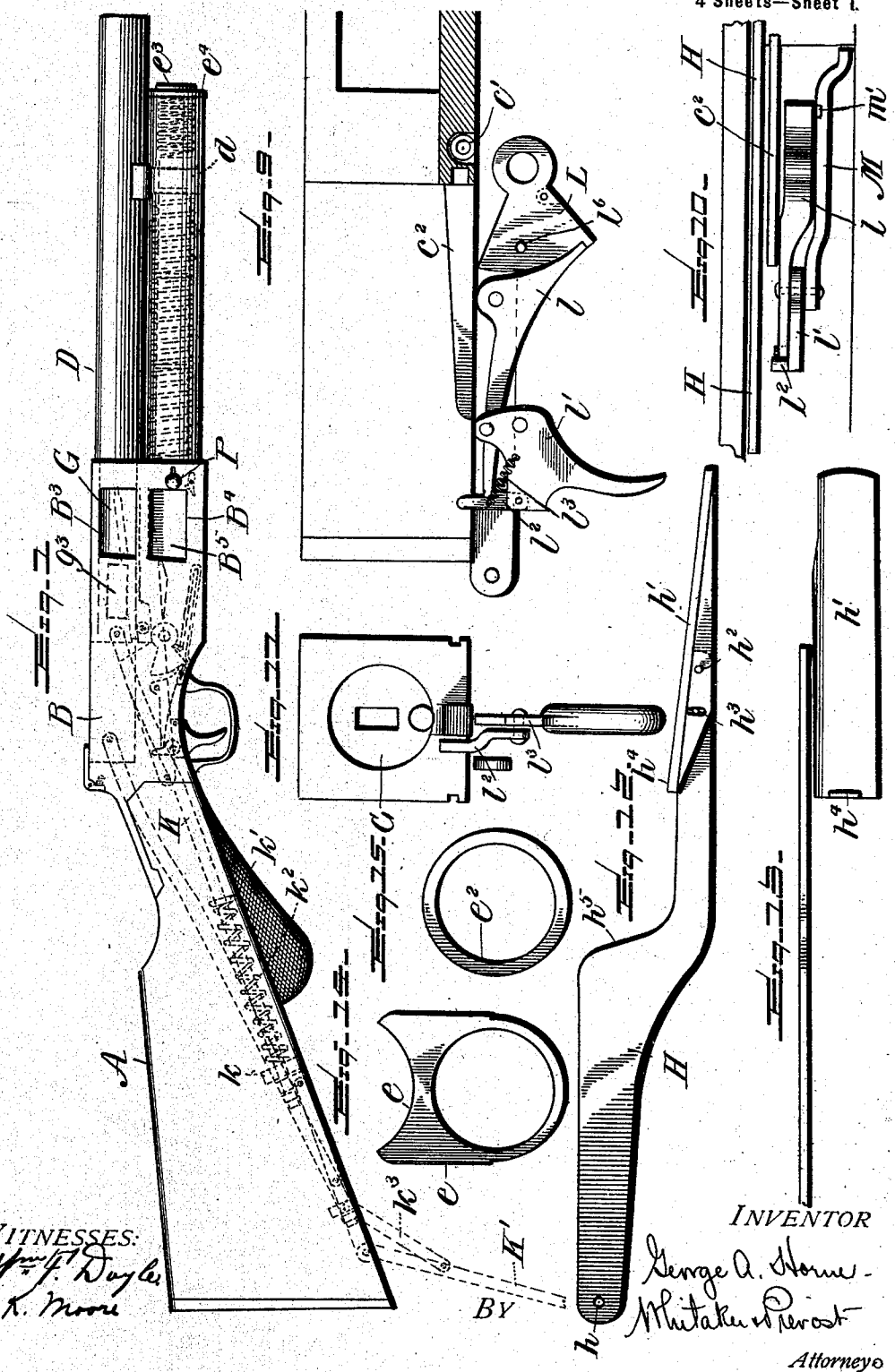
No. 690,955. Patented Jan. 14, 1902.

G. A. HORNE.

RECOIL OPERATED FIREARM.

(Application filed Apr. 27, 1901.)

(No Model.) 4 Sheets—Sheet 1.



