

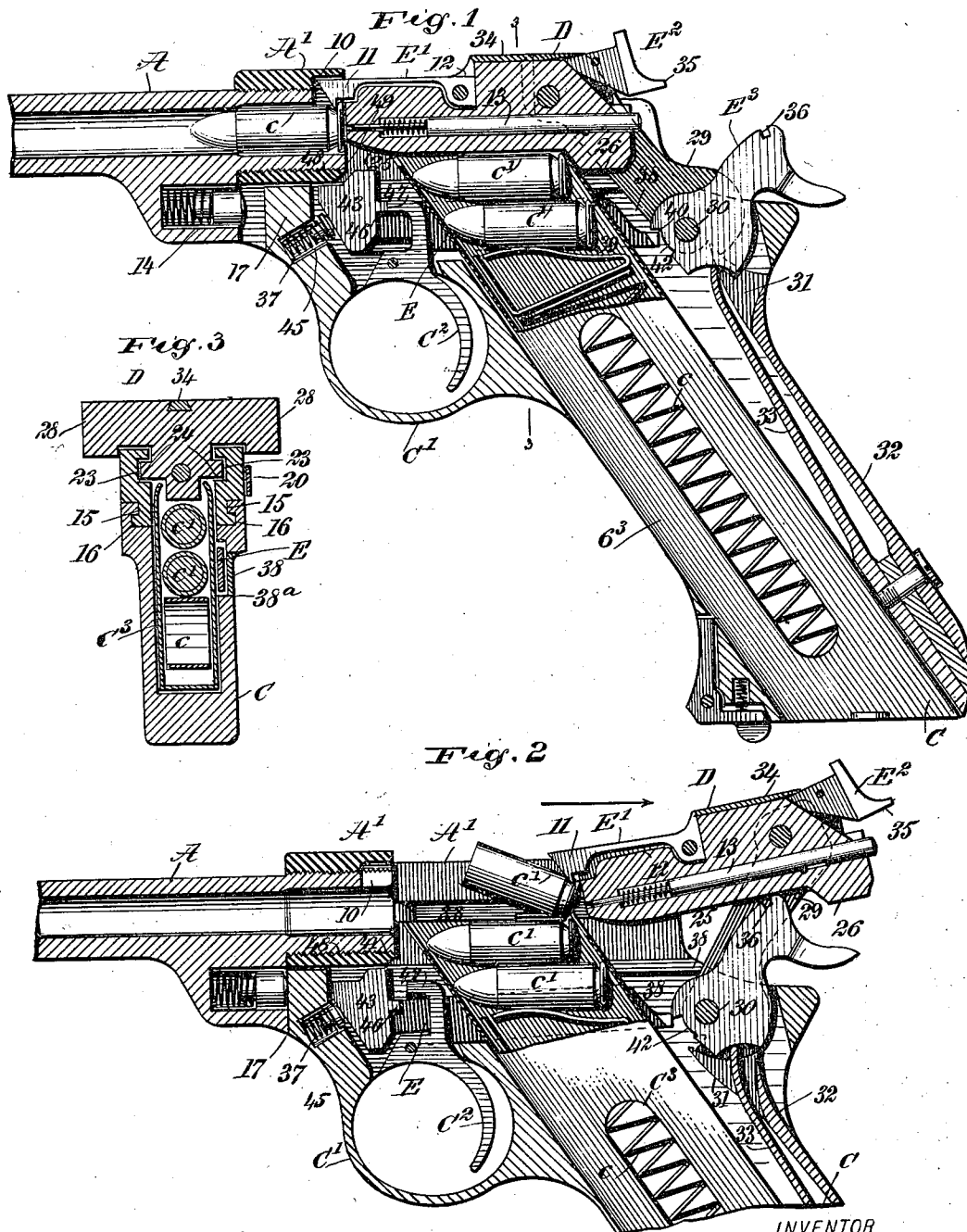
No. 743,002.

PATENTED NOV. 3, 1903.

W. B. KNOBLE.
RAPID FIRE PISTOL.
APPLICATION FILED DEC. 12, 1902.

NO MODEL.

