

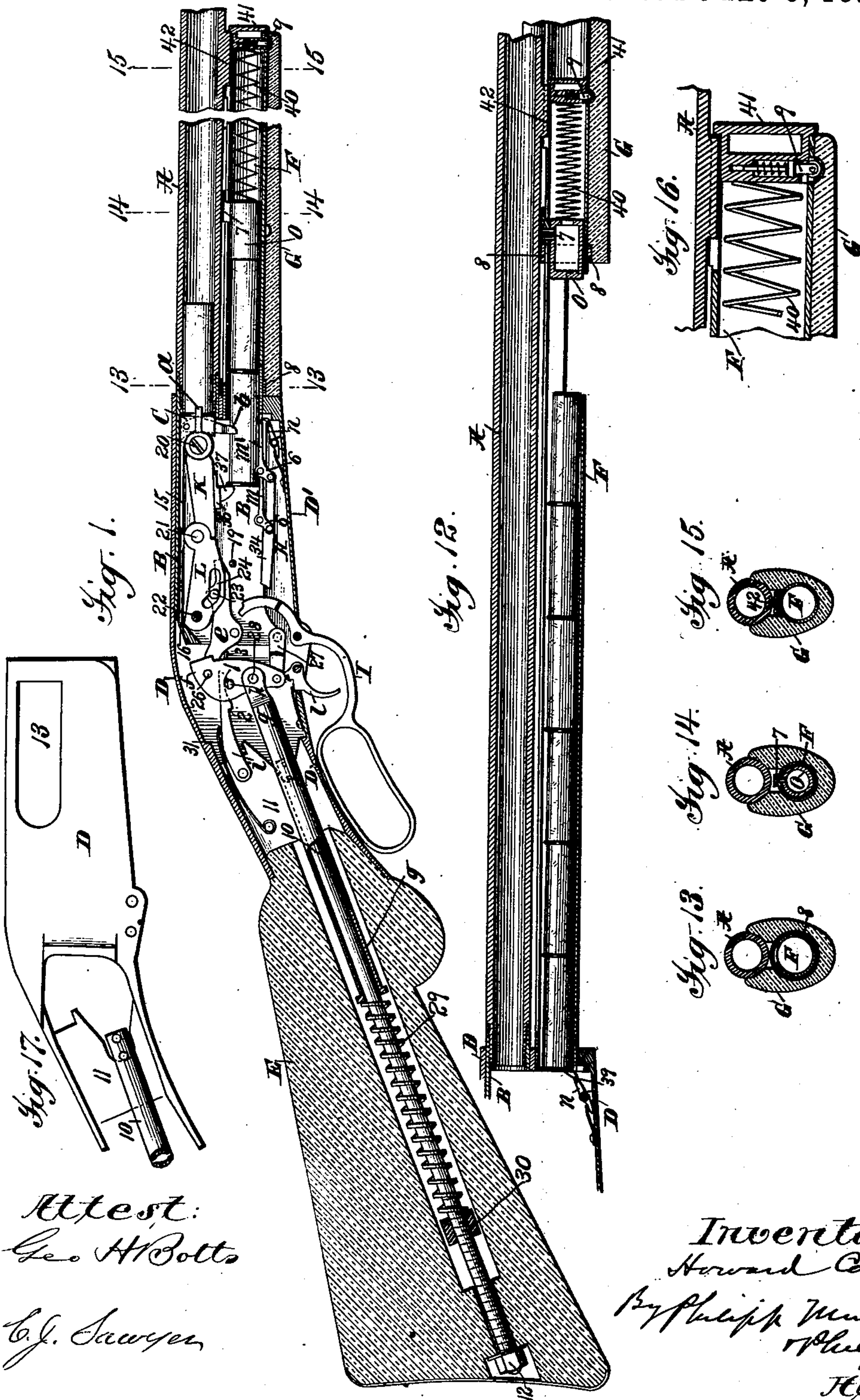
(No Model.)

4 Sheets—Sheet 1.

H. CARR.  
RECOIL OPERATED FIREARM.

No. 584,153.

Patented June 8, 1897.