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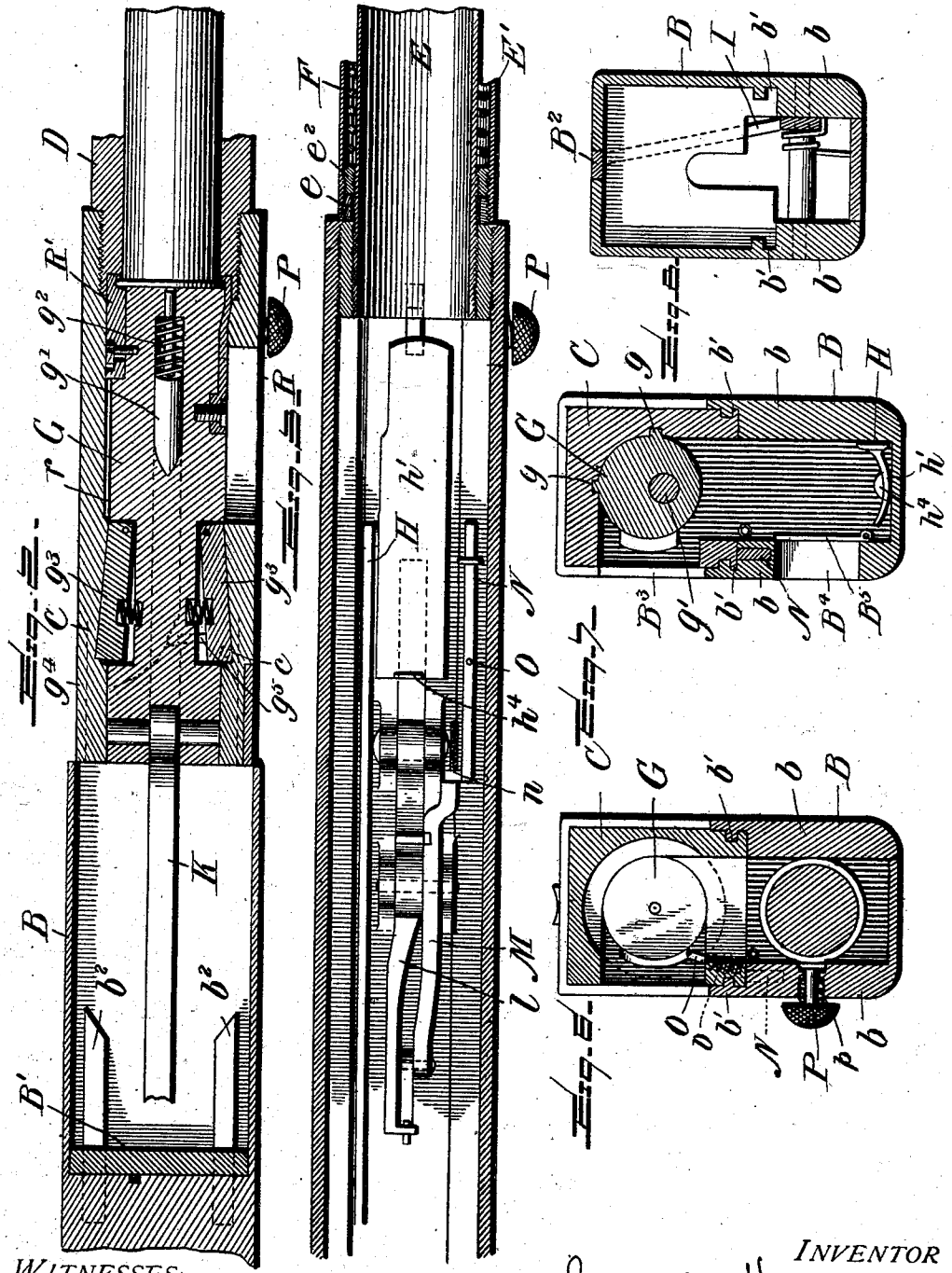
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