3 SHEETS—SHEET 1.



WITNESSES:

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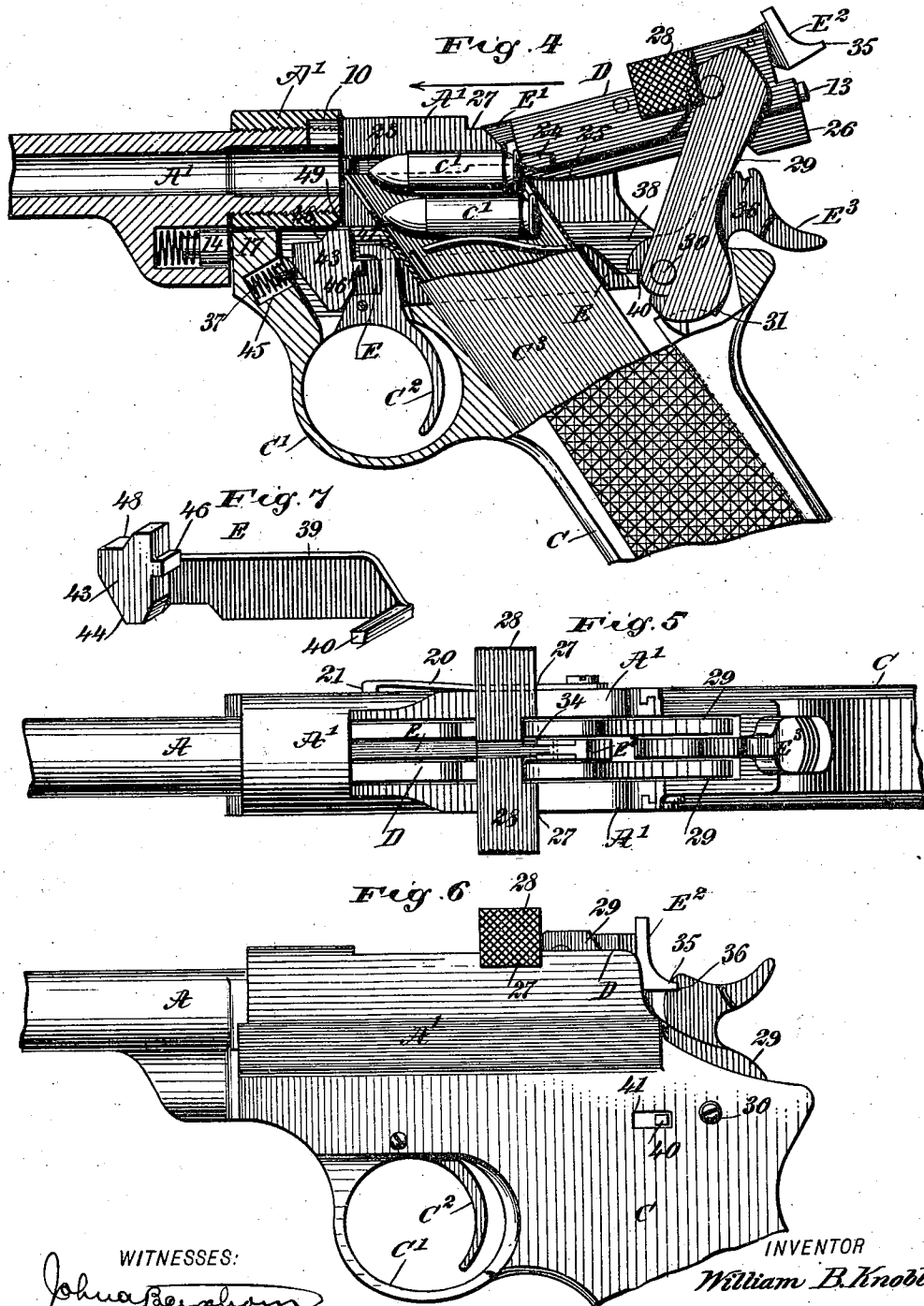
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3 SHEETS—SHEET 2.