Attest:  
Geo. H. Botts  
C. J. Sawyer

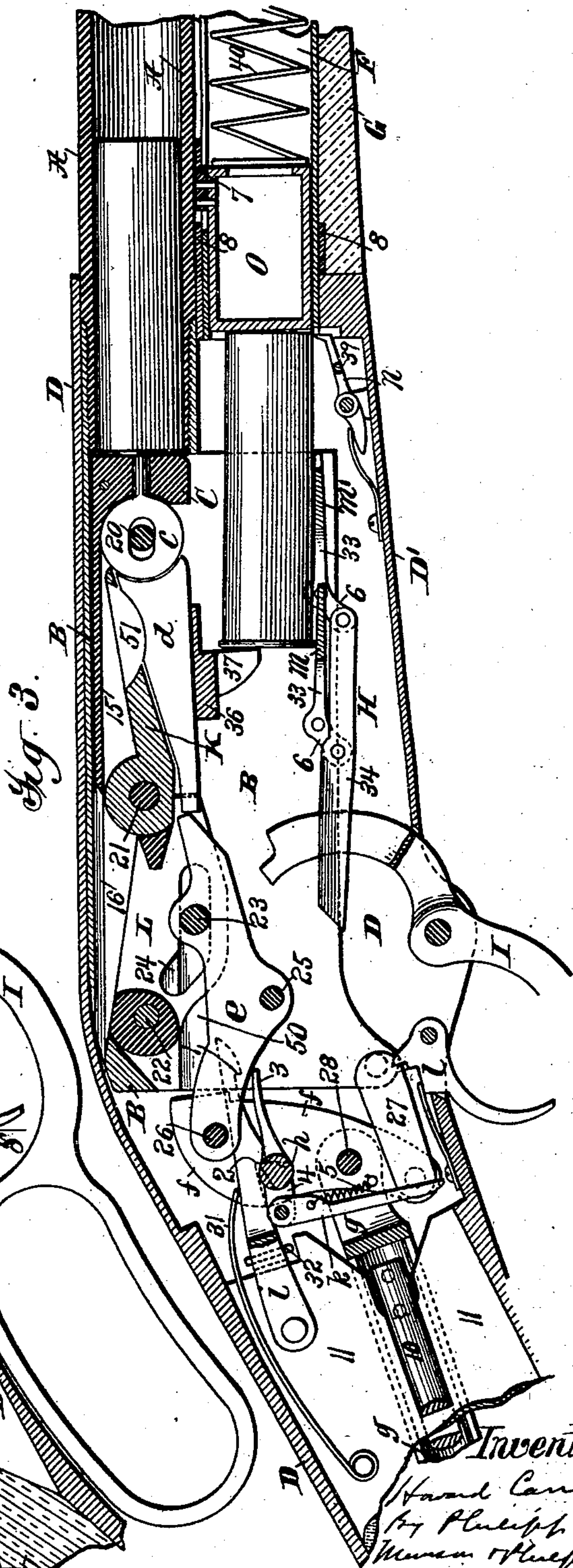
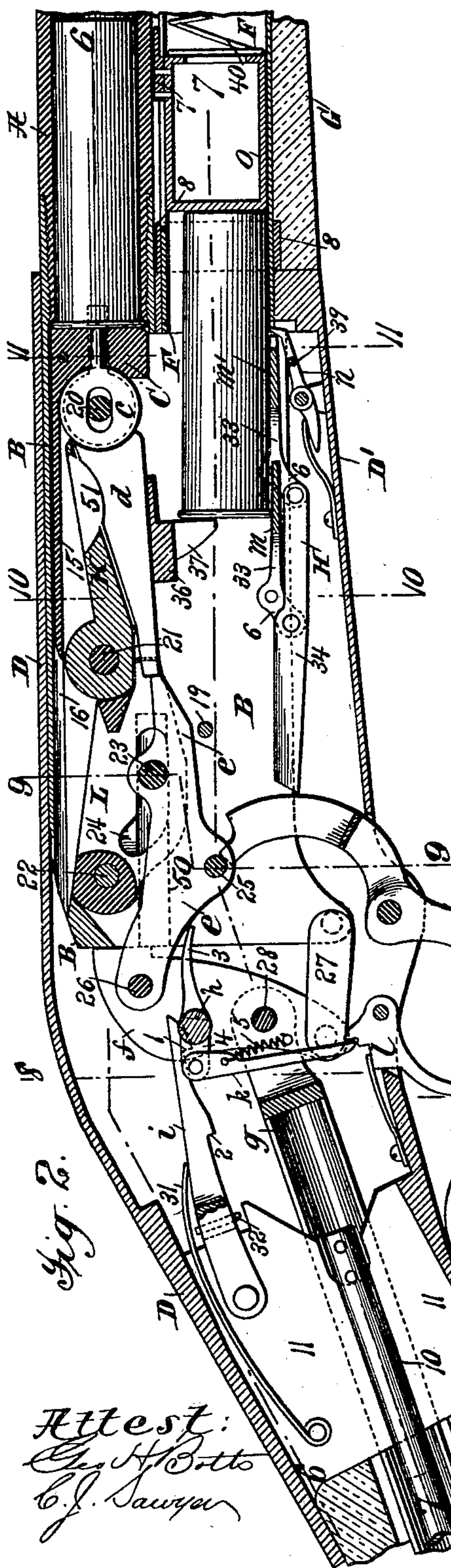
Inventor  
Howard Carr  
By Philip Munson  
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**4 Sheets—Sheet 2.**

No. 584,153.

Patented June 8, 1897.