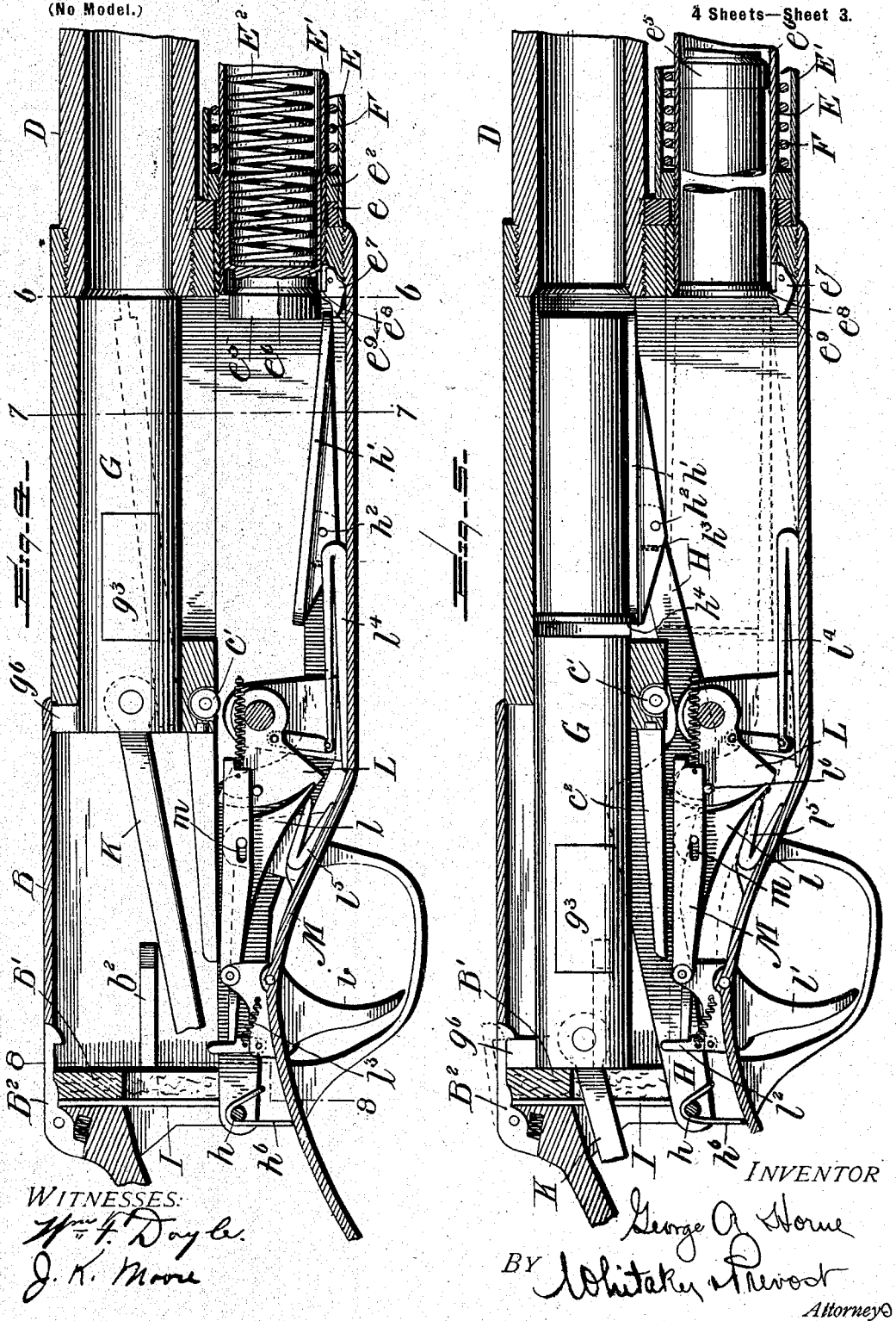
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(No Model.) 4 Sheets—Sheet 3.