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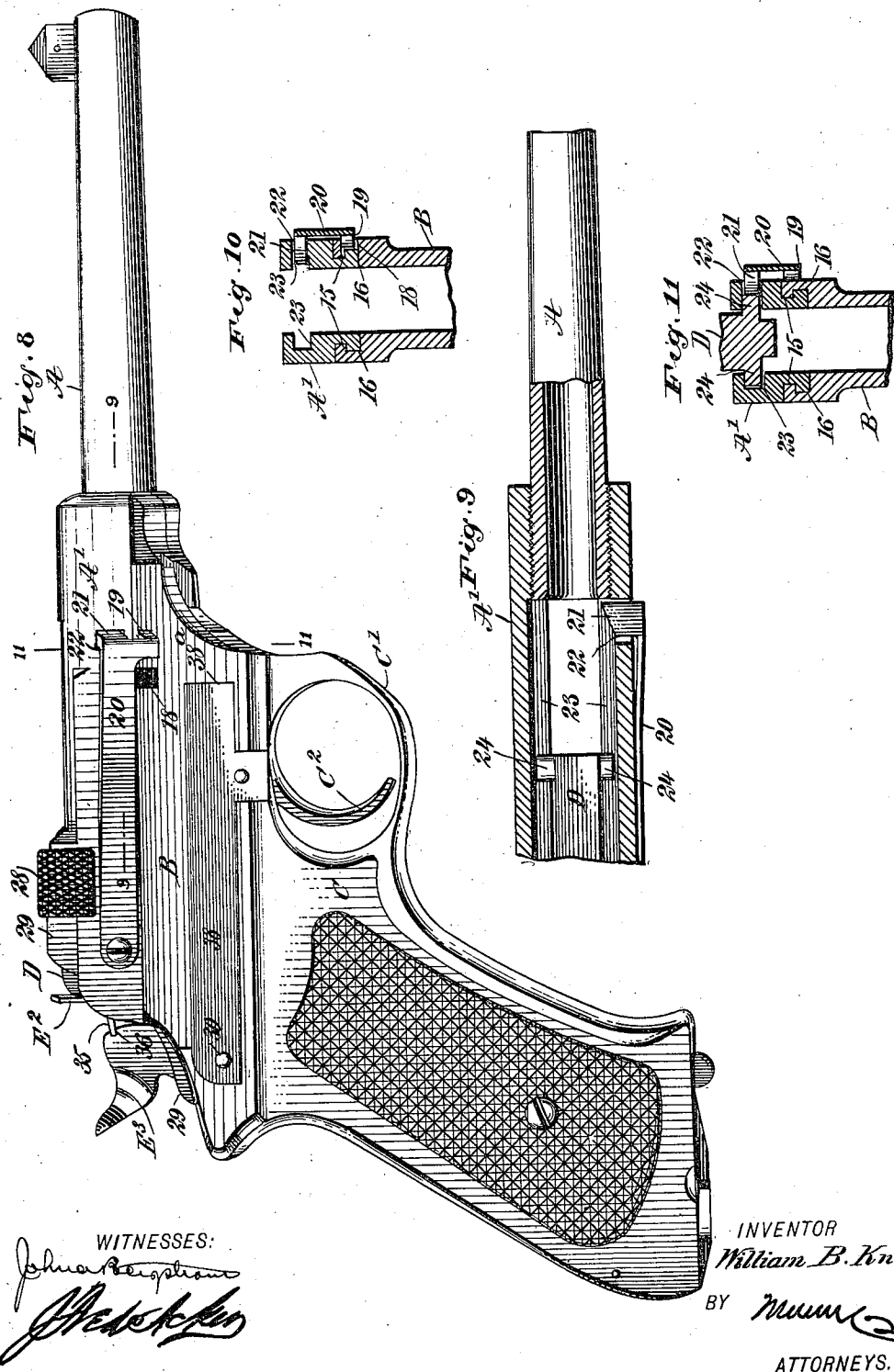
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3 SHEETS—SHEET 3.



UNITED STATES PATENT OFFICE.

WILLIAM B. KNOBLE, OF TACOMA, WASHINGTON.

RAPID-FIRE PISTOL.

SPECIFICATION forming part of Letters Patent No. 743,002, dated November 3, 1903.

Application filed December 12, 1902, Serial No. 134,925. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. KNOBLE, a citizen of the United States, and a resident of Tacoma, in the county of Pierce and State of Washington, have invented a new and Improved Rapid-Fire Pistol, of which the following is a full, clear, and exact description.

My invention relates to rapid-fire pistols or automatic self-loading pistols, and particularly to that class of recoil-operated arms in which the barrel and breech-block are movable together in a longitudinal direction upon the frame or receiver and in which when the barrel is in its forward position and the breech is closed the breech-block is firmly locked to the barrel. Upon firing, the barrel and breech-block recoil together to the rear for a short distance, whereupon the recoil of the barrel is stopped by suitable abutments. The breech-block during its rearward movement becomes unlocked from the barrel, and the impetus it has acquired through the recoil carries it to the full extent of its travel to the rear, cocking the hammer, extracting and ejecting the fired shell, and causing the recoil or recuperative spring to be compressed. The breech-block having traversed fully to the rear, a cartridge from the magazine in the handle now rises in front of it. The recuperative spring impels the breech-block forward, shoving the cartridge into the barrel, and during the final movement locks the breech-block to the barrel again ready for the next shot. So far this pistol is the same in principle as several other recoil-operated arms. It, however, differs greatly in the methods by which the several movements are accomplished, in certain mechanical features, and in important structural points. Foremost among the improvements are the movement and operation of the breech-block and the manner of locking it to the barrel; next, the safety-catch for the hammer, which is immediately above the firing-pin and which can be quickly depressed by the finger to locking engagement with the nose of the hammer when the latter is in half-cocked position to hold it temporarily, yet securely, in such position, said safety-catch being normally held out of possible contact with the hammer by a suitable spring, and the moment the hammer is carried from a half-cocked to a