Attest:  
Geo. H. Botto  
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*Inventor*  
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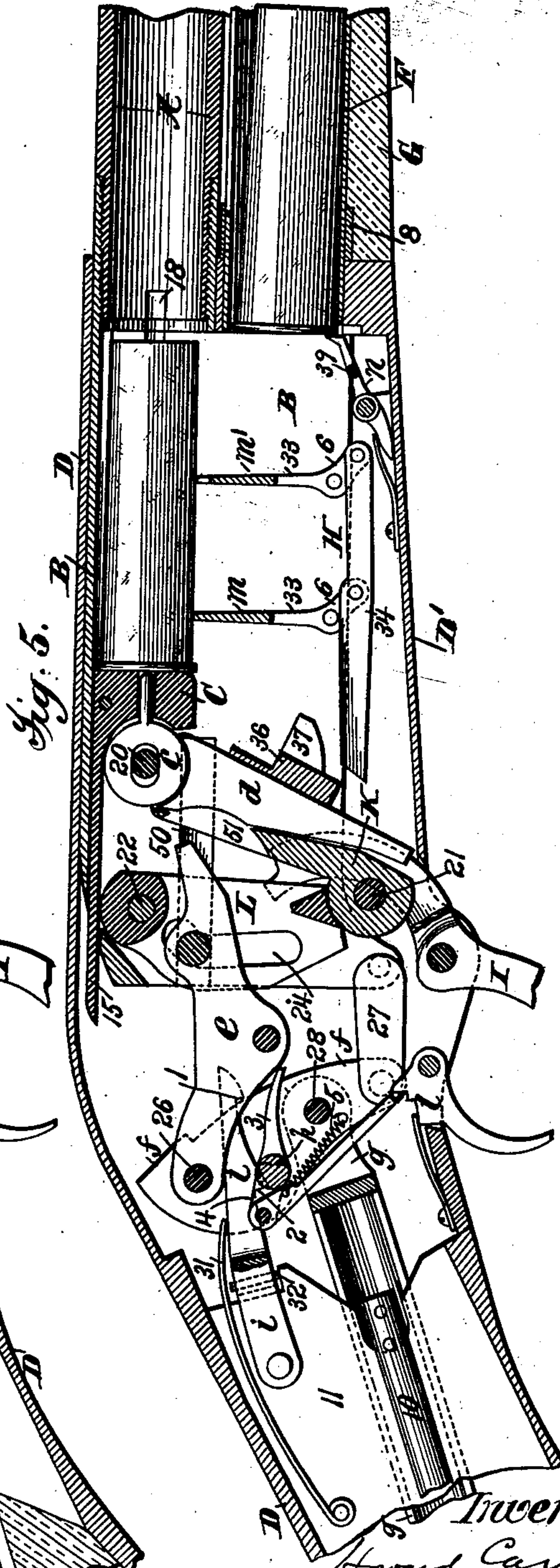
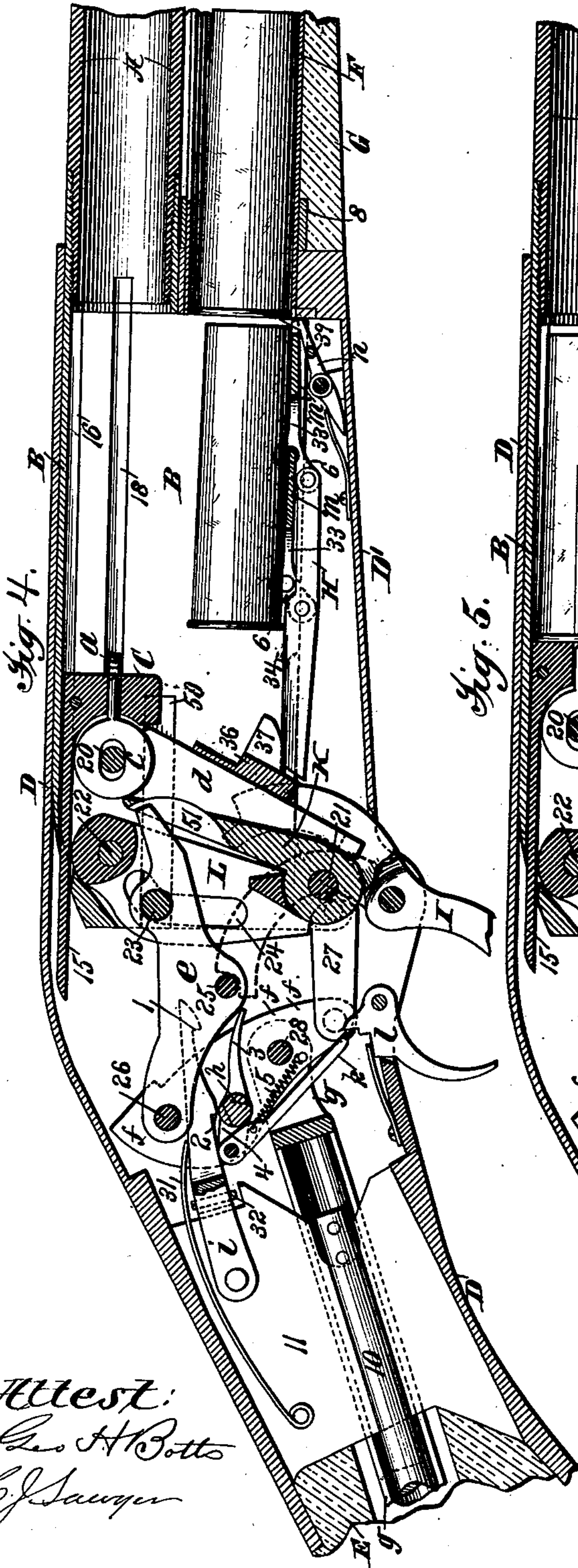
(No Model.)

4 Sheets—Sheet 3.

H. CARR.  
RECOIL OPERATED FIREARM.

No. 584,153.

Patented June 8, 1897.



Attest:  
Geo. H. Bots  
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Howard Carr  
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Attys.



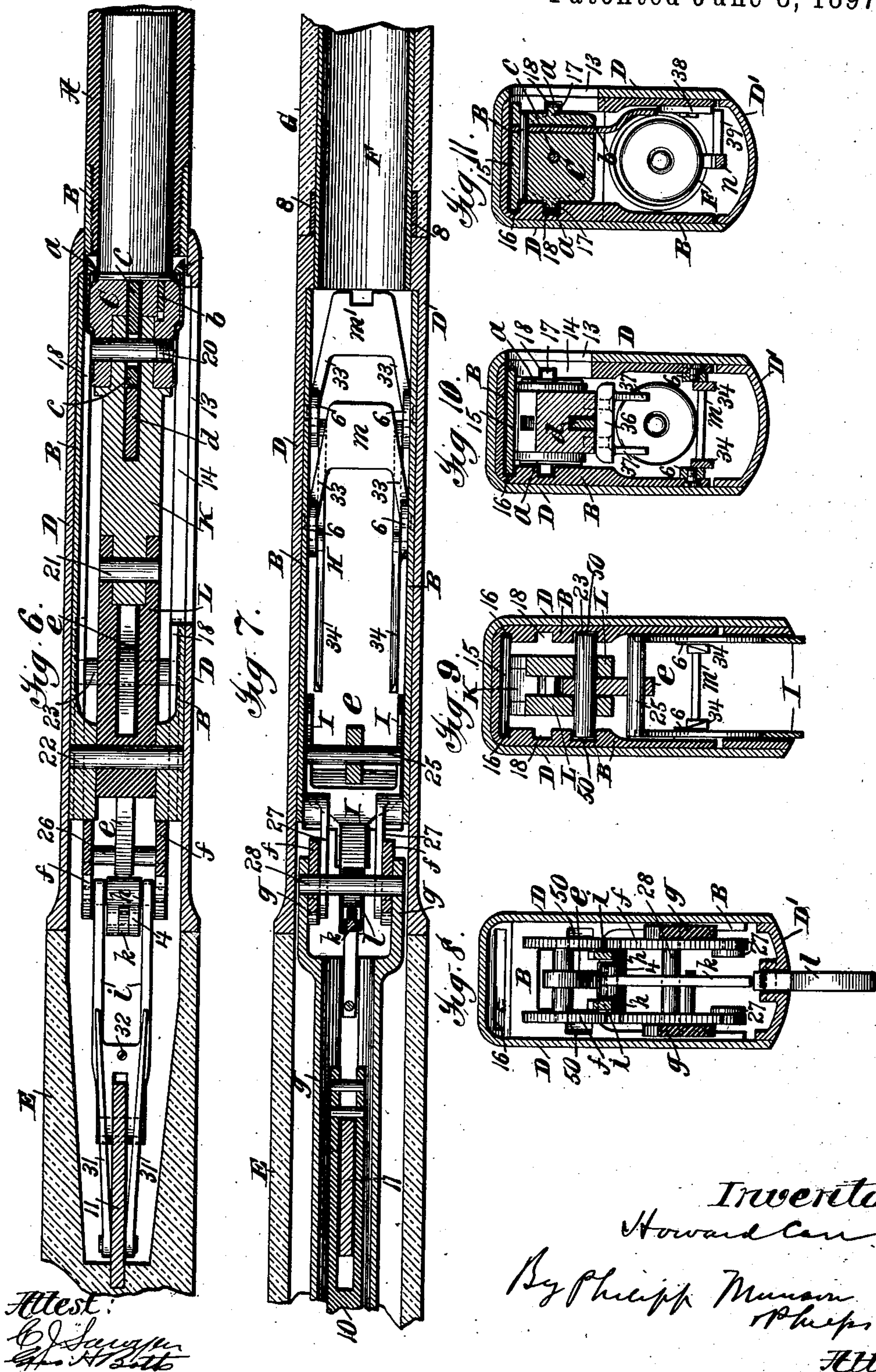
((No Model.))