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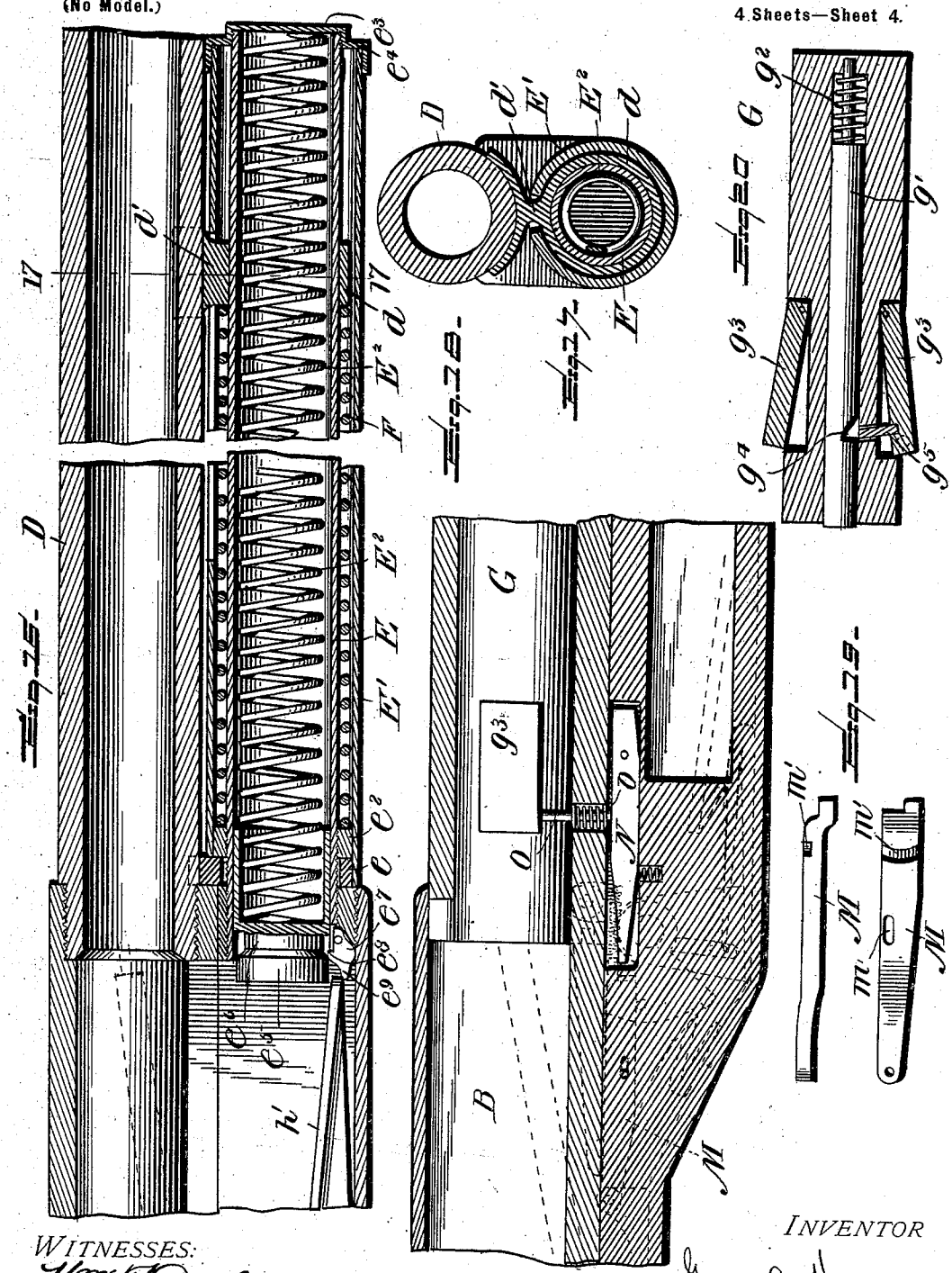
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UNITED STATES PATENT OFFICE.