fully-cocked position the safety-catch immediately returns to its upper position out of the path of the hammer. Finally, my improvement consists in the mechanism for catching and holding the hammer in a cocked position and for releasing it to fire, which mechanism comprises practically three pieces only—a sear, a sear-spring, and a trigger.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical longitudinal section through the frame or receiver, the breech-block and the handle, and a portion of the barrel and magazine in the handle, the breech-block being shown closed and the hammer fully cocked. Fig. 2 is a view similar to Fig. 1, the breech-block being, however, shown open and at the limit of its rearward throw. Fig. 3 is a transverse section taken practically on the line 3 3 of Fig. 1. Fig. 4 is a longitudinal section through the frame and a portion of the barrel and a side elevation of the breech-block raised to its full extent and in the act of returning to its closed position. Fig. 5 is a plan view of the frame and handle portion of the pistol, the breech-block being closed. Fig. 6 is a side elevation of the frame or receiver and a portion of the barrel, the breech-block being closed and the safety-catch shown as locking the hammer at half-cock or in safety position. Fig. 7 is a detail perspective view of the sear. Fig. 8 is a side elevation of the complete pistol, the breech-block being closed and the hammer locked at safety by the safety-catch. Fig. 9 is a horizontal section through a portion of the frame and barrel, the section being taken practically on the line 9 9 of Fig. 8; and Figs. 10 and 11 are transverse sections taken both on the line 11 11 of Fig. 8. In Fig. 10 the breech-block is out from the frame and the latch for the barrel is shown locking the barrel in its rearward or recoiled position, and in Fig. 11 the breech-block has been closed, and the latch is carried thereby out of locking engagement with the barrel.

A represents a barrel; A', the barrel extension; B, the frame or receiver upon which the barrel extension slides, and C the handle, which is chambered to removably receive a magazine C³, the said magazine extending through the frame-chamber and slightly into the chamber of the barrel extension A', as is shown in Figs. 1, 2, and 4. The magazine is provided with the usual spring c to force the cartridges c' contained in the magazine forward, so that the uppermost cartridge the moment the breech-block D moves rearward will be forced upward in the chamber of the barrel extension, the projectile facing and being in longitudinal alinement with the breech of the barrel, so that at the forward return movement of the breech-block D the said upper cartridge will be carried thereby into the breech of the barrel for firing, as shown in Figs. 1 and 4. C' represents the trigger-guard, and C² the trigger, E the sear, and E' the extractor, carried by the breech-block D, and E² the safety-catch for the hammer E³.

The barrel extension A' is tubular where the barrel fits therein, but rearward of the tubular portion is open at the top and at the bottom, and the said tubular portion of the barrel extension is provided with a recess 10 to receive the head 11 of the extractor E', the body of which extractor is in the form of a spring of suitable strength secured at its rear end in a recess 12, made longitudinally in the upper forward portion of the breech-block, as is particularly shown in Fig. 1, and the said head of the extractor when the breech-block is in closed position engages with the rim of the cartridge-shell within the barrel. When an empty cartridge is extracted by the rearward movement of the breech-block, it is ejected through the upper opening in the barrel extension, then uncovered, through the medium of the spring in the magazine acting upon the uppermost cartridge to force said cartridge in alinement with the barrel. The breech-block is provided with the usual spring-controlled firing-pin 13, extending from end to end, as is shown in Figs. 1 and 2.

A cushion 14 is located in the under portion of the barrel A where it connects with the extension A' to relieve the shock when the barrel is in its recoil position or is forced backward against the frame. The barrel A is screwed into the extension A', which is similar in its functions to the receiver of an ordinary repeating rifle. The barrel extension A' is provided with longitudinal grooves or ways 15 upon each outer side near its lower edge, as is shown particularly in Figs. 3, 10, and 11, and grooves or ways 16 are cut longitudinally in the inner side portions of the frame or receiver B near the top, extending over a connecting-block 17 at the forward end of the frame or receiver B, which block has a horizontal slot therein connecting with the frame-chamber to receive the head of the sear E, as will be hereinafter described.