4 Sheets—Sheet 4.

H. CARR.  
RECOIL OPERATED FIREARM.

No. 584,153.

Patented June 8, 1897.



*Inventor:*

Howard Can

By Philip Munson  
or Sheriff

*PHys*



# UNITED STATES PATENT OFFICE.

HOWARD CARR, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR, BY DIRECT  
AND MESNE ASSIGNMENTS, TO THE SAN FRANCISCO ARMS COMPANY, OF  
SAME PLACE.

## RECOIL-OPERATED FIREARM.

SPECIFICATION forming part of Letters Patent No. 584,153, dated June 8, 1897.

Application filed September 28, 1894. Serial No. 524,329. (No model.)

*To all whom it may concern:*

Be it known that I, HOWARD CARR, a citizen of the United States, residing at San Francisco, county of San Francisco, and State of California, have invented certain new and useful Improvements in Recoil-Operated Firearms, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

10 The object of the present invention is to provide an improved magazine-gun and especially to provide an improved construction of gun of that class known as "recoil-operated" guns, in which the energy developed by the recoil when the gun is fired is utilized in retracting the breech-bolt from the barrel to open the breech and performing the other operations of the gun required for a new discharge. The invention is intended especially for use in shoulder-arms, either rifles or shot-guns, but it is applicable also to other classes of firearms and guns.

The present invention relates especially to a gun of the special class having a longitudinally-movable barrel and employing in the breech-movement a pair of links connecting the breech-bolt and barrel, so that the breech-bolt moves with the barrel during the recoil movement of the latter, while on the return movement of the barrel the links are actuated to retract the breech-bolt and open the breech, the breech-bolt being released and returned to position at the proper time in the operation of the gun. The especial object of the invention is to provide an improved gun having a breech-movement of this class; and the invention includes various features of construction and combination of parts in a gun of this general organization and certain features which are applicable also in other classes of guns employing a different breech-movement.

For a full understanding of the invention a detailed description of a construction embodying all the features of the present invention as applied in their preferred form to a shoulder-arm will now be given in connection with the accompanying drawings, forming a part of this specification, and the features forming the invention will then be specifically pointed out in the claims.

In the drawings, Figure 1 is a longitudinal

section taken centrally through the stock and barrel and inside the frame of the breech mechanism, showing the complete gun with the barrel partially broken away, the parts being in position for firing with the hammer cocked. Fig. 2 is a longitudinal central section, on a larger scale, of the breech portion of the gun, it being shown as just discharged. Fig. 3 is a similar view showing the parts in the position they occupy after the recoil, with the barrel in its rearward position. Fig. 4 is a similar view showing the barrel returned to its normal position and the breech-bolt fully withdrawn and about to be returned to position to close the breech. Fig. 5 is a similar view showing the breech-bolt partially returned with a live cartridge inserted by the carrier. Figs. 6 and 7 are horizontal sections on, respectively, the lines 6 and 7 of Fig. 2. Figs. 8, 9, 10, and 11 are cross-sections on, respectively, the lines 8, 9, 10, and 11 of Fig. 2. Fig. 12 is a detail of the magazine, showing the method of loading. Figs. 13, 14, and 15 are cross-sections of the barrel and magazine on, respectively, the lines 13, 14, and 15 of Fig. 1. Fig. 16 is an enlarged detail of the catch for holding the magazine in normal position. Fig. 17 is a side view of the casing which incloses the breech mechanism.

Referring to said drawings, A is the barrel; B, the barrel extension, which virtually forms a part of the barrel and is formed integral therewith or rigidly secured thereto, the barrel being shown as screwed into the barrel extension, and C is the breech-bolt. The barrel and barrel extension move in the frame D, which, in the preferred form shown, consists of a single piece in which the barrel and magazine are mounted at one end and receiving the stock E at the opposite end, the stock entering between top and bottom plates forming rearward extensions or tangs of the frame and being secured thereto by a rod 10, connected to a central cross-plate 11 of the frame and passing through the butt-end of the stock, where the stock is drawn up tight, and secured by a nut 12 on the rod 10. The frame D is entirely closed by a bottom plate D', except at its opposite ends and where it is provided with an opening 13 on the side for the ejection of the shell and an opening at the bot-



tom for the hand-lever and trigger, the gun shown being of that class known as "hammerless" guns. While this inclosed hammer construction is preferred, however, and a part of the invention consists in such a construction having a recoil-operated breech-movement, it will be understood that this is not essential and that the invention, considered broadly, may be embodied in other constructions and the form of the frame be varied. Under the barrel A is the magazine F, extending longitudinally of the barrel and secured in a fixed position to the front end of the frame D.