GEORGE A. HORNE, OF SYRACUSE, NEW YORK.

RECOIL-OPERATED FIREARM.

SPECIFICATION forming part of Letters Patent No. 690,955, dated January 14, 1902.

Application filed April 27, 1901. Serial No. 57,725. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. HORNE, a citizen of the United States, residing at Syracuse, in the county of Onondaga and State of New York, have invented certain new and useful Improvements in Recoil-Operated Firearms; 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.

My invention is an improvement in recoil-operated guns; and it consists in the novel features hereinafter described, reference being had to the accompanying drawings, which illustrate one form in which I have contemplated embodying my invention, and said invention is fully disclosed in the following description and claims.

Referring to the said drawings, Figure 1 represents a side elevation of a gun embodying my invention, a portion of the barrel being broken away. Fig. 2 represents a horizontal section, drawn to an enlarged scale, through the lock-frame, reciprocating barrel extension, breech-block, and barrel. Fig. 3 is a similar section taken through the lock-frame and a portion of the magazine. Fig. 4 is a vertical section through the lock-frame, showing the barrel, barrel extension, and breech-block in their forward positions. Fig. 5 is a similar view showing the breech-block held back in its rear position, and the cartridge lifter with a cartridge in loading position. Fig. 6 is a vertical transverse section on line 6 6, Fig. 4. Fig. 7 is a similar section on line 7 7, Fig. 4. Fig. 8 is a similar section on line 8 8, Fig. 4. Figs. 9 to 15 are details of parts of the mechanism. Fig. 16 is an enlarged longitudinal sectional view of the barrel, magazine, and adjacent portions of the lock, the barrel and magazine being broken away. Fig. 17 is a section on line 17 17 of Fig. 16. Fig. 18 is a vertical sectional view of a portion of the lock-frame, taken at one side of the same. Fig. 19 shows a top plan and inner side elevation of the locking-bar for the trigger. Fig. 20 is a horizontal sectional view of the breech-block in the inclined plane of the firing-pin.

In the drawings, A represents the butt of the gun, and B the lock-frame. The side plates *b b* of the lock-frame (see Figs. 6, 7, and 8) are provided with grooved guides or ways *b' b'*, in which the barrel extension or slide C is mounted, so as to be capable of reciprocating therein, as hereinafter described.

D represents the barrel, which is screwed into or otherwise secured rigidly to the barrel extension C. The barrel D and barrel extension C are thus arranged to be forced rearward in the frame by the recoil and are forced forward by springs, as hereinafter described.

E represents a magazine or tube, which is secured to the frame B below and parallel with the barrel. This tube E is screwed into the lower part of the forward end of the frame B, and a perforated plate *e* (see Fig. 14) is then placed over the tube and pressed against the end of the frame B, its upper end extending above the contiguous portion of the frame and being curved, as shown at *e'*, to fit the under side of the barrel D. The plate *e* is held in position by a circular nut e^2, (shown in detail in Fig. 15,) screwed upon the magazine or tube E, as shown in Figs. 4 and 5.

F represents a coiled spring which surrounds the magazine E and engages at its outer end a sliding collar *d*, which is rigidly secured to the barrel D by a neck *d'*.

E' represents a casing which surrounds the spring F and is provided on its upper side with a slot through which the neck *d'* of the ring *d* extends, said slot permitting the reciprocation of the barrel. The rear end of the casing E' fits over the circular nut e^2, and its front end is secured by a cap or nut e^3, which is screwed onto the magazine E and is provided with flanges e^4 to engage the end of the casing E'.

Within the magazine-tube E is a coiled spring E^2 for forcing out the cartridges. This spring has its forward end bearing against the cap e^3, and its rear end is provided with a head e^5, provided with an annular groove e^6. At the rear end of the magazine-tube E and at the lower side of the same is a spring-actuated pawl or detent e^7, provided with a lug e^8, to normally prevent the cartridges from being pushed rearward into the lock-frame, and with a lug e^9, extending horizontally rearward and adapted to be struck by the cartridge-lifter, as hereinafter described, to depress the lug e^8 and allow a cartridge to be forced out upon the lifter.

Within the barrel extension C, before referred to, is a breech-block G, which is mounted to slide longitudinally therein and provided with one or more ribs g, engaging grooves in the barrel extension to prevent the breech-block from turning. This breech-block G carries the firing-pin g', which is mounted in the block and provided with a spring g^2, normally holding the pin in retracted position. The breech-block is also provided with means for holding it rigidly in said extension when the extension is in its forward position. In this instance the breech-block is provided with two laterally-movable spring-actuated pawls g^3 g^3, which engage notches c c in the inner faces of the side walls of the extension C when the extension is in its forward position, as shown in Fig. 2. In order to prevent the firing-pin from being operated except after the block G is in its forward position and securely locked, I provide the pin with a recess g^4, (see Fig. 20,) and I provide one of the pawls g^3 with a pin g^5, which will engage said notch and hold the firing-pin from forward movement at all times except when the breech-block G is in its forward position and the pawls g^3 g^3 have moved outward to engage the recesses c c in the barrel extension.

The rear face of the lock-frame B is provided with a cushion-plate B', of wood, soft metal, or other suitable material, against which the barrel extension and breech-block strike when the recoil takes place, and it is further provided with two horizontal arms b^2 b^2, having bevel ends which are arranged so that they will strike and press inward the pawls g^3 g^3 when the barrel extension moves rearwardly under the action of the recoil, so as to release the breech-block G from engagement with the barrel extension C.