In the upper edge of one side of the frame B a slot 18 is made, as is shown in Fig. 8, to receive a lower lug 19 at the forward end of a spring-latch 20, which latch is secured at its rear end to the outer surface of the barrel extension A'. The lug 19 is opposite an outer groove 15 in the barrel extension for the purpose of locking the barrel in rearward or recoil position as the breech-block moves rearward to open position, and in order that the barrel may be released from such locking engagement and be moved forward by the breech-block on its return a second lug 21 is located above the lug 19, having a rearwardly-beveled inner edge, as is shown in Fig. 9, and this upper lug 21 of the spring-latch 20 projects within the barrel extension A' through an opening 22. The spring-latch 20 is forced outward to release the barrel by the forward and seating movement of the breech-block. The barrel extension has guided and sliding movement upon the frame, which is produced by fitting the inner upper side portions of the frame in the outer grooves or ways 15 in the barrel extension and fitting the lower outer portions of the barrel-sections in the inner grooves 16 in the frame, as is also shown in Figs. 3, 10, and 11.

The barrel extension A' is also provided with longitudinal grooves 23 in its inner side faces, which grooves 23 are adapted to receive guide-lugs 24, extending from the side faces of the breech-block D at the lower portion of its forward end, and the under forward portion of the breech-block is more or less outwardly curved, as is shown at 25 in Figs. 1, 2, and 4, in order that in its return or forward movement it may readily pass the upper end of the magazine C³. When the breech-block is closed or seated, its upper portion is close to and closes the upper end of the magazine C³, as is shown in Fig. 1, and a heel 26 is formed at the lower rear portion of the breech-block having an inclined forward edge, which inclined portion of the heel bears against the upper rear surface of the magazine when the breech-block is closed, as is also shown in Fig. 1.

At a sufficient distance to the rear of the breech of the barrel A the barrel extension A' has opposing vertical slots or recesses 27 cut or otherwise produced in its upper edges, adapted when the breech-block is closed to receive locking-lugs 28, extending opposite each other one from each side of the breech-block, preferably between its center and rear end, and usually the upper surfaces of the locking-lugs are flush with the upper face of the breech-block. In the closed position of the breech-block D these locking-lugs 28 drop down into the slots or recesses 27 in the extension A' from the barrel A, thus locking the barrel extension to the breech-block and compelling the two to move together under the shock of the recoil a distance equal to the extent of movement of the barrel, whereupon the breech-block leaves the barrel ex-

tension. When the breech-block is thus locked to the barrel extension, said extension is held firmly in its forward position until a shot is fired; but this locking connection does not take place until the breech-block D has forced a cartridge into the breech of the barrel and has also carried the barrel extension and barrel to their full forward position.

Immediately at the rear of the locking-lugs 28 of the breech-block D two action-levers 29 are hinged or pivoted, one at each side of the breech-block, which levers extend downward and rearward at each side of the hammer E³, and their lower ends are pivoted at 30 in the rear of the frame B just above the handle C. At the moment of firing, when the barrel with its breech-block locked to it recoils a short distance to the rear, these action-levers 29, being pivoted at their lower ends to the frame and at their upper forward ends to the rear end of the breech-block, thrust upward the rear end of the breech-block and lift the locking-lugs 28 from their slots 27 in the barrel extension, thus unlocking the breech-block from the barrel. The breech-block having received a sufficient impetus from the recoil now traverses to the rear to the limit of its travel, its forward end being guided by the front lugs 24, moving along the inner grooves 23 in the barrel extension. During the rearward movement of the breech-block the block impinges upon the hammer E³, which is pivoted in the handle-section of the frame B between the action-levers 29 and upon the same pivot-pin 30, and sets the hammer at full cock. A cradle 31, attached to the upper end of a recuperative or recoil spring 32, receives and bears against the lower ends of the action-levers 29, as is shown particularly in Fig. 2, which spring extends down into the handle C and is suitably secured at its lower end. The recuperative or recoil spring 32 is preferably just to the rear of the action-spring 33 for the hammer E³, which latter spring is also secured at its lower end in the handle, as is shown in Fig. 1. The breech-block having reached the limit of its travel to the rear is now thrust forward by the action-levers through the medium of the recuperative spring 32. In the course of its forward travel the breech-block pushes the topmost cartridge from the magazine into the barrel and closes the breech, as has been stated. The upper ends of the action-levers moving in the arc of a circle now lower the rear end of the breech-block D, bringing the locking-lugs into the proper recesses or slots 27 in the barrel extension A', thus locking the breech-block to the barrel, and the arm is again ready to fire.

