaging said projection to force air through said conduit.

27. A firearm comprising a casing; a rotary member mounted on the casing and having a relatively large portion of its mass at a distance from its axis; and means acted upon by the pressure of the gases in the barrel when the piece is fired, and engaging said member between its axis and its center of inertia at the instant of discharge, to retard the opening of the breech by means of inertia and friction and to swing the rotary member out of the prolongation of the bore when said inertia and friction are overcome.

28. In a firearm a rotary inertia block to retard the opening of the breech when the piece is fired, said inertia block being mounted on trunnions independently of the breech-closer, and having a relatively large portion of its mass remote from its axis; and a reciprocally movable breech closer mounted on the casing and engaging said inertia block between its axis and its center of inertia at the instant of discharge for the purpose specified and thereafter swinging it clear of the prolongation of the bore.

29. A firearm comprising a casing; a hammer to explode the cartridge, said hammer being rotatably mounted directly on the casing, and having a relatively large portion of its mass remote from its axis; and means acted upon by the pressure of the gases in the barrel when the piece is fired, and engaging said hammer near its axis at the instant of discharge whereby the opening of the breech is retarded by the inertia of said hammer.

30. A firearm comprising a casing; a hammer to explode the cartridge, said hammer being mounted independently of the breech closer, and having trunnions upon which it rotates, and having a relatively large portion of its mass remote from its axis; and a reciprocally movable breech closer mounted on the casing and engaging said hammer near its axis to maintain momentary closure of the breech by means of inertia when the piece is fired.

31. A firearm comprising a barrel; a movable breech closer; and a member mounted independently of the breech closer and having trunnions upon which it rotates and having a relatively large portion of its mass remote from its axis, said breech closer engaging said rotary member between its axis and its center of inertia and said member acting independently of the barrel to maintain momentary closure of the breech by means of inertia and friction when the piece is fired, and thereafter under the same impulse swinging clear of said breech closer.

32. A firearm comprising a barrel; a rotary inertia block mounted independently of the breech closer and having a relatively large portion of its mass remote from its axis; and means including a breech closer acting independently of the barrel but acted upon by the pressure of the gases in the barrel when the piece is fired and engaging said inertia block between its axis and its center of inertia at the instant of discharge to retard the opening of the breech by reason of the inertia of said rotary block, but continuously turning said rotary block out of the path of movement of said breech closer.

33. A firearm comprising a fixed barrel; a movable breech closer; and a member rotatably mounted independently of the breech closer and having a relatively large portion of its mass remote from its axis; said breech closer engaging said rotary member between its axis and its center of inertia to maintain momentary closure of the breech by means of inertia when the piece is fired, and thereafter continuously swinging said member out of the path of said breech closer.

34. In a firearm a rotary inertia block mounted directly on the casing and having a relatively large portion of its mass remote

from its axis; and means acted upon by the pressure of the gases in the barrel when the piece is fired and engaging said inertia block between its axis and its center of inertia at the instant of discharge to maintain momentary closure of the breech by reason of the inertia of said rotary block, and to swing said rotary block out of the prolongation of the bore when said inertia is overcome.

35. In an automatic firearm having a fixed barrel, a rotary inertia block which closes the line of the bore when in its closed position, and fully clears the line of the bore when in its open position; means actuated by the pressure of the gases in the barrel when the piece is fired for swinging said inertia block to its open position; means for inserting a fresh cartridge through the space thus cleared; and means to return said inertia block to its closed position after the insertion of the cartridge.

36. In a firearm the combination of a casing; a barrel fixed to the casing; a rotary member mounted in the casing with its axis crosswise of the casing, said axis being near the axis of the barrel; and means acted upon by the pressure of the gases in the barrel when the piece is fired, and engaging said rotary member at the instant of discharge in a line near the axis of the barrel, to maintain momentary closure of the breech by reason of the inertia of said rotary member, and the friction incident to its rotation.

JOSEPH C. WHITE.

Witnesses:
SAMUEL MERRILL,
ARTHUR F. RANDALL.