B^2 represents a spring-latch pivoted at the upper end of the rear face of the lock-frame in position to engage a projection or lug g^6 and lock the breech-block G in its rearward position until the latch is released, as hereinafter described.

H represents the cartridge-lifter. (Shown in detail in Figs. 12 and 13.) This device consists of a thin steel arm or lever H, pivoted at h in the lock-frame at the rear end of the same adjacent to one side and extending forward to a point in rear of the magazine, where it is provided with a spoon h', pivotally connected to the lever H at h^2 and limited in its movement by a pin h^3 on the lever H engaging a slot in a part of the spoon, as shown in Fig. 12. The rear end of the spoon h' is provided with a stop-lug h^4 to limit the rearward movement of the cartridges when they are fed onto it from the magazine. The lever H is provided with a cam portion h^5, which is engaged by the barrel extension C when it moves rearward, thereby depressing the lifter-lever, which is raised by a spring h^6 engaging said lever adjacent to its point of pivoting h.

I represents a vertically-movable pin arranged in an inclined bore or recess in the rear wall of the frame B and having its lower end resting on the lever H and its upper end beneath the latch B^2. When the lifter-lever H rises under the action of its spring, it will push the pin I upward and lift the latch B^2 from engagement with the lug g^6 of the block G, thus permitting the breech-block G to move forward into its normal position within the barrel extension C. The power to force the breech-block G forward is supplied by the following-described mechanism.

To the rear end of breech-block G is pivoted the forward end of a push-bar K, which extends rearward through the lock-frame into a recess in the stock, where it passes through a guide k. (See Fig. 1.) The bar K is provided with a collar k', rigidly secured thereto, and with a spiral spring k^2, encircling the bar between the collar k' and guide k. This spring actuates the breech-block G through the push-bar K. I also provide means for drawing back the bar K and compressing the spring k^2 by hand when desired. This mechanism consists of a lever K', connected by a link or links k^3 to the push-bar K. To operate the push-bar K by hand, the operator will grasp the lever K', which normally lies up snug against the under side of the stock, and draw it down into the position shown in dotted lines, Fig. 1, thus drawing back the push-bar, together with the breech-block G, barrel extension C, and barrel D, and compressing the spring k^2.

L represents the hammer, pivoted in the lock-frame; l, the sear; l', the trigger, provided with a pivoted trip-piece l^2, having a lug on which the rear end of the sear normally rests. The trip-piece is held normally in vertical position by the spring l^3. The rear end of the barrel extension C is provided with a friction-roll c', which rides over the front face of the hammer L and forces it back into cocked position against its mainspring l^4, the sear being forced into locking engagement with the hammer by the spring l^5. The object of the trip-piece is to prevent the sear from failing to catch the hammer in case the operator should continue to hold the trigger back after firing the gun. The barrel extension C is provided with a rearwardly-extending trip-bar c^2 in line with the trip-piece l^2, adapted to hit said trip-piece and disengage it from the sear before the roll c' passes off of the hammer. This releases the sear whether the operator has his finger still on the trigger or not, and the sear is thus always ready to catch and lock the hammer. When the operator releases the trigger, the trip-piece will be drawn down until its lug passes beneath the end of the sear, when the trigger is in position to release the hammer again.

I also provide mechanism to prevent the trigger from being pulled prematurely before the parts have been restored to normal positions after firing.

M represents a locking-bar which has its rear end pivoted to the trigger. (See Fig. 5.) This bar has a slot *m* formed in it, which in this instance engages the pivot-pin of the sear. The forward end of the locking-bar is provided on its inner side with a curved slot *m'*. The hammer L is provided with a pin l^6, which normally lies beneath the locking-bar M when the hammer is cocked, so that the hammer cannot drop even if the sear were to be released.

N represents a rod pivotally mounted in a recess in the side wall of the lock-frame and having an inwardly-extending lug *n*, which normally lies in front of the end of the locking-bar M, so as to prevent its being moved forward by the trigger.