A safety-catch E² is pivoted to the rear end of the breech-block D immediately over the firing-pin 13, and said safety-catch is movable in a vertical plane. Normally the safety-catch is held in an upper position by a spring

34, secured upon the upper face of the breech-block and extending over the forward upper end portion of the safety-catch, as is shown in Fig. 1. The safety-catch preferably consists of a block of substantially triangular shape pivoted near its contracted end, and at the bottom of the wider or rear end of the block a rearwardly-extending toe 35 is formed. When the safety-catch is depressed by the finger, the hammer may be lowered to a half-cocked position, whereupon the toe 35 will be received in a notch 36 in the nose of the hammer, effectually preventing the hammer from moving forward, as is shown in Fig. 6. When the hammer is cocked, the toe of the safety-catch is released, the safety-catch returns to its upper position, and the hammer is free when it falls to strike the firing-pin 13.

The mechanism for catching and holding the hammer in a cocked position and for releasing it to fire consists of three pieces only—a sear E, a sear-spring 37, and a trigger C². The sear is introduced into the frame B through a side opening 38^a, covered by a suitably-bolted plate 38, as is shown in Figs. 3 and 8, which opening is of greater length than the length of the sear. The sear, which is in a measure supported throughout the major portion of its length by the bottom wall of the opening 38^a, is in the form of a long plate or flat bar 39, having its rear end bent at right angles to the body, forming a locking-arm 40, which when the sear is in position in the frame extends across the frame-chamber back of the magazine and in front of the hammer-pin 30. This locking-arm is also a bridge, as it extends out through an opening 41 at the opposite side of the frame, as is shown in Fig. 6, and the said locking-arm falls in a suitable notch 42 in the hammer and at such time holds the hammer cocked. At the forward end of the sear a head 43 is inwardly offset from the inner face of the body 39 of the sear, having a downwardly and rearwardly inclined face 44, against which the spring 37 has bearing, the said spring being located in a pocket 45 in the forward portion of the frame B, preferably in the forward connecting-block 17 of the frame, as is shown in Figs. 1, 2, and 4. At the rear vertical face of the said sear-head 43 a transverse lug or shoulder 46 is formed, adapted when the barrel is in its forward and firing position to engage with the forward end of the forwardly-directed hook extension 47 from the upper end of the trigger C², as is shown in Fig. 1, so that at such time when the trigger is drawn the sear will be forced forward, releasing the sear from the hammer and permitting the hammer to be forced forward by the spring 33 to strike the firing-pin 13. Further, in the construction of the head of the sear a recess 48 is made in the upper face of the head 43, having an upwardly and rearwardly inclined rear wall, and at the inner lower portion of the tubular section of the barrel extension A' an inclined surface

49 is produced, which as the barrel and its extension move rearward under the influence of the recoil rides up the inclined rear wall of the recess in the head 43 of the sear, thus depressing said head and carrying the lug or shoulder 46 on the head below the hook extension 47 of the trigger, as is shown in Figs. 2 and 4, thereby preventing the trigger if pulled while the breech-block is open from acting on the sear. At such time the spring 37 is placed under tension; but the moment that the barrel and its extension are carried to their forward position by reason of the breech-block seating itself the head-section of the sear is free to move upward and is forced upward and rearward by the spring 37, thereby bringing the lug or shoulder 46 on the sear-head in engagement with the hook extension 47 of the trigger, again carrying these two parts in operative connection, as shown in Fig. 1. In explanation of the operation of the sear with respect to the hammer and the trigger it is remarked that as it is impossible for the human finger to release the pressure on the trigger quickly enough to allow the sear to catch the hammer during the automatic operation of the arm means must be provided whereby the sear may be automatically disengaged from the trigger at the moment of firing and allowed to move back and catch the hammer. For this purpose the front end or head of the sear, which engages the trigger, is capable of up-and-down motion in a vertical direction, the rear or locking arm 40 acting as a pivot. When the pistol is cocked and ready to fire, the head of the sear, as stated, is in its upper position, held so by the sear-spring 37, which also exerts a pressure to the rear, at which time the sear is in operative connection with the trigger, and the hammer is released upon operating the trigger. When the barrel recoils in firing, the head of the sear is driven down in the manner described and the sear and the trigger are carried out of possible engagement. The sear is then free to move back and catch the hammer while the trigger is yet being pulled. Upon releasing the trigger the head of the sear again rises for operative engagement with the trigger, which may now be drawn to fire the next shot.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a recoil-operated firearm, a frame or handle, a barrel provided with an extension having a limited sliding movement on the frame or handle, and adapted to be moved rearwardly by the recoil in firing, a breech-block having sliding movement in the extension of the barrel and provided with means for locking it to the barrel extension when the breech-block is in the forward or closed position, and means for lifting and lowering the rear end of the breech-block to unlock the block from the barrel extension, or to lock it to the same, the said means being

pivotaly connected with the frame or handle and with the rear of the breech-block, substantially as described.