G is the fore-stock, which is mounted to slide for loading the magazine, as will be explained hereinafter.

H is the carrier, and I the hand-lever.

Considering now the construction of the gun in detail, the barrel extension B is mortised vertically or consists of a casing which incloses the breech-bolt, its operating parts, and the carrier, and, in the preferred construction shown, is a strong rectangular tube fitting inside the frame D, open at the bottom and ends, but closed otherwise, except that it is provided with an opening 14 on the side corresponding to the opening 13 in the frame D and through which the shell is ejected. The breech-bolt C is provided with a flange 15 at the top, which runs in grooves 16 at opposite sides of the top of the barrel extension B and by which the breech-bolt is guided and held in position, the breech-bolt also being provided with side ribs 17, entering corresponding grooves 18 in the barrel extension B at opposite sides, these grooves 18 being of sufficient depth to accommodate also the extractors *a*, which are of the common spring-hook form and mounted opposite the ribs 17. The breech-bolt also carries an ejector *b*, which consists of a plate pivoted in the breech-bolt so as to swing longitudinally of the gun and projecting below the breech-bolt sufficiently to engage a stud 19 on the barrel extension when the breech-bolt is fully withdrawn, the ejector thus being forced forward and the shell thrown out sidewise through the openings 13 14 in advance of the insertion of the live cartridge.

The breech-bolt C is connected to the barrel extension B by a pair of links K L, pivoted together by pivot 21, the forward end of the front link K being pivoted to the breech-bolt by the pivot 20 and the rear end of the rear link L to the barrel extension by pivot 22, the link L being preferably forked, or, as shown, consisting of two side plates between which the rear end of the link K enters and which also affords space for the movement of a central hammer.

Within the breech-bolt C is mounted the firing-pin *c*, which, as shown, consists of a disk carrying the pin at its forward side and having a central slot by which the disk is threaded upon a pivot 20, the latter thus limiting its movements in both directions. The

firing-pin *c* is engaged at its rear end and actuated for firing by a bar *d*, which forms practically a part of the firing-pin, but is separate therefrom to allow the front link to turn freely on its pivot 20. For ease of assembling and separating the parts also this bar is preferably thus made separate from the firing-pin *c* and is of the form shown, tapering rearward and mounted in a tapering groove extending centrally through the bottom of the link K. The bar *d* is thus held from rearward movement by its form and that of the groove in the link K, being supported in the link by a projection below the groove, as presently to be described, and the bar *d* may readily be withdrawn from the forward end of the link K when the latter is detached.

The bar *d* is engaged at its rear end by the hammer *e*, which serves not only as a hammer to actuate the firing-pin, but also performs important functions in the operation of the breech mechanism, the link K and the bar *d* being cut away at 51 to accommodate the front end of the hammer *e* in the position shown in Fig. 4. The hammer *e* carries a strong cross-pin 23, which moves in straight horizontal grooves 50 in opposite sides of the barrel extension B, so that it is guided and positively held to straight-line movement therein, and this pin passes through slots 24, cut in the opposite side plates forming the rear link L, these slots having a horizontal portion in which the pin 23 lies in the normal position of the gun and an upwardly-inclined portion by movement in which the pin 23 breaks down the links for retracting the breech-bolt. The hammer *e* carries also on its lower side a cross-pin 25, which is engaged by projections on the end of the hand-lever I to open the breech by hand. At its rear end the hammer *e* is pivoted by a pin 26 between two side plates, which form a lever *f*, which is connected by links 27 at its lower end to the base of the barrel extension B, and between the hammer *e* and the link 27 the lever is pivotally connected by a pin 28 to a tube *g*, slotted to move and be guided upon the cross-web 11 of the frame D and upon the rod 10. The lower end of the tube *g* within the stock E bears against a spring 29, coiled upon the rod 10 and held under tension, which may be adjusted by a nut 30, this spring being the operating-spring of the breech mechanism and by which the barrel is returned to position, the breech-bolt withdrawn to open the breech, and returned to close the breech, all these operations being performed in the preferred construction shown by a single spring.

The lever *f* carries a catch *h*, which, as shown, consists of a pin mounted in the two side plates of the lever and cut away so as to form an angular catch, this catch connecting with a sear which consists of a lever *i*, pivoted on the cross-web 11 and spring-pressed downward by spring 31, this sear preferably being forked, as shown, and having two hooks 1 2, forming catches and engaging



the catch *h*, of which the former hook 1 holds the hammer at cock, as shown in Fig. 1, and the latter, 2, holds the lever *f* during the return of the barrel, as shown in Fig. 3, so as to actuate the hammer *e* and link *L* to withdraw the breech-bolt. An adjustable stop 32 is carried by the sear and engages a shoulder on the web 11 to limit the downward movement of the sear. The pin *h*, which is mounted to rotate in the plates of the lever *f*, carries a rigid tailpiece or arm 3, which lies under the rear part of the hammer *e* and forms the means by which the hammer trips the pin *h* to release it from the catch 2 of the sear *i*, and the pin *h* has at the opposite side of the tailpiece 3 an arm 4, to which is pivotally connected a tripper *k*, the lower end of which normally rests upon or above the trigger *l*, so that the tripper is raised by the trigger when the latter is drawn back, the tripper being normally drawn downward and the pin *h* rocked rearward by a spring 5, connected to the tripper *k* and lever *f*. The trigger *l* is squared on its rear side or cut away to form a shoulder, so that the tripper may be returned to position behind said shoulder in case the trigger has not been released, and the pin *h* thus be rocked to hold the hammer at cock. If a gun be desired in which all the cartridges in the magazine are discharged at one pull of the trigger, the construction of the latter may be varied, so as to hold the tripper raised on its return, thus preventing the holding of the hammer at cock, and thus firing the gun as the hammer moves forward at the end of the operation of the breech mechanism.