The barrel extension C is provided with a vertically-movable pin O, (see Fig. 6,) having its upper end beveled and adapted to be engaged by one of the pawls g^3 when it slips outward into locking engagement with its recess *c*. This pin O is provided with a spring *o*, which presses it upward, and its lower end rests upon the bar N. Hence when the parts are in position for firing, the pawl g^3, just referred to, will have depressed the pin O and the bar N, and thus moved the lug *n* out of the path of the locking-bar M. If now the trigger is pulled, the bar M will be moved forward, so as to bring the slot or recess *m'* over the pin l^6 at the same time that the sear is released, thus allowing the hammer to fly and strike the firing-pin.

The lock-frame B is provided on the right-hand side with an ejector-aperture B^3 on a level with the barrel, through which a cartridge may be inserted, as hereinafter described, and a second aperture B^4 for the same purpose on a line with the magazine, the latter being provided with a spring-actuated closing-plate B^5.

The operation of the gun will be as follows: Supposing the gun to be unloaded, the operator will seize the lever K' and force back the push-bar K, thus drawing back the breech-block G, barrel extension C, and barrel D and compressing the spring k^2. As the parts are drawn back the barrel extension C will engage the cam portion h^5 on the cartridge-lifter and depress the lifter. At the same time the breech-block G will be locked in its rear position by the latch B^2, while the barrel extension G will be released by the engagement of the arms b^2 b^2 with pawls g^3 g^3, and the spring F will cause the barrel extension and barrel to fly back to their forward positions. The magazine is supposed to be empty, and when the cartridge-lifter is depressed, as above described, its spoon will strike the lug e^9 and move downward the detent e^7, which will allow the head e^5 of the spring E^2 to project out over the end of the spoon and hold the lifter in its lowest position. The parts are shown in this position in Fig. 4. A cartridge may now be inserted through the aperture B^3 and pressed into the barrel or laid upon the spoon of the cartridge-lifter. In order to release the cartridge-lifter, it is necessary to push the head e^5 into the magazine, and to do this I employ a button P, (shown in Fig. 6,) which has a stem extending through a horizontal slot in the lock-frame and provided with a spring *p*. The inner end of the stem is provided with a catch, which when the button P is pushed in engages the groove e^6 in the head e^5, and by pushing the button horizontally along its slot the head e^5 can be pushed into the magazine far enough to be held by the lug e^8 on the detent e^7. The cartridge-lifter will now rise under the action of its spring into the position shown in Fig. 5, when the pin I will be pressed upward and will release the latch B^2, thus permitting the spring k^2 to force the breech-block G forward into the barrel extension C. If the cartridge has been previously placed on the spoon of the cartridge-lifter, as shown in Fig. 5, the forward movement of the breech-block G will push the cartridge into the barrel, and the block will then be automatically locked to the barrel extension C by the pawls g^3 g^3, as before described. The proper number of cartridges may now be placed in the magazine by inserting them through the aperture B^4 and pushing them into the magazine until caught by the detent e^7. The gun being loaded, if it is fired the recoil will force back the barrel, barrel extension, and breech-block, as will be readily seen, thus forcing down the cartridge-lifter, the spoon of which will trip the detent e^7 and receive a cartridge from the magazine. The rearward movement of the parts will cause the breech-block G to release the barrel extension C and to lock itself by means of the latch B^2. The barrel extension and barrel will then fly forward again, thus releasing the cartridge-lifter, which rises with its cartridge, thus releasing the breech-block G by raising the latch B^2. The breech-block is then forced forward by the spring k^2 and forces the cartridge into the barrel and locks itself in the barrel extension, when the gun is ready to fire again.

I also provide means for ejecting the empty shells through the ejector-aperture B^3, consisting of the following parts: The forward end of the breech-block G is provided with a spring-extractor R on the side adjacent the aperture B^3 and on the other side with an ejector R', having a slight movement longitudinally permitted by a slot through which its securing-screw passes, both clips being constructed to engage the rim of the cartridge. The ejector R' projects beyond the breech-block G and engages a groove in the inner wall of the barrel extension C, which groove terminates in a shoulder *r*. When the parts move backward by the recoil and the breech-block G is locked by the latch B^2, the barrel extension C is released and moved forward with the barrel. As the extractor R and ejector R' hold the rim of the cartridge the latter is drawn out of the barrel as the barrel

moves forward. As the barrel extension nearly reaches its forward position the shoulder *r*, before referred to, strikes the ejector R′ with a sharp blow, thus ejecting the cartridge sidewise through the ejector-aperture B^3.