2. In rapid-fire or automatic firearms, a frame or handle, a barrel provided with an extension having a limited sliding movement in the frame, the said extension having marginal side recesses, a breech-block having sliding movement in the said extension of the barrel and provided with projecting members adapted to enter the said recesses, and means pivotaly connected with the rear end of the breech-block and with the said frame, for lowering and lifting the rear end of the breech-block, whereby to bring the projecting members in locking engagement with the recessed portions of the extension and to remove said members from such locking engagement, as specified.

3. In rapid-fire or automatic firearms, a frame, a barrel having an extension provided with marginal side recesses, the said extension having a limited sliding movement in the frame, a breech-block having guided, sliding and pivotal movement in the said barrel extension at its forward end, abutments extending from opposite sides of the breech-block, adapted to enter the said recesses, and a lifting and supporting device pivoted to the rear end of the breech-block and to the said frame and arranged to direct the abutments to the said recesses and remove them therefrom.

4. In rapid-fire or automatic firearms, a frame, a barrel provided with an extension having limited sliding movement in the frame and adapted to be moved rearwardly by the recoil in firing, said barrel extension having recesses in the upper portions of its sides, a breech-block having sliding movement in the barrel extension and pivot-supports at its forward end, abutments extending from the sides of the breech-block, adapted in the forward or closed position of the block to enter the said recesses, and lifting and supporting links pivoted at the rear portion of the breech-block and to the frame, substantially as described.

5. In rapid-fire or automatic firearms, a frame, a barrel provided with an extension having limited sliding movement in the frame and adapted to be moved rearwardly by the recoil in firing, said barrel extension having recesses in the upper portion of its sides, a breech-block having sliding movement in the barrel extension and pivot-supports at its forward end, abutments extending from the sides of the breech-block, adapted in the forward or closed position of the block to enter the said recesses, lifting and supporting links pivoted to the rear portion of the breech-block and to the frame, and a tension device acting upon the said links to move the breech-block to closed position, substantially as described.

6. In a recoil-operated firearm, a frame, a barrel, an extension from the barrel having sliding movement in the frame and provided with interior longitudinal grooves and re-

cesses in its upper side edges, a breech-block, lugs laterally projecting from the forward side portions of the breech-block, adapted to enter the said grooves in the barrel extension, serving as guides to the breech-block during its forward and backward movement, and which also serve as pivots during the up-and-down movement of the rear end of the breech-block, a laterally-projecting locking-abutment at each side of the breech-block between its ends, and which enter the recesses of the barrel extension and serve as means for locking the breech to the barrel when in its closed position, and supporting and lifting links for the rear of the breech-block, pivotally connected with said block and with a fixed support below the block, as described.

7. In a recoil-operated firearm, a frame, a breech-block provided with forward pivotal guide-lugs, laterally-projecting abutments between its ends, and action-levers at the rear portion of the block, and connected with the frame, the said levers being adapted to lift the block, and a tension device acting upon the said levers to force the same forward and upward, as described.

8. In a recoil-operated firearm, a frame, a barrel, an extension from the barrel having sliding movement in the frame, a handle for the frame, a breech-block mounted in the barrel extension, and having pivotal sliding support at its forward end, action-levers pivoted to the rear of the breech-block and to the frame, and a recuperative spring having bearing upon the lower portion of the action-levers at one end, the said end being secured to a lower stationary pin or support and the opposite end being pivoted to the rear end of the breech-block, which levers serve during the initial motion of the barrel and breech-block to lift the rear end of the breech-block, and also serve during the final forward motion of the same to lower the rear end of the breech-block, and which levers further serve, between the aforesaid motions, to impel the breech-block forward after it has completed its travel to the rear, as set forth.

9. In a recoil-operated firearm, a sliding barrel extension and a frame supporting the same, a breech-block mounted to slide in the barrel extension, being free to rise and fall at its rear, a hammer in the frame, and action-levers pivoted to the rear of the breech-block, extending down at each side of the hammer, being pivoted at their lower ends in the frame by the pivot-pin for the hammer, as set forth.