The carrier, which receives the cartridges from the magazine and delivers them in front of the breech-bolt for being carried by the latter into the barrel, consists of two plates *m m'*, carried by levers 33, pivoted to opposite sides of the barrel extension *B* and having short arms 6 extending below the pivots and to which are pivoted arms 34, which, as shown in Fig. 7, preferably are formed of plates having their inner surfaces inclined inward. The carrier is actuated by the engagement of these arms 34 by a projection 36 on the lower side of the front link *K* as the latter returns to normal position, this projection having side wings 37, forming a stop for the cartridge as it is forced back from the magazine onto the carrier. A spring-pressed dog *n* of any suitable construction is used for holding the next cartridge in the magazine as the carrier is actuated to raise a cartridge to the barrel and until the return of the breech-bolt to normal position, the dog projecting through a notch in the forward end of plate *m'* and being lowered to permit the next cartridge to be forced out onto the carrier by some part of the returning breech-bolt, preferably by the lower inclined end of the ejector *b* (shown in Fig. 1) striking a plate 38, mounted to slide vertically on the side of the barrel extension, and engaging a

pin 39 on the dog *n*, so as to depress the latter, the spring-pressure upon the dog raising the plate when the breech-bolt is retracted, and the pressure of the ejector *b* upon the plates 38 thus relieved.

The magazine *F* is provided with an opening near its forward end, through which it may be loaded, which is normally closed by the fore-stock *G*, but by sliding the fore-stock forward this opening is uncovered for loading, as shown in Fig. 12, in which the magazine is shown as having just been loaded.

The construction of the magazine and its connections with the barrel and fore-stock is as follows: The magazine is provided with a follower *o*, spring-pressed by a spring 40, bearing against the follower and the head 41 of the magazine, and the follower *o* carries an arm 7, which slides within a slot on the side of the magazine next the barrel and is engaged by a ring 8, carried by the fore-stock *G*, the fore-stock thus being hung upon the magazine. The magazine is connected to the barrel, so that the latter may slide independently of the magazine, by a tongue-and-groove connection 42, as shown in Fig. 15, and the fore-stock *G* encircles the magazine sufficiently so that with the ring 8 it is firmly supported upon the latter and held as shown in Figs. 13 to 15, this fore-stock preferably partially embracing the barrel, as usual in such constructions. As the fore-stock is drawn forward, as shown in Fig. 12, the follower *o* is carried forward with it, thus compressing the spring 40, and the fore-stock is held in its rearward and forward positions by a roller-catch 9, carried by the head 41 of the magazine and engaging depressions at the forward and rear ends of the fore-stock in the two extreme positions of the latter. This catch may possibly be omitted, however, and the fore-stock held by friction, but a catch of some form is desirable.

The operation of the gun will now be described: Assuming that the parts are in the position shown in Fig. 2, the gun just having been discharged, the recoil carries the barrel *A* and barrel extension *B* rearward together to the limit of the recoil movement of the barrel, the breech-bolt moving with the barrel and barrel extension, this movement of the barrel and barrel extension forcing the lever *f* backward by the engagement of the rear end of the barrel extension with the lever *f* at the top and the connecting-link 27 between the lower end of the lever and barrel extension, the lever *f* thus being carried rearward bodily and compressing the spring 29 by the tube *g*, which moves back with the lever. The lever *f* is thus carried back sufficiently so that the rear hook 2 on the spring-pressed sear *i* lies forward of the catch *h* and is pressed down so as to catch the latter and hold this portion of the lever against forward movement. During this movement the links *K L* are held in normal position and the breech-bolt locked to the barrel, so that the barrel extension receives the full force of the



recoil, and the escape of gases at the breech is prevented by the pin 23 moving in the grooves 50 and the straight portion of the slot 24. As the breech-bolt moves back the pressure of the  
 5 ejector *b* upon the plate 38 is relieved and the dog *n* left free to spring upward and stop the next cartridge in the magazine, when the cartridge to be loaded is carried upward by the carrier. The parts are all now in the po-  
 10 sition shown in Fig. 3.

The force of the recoil being expended and the barrel being free to return, the spring 29 now recoils, and, as the lever *f* is now held against bodily forward movement by the catch  
 15 *h* and hook 2 on the sear *i*, the lever *f* is operated as a lever with its fulcrum at the pivot of the catch *h* and its lower end thrown forward and its upper end rearward as the tube *g* returns to normal position. By this action  
 20 the lower end of the lever *f* actuates the barrel extension through the link 27, so as to return the barrel to normal position and thus throw backward the upper end of the lever *f* and draw back the hammer *e*, connected  
 25 thereto. The pin 23 travels in the straight portion of the slot 24 for a short distance during this movement and then enters the inclined portion of the slot 24 and breaks down the links *K L*, and the link *L* then is actua-  
 30 ted as a lever with its fulcrum at 22 and the power applied by the pin 23 and through the link *K*, connecting the other end of this lever to the breech-bolt, draws the latter backward to fully open the breech as the barrel reaches  
 35 its normal position. As the link *K* moves downward and backward the wings 37 of the projection 36 pass between the arms 34, and the projection 36 moves into position to en-  
 40 gage the rear end of these arms during its return movement and thus actuates the carrier. Just as the breech-bolt is fully with-  
 drawn and the barrel fully returned to position, so that the breech is fully open, the  
 45 ejector *b* strikes the lug 19 and thus rocks the ejector forward, so as to throw the empty shell outward at the side of the gun through the openings 13 14. At the termination of  
 this movement, also, the under surface of the  
 50 hammer *e*, acting upon the tailpiece 3 of the catch *h*, carries the tailpiece downward, so as to rock the catch *h* and release it from the  
 hook 2 on the sear *i*, so that the lever *f*, ham-  
 mer *e*, links *K L*, and the breech-bolt *C* are free to be returned to normal position by the  
 55 spring 29, the tension of which is not entirely exhausted by the return of the barrel. All the parts are now in the position shown in  
 full lines in Fig. 4. A cartridge being now  
 60 fully within the carrier and ready to be transferred to the barrel and the dog *n* stopping the next cartridge, the parts now return to  
 normal position, the first part of the move-  
 ment being shown in Fig. 5, the lever *f* being  
 65 rocked forward by the spring 29 on the pivot by which it is connected to the link 27 and thus carrying the hammer *e* forward to move  
 the link *L* forward and upward by the pin