What I claim, and desire to secure by Letters Patent, is—

1. In a recoil-operated firearm, the combination with the lock-frame, the reciprocating barrel extension and barrel, and the breech-block adapted to reciprocate with respect to said barrel extension, of a latch pivoted to the frame and adapted to engage said breech-block, a cartridge-lifter, pivotally mounted in said frame, and having a cam part adapted to be engaged by said barrel extension, a vertically-disposed trip-pin, interposed between said cartridge-lifter and said latch, whereby the upward movement of the cartridge-lifter will lift said latch and release said breech-block, substantially as described.

2. In a recoil-operated firearm, the combination with the lock-frame, the reciprocating barrel extension and barrel, and the breech-block having a sliding movement in said barrel extension, of a pivoted cartridge-lifter, provided with a cam portion adapted to be engaged by said barrel extension to depress the lifter, a spring for raising said lifter, a cartridge-magazine, a detent adjacent to the discharge end of the magazine, having a part in the path of the cartridge-lifter, a spring in said magazine provided with a head adapted to pass said detent, and engage the cartridge-lifter, and an auxiliary device for moving said spring-head out of engagement with the cartridge-lifter, substantially as described.

3. In a recoil-operated firearm, the combination with the lock-frame, the reciprocating barrel extension and barrel, and the breech-block having a sliding movement in said barrel extension, of a pivoted cartridge-lifter, provided with a cam portion, adapted to be engaged by said barrel extension to depress the lifter, a spring for raising said lifter, a cartridge-magazine, a detent adjacent to the discharge end of the magazine, having a part in the path of the cartridge-lifter, a spring in said magazine provided with a head adapted to pass said detent, and engage the cartridge-lifter and an auxiliary, inwardly and longitudinally movable device normally out of engagement with the spring-head but capable of being pressed inwardly to engage said head and moved longitudinally of the gun to move said head out of engagement with the cartridge-lifter, substantially as described.

4. In a recoil-operated firearm, the combination with the lock-frame, the barrel extension and barrel, and the breech-block movable with respect to said barrel extension, of laterally-movable spring-actuated pawls carried by said breech-block, and adapted to engage the barrel extension, a firing-pin in said breech-block, provided with a locking-recess, and a locking device secured to one of said pawls, and adapted to engage said locking-recess, when the pawl is retracted to lock the firing-pin, substantially as described.

5. In a recoil-operated firearm, the combination with the lock-frame, the barrel extension and barrel and the breech-block carrying the firing-pin, of the trigger, the sear, a trip-piece pivoted to the trigger and provided with a part for engaging and operating the sear, and a part connected with the barrel extension for engaging said trip-piece and disengaging it from the sear, substantially as described.

6. In a recoil-operated firearm, the combination with the lock-frame, the barrel extension, and barrel and the breech-block carrying the firing-pin, of the hammer, the sear, the trigger, a trip-piece pivoted to the trigger and provided with a part for engaging and operating the sear, a part connected with the barrel extension for engaging and cocking the hammer during the rearward movement and a part connected to said barrel extension, and extending in rear of the hammer-engaging part, for engaging the trip-piece and throwing it out of engagement with the sear before the hammer is fully cocked, substantially as described.

7. In a recoil-operated firearm, the combination with the lock-frame, the barrel extension and barrel, and the breech-block having an independent movement with respect to the barrel extension, of the hammer, provided with a locking projection, the trigger, a locking-bar pivoted thereto lying normally above the said locking projection, and provided with a recess for the passage of the said locking projection, said recess being normally out of line with the said projection, a movable device for preventing the movement of said locking-bar, and tripping mechanism for said movable device, operated by the breech-block substantially as described.

8. In a recoil-operated firearm, the combination with the lock-frame, the barrel extension and barrel, and the breech-block movable longitudinally with respect to said barrel extension, of a locking-pawl carried by said breech-block for engaging said barrel extension and locking the breech-block therein, the hammer, provided with a locking projection, the trigger, a locking-bar pivoted to the trigger and provided with a recess for the passage of the said locking projection, normally out of line with said projection, a movable device having a part in the path of said locking-bar, a trip-pin for moving said part out of the path of the locking-bar, said pin having one end in position to be operated by the pawl on said breech-block, substantially as described.

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

GEORGE A. HORNE.

Witnesses:

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ELISHA L. FREEMAN.