10. In a recoil-operated firearm, a frame, a trigger and a hammer, and an action-spring for the hammer, a sear which is bodily movable in a longitudinal direction in the frame, the forward end of the sear being also movable in a vertical direction up and down, said longitudinal motion serving to catch and hold the hammer in a cocked position and release the same, and said vertical motion of the for-

ward end of the sear serving to engage the sear with and to disengage it from the trigger.

11. In a recoil-operated firearm, a frame, a barrel having sliding movement in the frame, a hammer, a trigger having a forwardly-disposed upper hook extension, a sear movable longitudinally in the frame and adapted for up-and-down movement at its forward end, a locking-arm at one end of the body of the sear; for engagement with the hammer, and a head at the opposite end of the body of the sear, adapted to be depressed by the barrel in its rearward movement, the said head having a member arranged for engagement with the extension of the trigger when the head of the sear rises, substantially as described.

12. In a recoil-operated firearm, a frame, a barrel having sliding movement in the frame, a hammer, a trigger having a forwardly-disposed upper hook extension, a sear movable longitudinally in the frame and adapted for up-and-down movement at its forward end, a locking-arm at one end of the body of the sear for engagement with the hammer, and a head at the opposite end of the body of the sear, adapted to be depressed by the barrel in its rearward movement, the said head having a member arranged for engagement with the extension of the trigger when the head of the sear rises, substantially as described, and a spring carried by the frame, having lifting and pushing action on the said head of the sear, as described.

13. In a recoil-operated firearm, a frame, a barrel having an extension, which extension is mounted to slide upon the frame, the said barrel extension having recesses in the upper edges of its sides, a breech-block held to slide in the barrel extension, having opposing abutments adapted to enter the said recesses of the barrel extension, a catch on a side of the barrel extension which serves to hold the barrel in its recoiled position until the breech-block has shoved a cartridge into the barrel and closed the breech and the abutments are ready to fall into their respective recesses, and front guide-lugs on the breech-block, one of which lugs is adapted to engage with the catch at the forward movement of the barrel and release the catch from locking engagement with the frame, as and for the purpose set forth.

14. In a recoil-operated firearm, of the kind described, the combination with the frame or handle, the barrel provided with an extension having a limited sliding longitudinal movement on the frame or handle under the influence of the recoil, the said extension being provided with slots or recesses, and a longitudinally-reciprocating breech-block carried in the extension of the barrel and having suitable abutments adapted to engage the said slots or recesses, said breech-block having suitable guides for retaining it in the extension of the barrel and being capable of vertical movement at its rear end whereby the said abutments may be dropped into or be lifted

from the said slots or recesses in the barrel extension, for the purpose of locking the breech-block to the barrel at the moment of explosion and unlocking it from the barrel after explosion; of a lever device pivotally attached at the upper forward end to the rear end of the breech-block and also pivotally connected at the lower rear end to the rear of the frame or handle, whereby when the barrel and extension carrying the breech-block move backward limitedly upon the frame or handle they will thrust backward upon the upper forward end of said lever device, causing said lever device to move upward and backward in the arc of a circle about its pivot in the frame or handle, thereby lifting the rear end of the breech-block to move its abutments out of locked connection with the barrel extension, substantially as described.

15. In a recoil-operated firearm, a frame or handle, a barrel provided with an extension having a limited sliding movement on the frame or handle and adapted to be moved rearwardly by the recoil in firing, a breech-block having sliding movement in the extension of the barrel, a locking connection between the breech-block and the barrel extension when the breech-block is in the forward or closed position, and means connected with the breech-block and the frame and actuated by the rearward movement of the barrel and its extension with the breech-block locked

thereto, for unlocking the breech-block from the barrel extension, substantially as set forth.

16. In a recoil-operated firearm, a frame or handle, a barrel, an extension from the barrel having a limited sliding movement on the frame or handle and adapted to be moved rearwardly by the recoil in firing, a breech-block having longitudinal movement in the barrel extension, the said breech-block being capable of vertical movement at its rear end, lateral projections on the breech-block engaging recesses or slots in the barrel extension to lock the breech-block to the barrel when the breech-block is in the forward or closed position, means connected with the frame and the said breech-block and adapted to lift the rear end of the breech-block to unlock the same from the barrel extension, the said means being actuated by the limited rearward movement of the barrel with the breech-block locked thereto, and a tension device for restoring the parts to position with the breech-block locked to the barrel extension, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM B. KNOBLE.

Witnesses:

JAMES GARVEY,
CATHERINE C. CASEY.