23, so as to open the links again and thus  
 move the breech-bolt forward, and as the pro-  
 jection 36 reaches the ends of the arms 34 it  
 70 strikes them and moves them forward, which movement, as they are pivoted upon the short  
 arms 6 of the levers 33, throws the arms 34 and the short arms 6 downward and thus  
 75 throws the carrier-plates *m m'* upward from the position shown in Fig. 4 to that shown in  
 Fig. 5, the parts being so timed that the car-  
 tridge is brought in front of the breech-bolt just in time to be transferred by the latter to  
 the barrel. The movement of the parts then  
 80 being continued from the position shown in Fig. 5 the pin 23 as it moves forward in the slot  
 24 on the rear link *L* opens the links to their normal position and thus closes the breech,  
 the carrier being thrown down to normal po-  
 85 sition by the projection 36 or wings 37 striking the plate *m*, the ejector *b* also actuating  
 the plate 38 to depress the dog *n* and allow the next cartridge to move back onto the car-  
 rier when the latter is lowered. The hammer  
 90 *e* has now been moved forward so as to release the tailpiece 3 of the catch *h*, and the  
 catch *h* is rocked rearward by the spring 5 connected to the tripper *k*, so as to carry it  
 into position to engage the hook 1 of the sear  
 95 *i* and hold the hammer *e* at cock. Thus all the parts are returned to the position shown  
 in Fig. 1, with the hammer cocked, the lever *f* and hammer being slightly withdrawn, so  
 that the hook 1 is over the catch *h* and holds  
 100 the lever against the tension of the spring 29 and the tripper *k* above the trigger *l*. If  
 now the trigger *l* be pulled, its top surface strikes the tripper *k*, raising the latter, and  
 thus rocks the catch *h* forward, so as to re-  
 105 lease it from the hook 1 on the sear *i* and thus release the lever *f*, which is then forced  
 forward by the spring 29 into the position shown in Fig. 2, the hammer *e* thus being  
 carried forward so as to force the bar *d*  
 110 against the rear side of the firing-pin *c* and fire the gun, and the operation previously de-  
 scribed is then repeated. If the trigger *l* has not been released, being held back against  
 the tension of its spring, the tripper *k* in its  
 115 forward movement comes against the shoulder at the top of the trigger and the gun can-  
 not be fired again until the trigger has been released, so as to be returned to its place be-  
 low the tripper. If the hammer is to be un-  
 120 cocked, this is accomplished by throwing  
 the hand-lever *I* so that its upper end 26  
 by engagement with the pin 25 holds the  
 hammer back against the tension of spring  
 29, then pulling the trigger and allowing the  
 125 hammer to move forward against pressure  
 on the hand-lever *I*. When there is no car-  
 tridge in the barrel and a cartridge is to be  
 transferred thereto by hand, the hand-lever  
 130 *I* is moved forward into the position shown  
 in dotted lines in Fig. 4, and the upper end  
 26, striking the pin 25, carries back the ham-  
 mer *e* and lever *f* against the pressure of  
 spring 29 on the tube *g*, the lever *f* thus



swinging upon the pivot by which it is connected to the link 27. As the breech-bolt is fully withdrawn, as shown in Fig. 4, the end 26 of the lever I, which is preferably cut away, as shown, passes under the pin 25 and holds the breech-bolt in its rear position until the hand-lever is returned to position, and upon the return movement of the hand-lever the action is the same as already described in connection with the latter part of the automatic movement. This return, however, may be controlled by the hand acting on the hand-lever I.

When the magazine is to be loaded, it is necessary only to slide the fore-stock G from the position shown in Fig. 1 to that shown in Fig. 12, which will carry the follower o forward against the pressure of spring 40, and the fore-stock will be held in this forward position by the roller-catch 9. The cartridges are then loaded through the opening on the under side of the forward end of the magazine, as shown, being successively passed backward into the magazine, and upon the return of the fore-stock G after loading the spring-pressed follower o is released and allowed to resume its normal position and pressure upon the cartridges.

It will be understood that the invention may be applied to guns of other general construction than that shown and that the form and arrangement of many of the parts shown may be varied widely. The invention therefore is not to be limited to the exact construction shown, as many modifications may be made therein by those skilled in the art without departing from the invention. It will be understood also that certain features of the invention may be applied to guns of other general constructions than that shown and not employing the link movement for operating the breech mechanism and are thus claimed.

What is claimed is—

1. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, a member engaging the rear link, and mechanism for actuating said member to swing the rear link on its barrel-pivot to withdraw the breech-bolt and open the breech and for returning the barrel and breech-bolt to normal position, substantially as described.

2. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, a member engaging the rear link, and mechanism for moving said member rearward to swing the rear link on its barrel-pivot to withdraw the breech-bolt and open the breech and for returning the barrel and breech-bolt to normal position, substantially as described.

3. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, a member engaging the rear link,

and mechanism for returning the barrel to position after recoil and actuating said member to swing the rear link on its barrel-pivot during the return movement of the barrel to withdraw the breech-bolt and open the breech, substantially as described.

4. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, means for returning the barrel to position after recoil, a member engaging the rear link, connections between said member and barrel whereby said member is actuated by the returning barrel to swing the rear link on its barrel-pivot to withdraw the breech-bolt and open the breech, and means for returning the breech-bolt to normal position, substantially as described.

5. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, means for returning the barrel to position after recoil, a member engaging the rear link, connections between said member and barrel whereby said member is moved rearward by the returning barrel to swing the rear link on its barrel-pivot to withdraw the breech-bolt and open the breech, and means for returning the breech-bolt to normal position, substantially as described.

6. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, means for returning the barrel to position after recoil, a member engaging the rear link, a catch and connections between said catch and member, means coacting with said catch to move the member whereby the link is actuated to withdraw the breech-bolt and open the breech, and means for tripping said catch and returning the breech-bolt to normal position, substantially as described.

7. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, means for returning the barrel to position after recoil, a member engaging the rear link, a lever connected to said member, and means for rocking said lever whereby the rear link is actuated to withdraw the breech-bolt and open the breech, substantially as described.

8. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, means for returning the barrel to position after recoil, a member engaging the rear link between its pivots, means for moving said member rearward whereby said link is actuated to withdraw the breech-bolt and open the breech, and means for returning the breech-bolt to normal position, substantially as described.

9. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, means for returning the barrel to



position after recoil, a member engaging the rear link between its pivots, means for moving said member rearward by the return movement of the barrel, whereby said link is actuated to withdraw the breech-bolt and open the breech, and means for returning the breech-bolt to normal position, substantially as described.

10. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, means for returning the barrel to position after recoil, a member engaging the rear link between its pivots, a catch and connections between said catch and member, means coacting with said catch to move the member rearward, whereby the link is actuated to withdraw the breech-bolt and open the breech, and means for tripping said catch and returning the breech-bolt to normal position, substantially as described.

11. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, means for returning the barrel and breech-bolt to position, a member engaging the rear link between its pivots, a lever connected to said member, and means for rocking said lever during the return movement of the barrel, whereby the rear link is actuated to withdraw the breech-bolt and open the breech, substantially as described.

12. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, means for returning the barrel to position, a member engaging the rear link between its pivots, a lever connected to said member, and means for rocking said lever to move the member in opposite directions, whereby the rear link is actuated during the return movement of the barrel to withdraw the breech-bolt and open the breech and to return the breech-bolt to normal position, substantially as described.

13. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, means for returning the barrel to position after recoil, a member engaging the rear link between its pivots, a lever connected to said member, a catch holding said lever during the return movement of the barrel and tripped for the return of the breech-bolt, and means for rocking said lever to move the member in opposite directions, whereby the rear link is actuated during the return movement of the barrel to withdraw the breech-bolt and open the breech and to return the breech-bolt to normal position, substantially as described.

14. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, means for returning the barrel to position after recoil, a member engaging the rear link between its pivots, a lever connected to said member, a catch holding said lever

for the withdrawal of the breech-bolt and tripped by said member for the return of the breech-bolt, and means for rocking said lever on said catch to actuate said member to withdraw the breech-bolt and for returning the lever to normal position to actuate said member to close the breech when the catch is tripped, substantially as described.

15. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, a member engaging the rear link between its pivots, a lever connected at different points to the member and barrel, a pressure device connected to said lever, and a catch forming a fulcrum for the lever during the return of the barrel and tripped for the return of the breech-bolt, substantially as described.

16. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, a member having a pin-and-slot connection to the rear link between the pivots, a lever connected at different points to the member and barrel, a pressure device connected to said lever, and a catch forming a fulcrum for the lever during the return of the barrel and tripped for the return of the breech-bolt, substantially as described.

17. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, a member having a pin-and-slot connection to the rear link between the pivots and forming a hammer, a lever connected at different points to the member and barrel, a pressure device connected to said lever, a catch forming a fulcrum for the lever during the return of the barrel and tripped for the return of the breech-bolt, a sear engaging the lever for holding the hammer at cock, a firing-pin, and a trigger and connections for releasing said sear, substantially as described.

18. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, a member having a pin-and-slot connection with the rear link and forming a hammer, a lever connected at different points to the member and barrel, a pressure device connected to said lever, a catch on said lever forming a fulcrum for the lever, a sear having two hooks engaging the catch, one to hold it during the return of the barrel and the other to hold the hammer cocked, means for tripping the catch for the return of the breech-bolt, a firing-pin, and a trigger and connections for tripping the catch for firing the gun, substantially as described.

19. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, a member having a pin-and-slot connection with the rear link and forming a hammer, a lever connected at different points to the member and barrel, a pressure device



connected to said lever, a catch mounted to rotate on said lever, a sear having two hooks engaging the catch, one to hold it during the return of the barrel and the other to hold the hammer cocked, a trip on the catch tripped by the hammer for the return of the breech-bolt, a tripper connected to an arm on the catch, a trigger engaging the tripper, and a firing-pin, substantially as described.

20. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, a member engaging the rear link between its pivots, a lever connected at one end to said member and at the opposite end having a link connection to the barrel, a pressure device connected to the lever between the member and barrel connections, and a catch forming a fulcrum for the lever between the member and pressure device during the return of the barrel and tripped for the return of the breech-bolt, substantially as described.

21. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, a member engaging the rear link between its pivots and forming a hammer, a lever connected at one end to said member and at the opposite end having a link connection to the barrel, a pressure device connected to the lever between the member and barrel connections, a catch forming a fulcrum for the lever between the member and pressure device during the return of the barrel, a sear having two hooks engaging said catch, one to hold it during the return of the barrel and the other to hold the hammer cocked, means for tripping the catch for the return of the breech-bolt, a firing-pin, and a trigger and connections for tripping the catch, for firing the gun, substantially as described.

22. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, means for returning the barrel to normal position after recoil, a member having a pin-and-slot connection with the rear link between its pivots, and devices whereby said member is retracted during the return movement of the barrel to withdraw the breech-bolt and then returned to move the breech-bolt to normal position, substantially as described.

23. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, means for returning the barrel to normal position after recoil, a member having a pin-and-slot connection with the rear link, a lever connected to said member, a catch holding said lever during the return movement of the barrel and tripped for the return of the breech-bolt, and devices whereby said lever is rocked on the catch during the return movement of the barrel to withdraw the breech-bolt and actuated to return

the breech-bolt when the catch is tripped, substantially as described.

24. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, means for returning the barrel to normal position after recoil, a member movable longitudinally of the barrel and having a pin moving in grooves in the breech-piece and an inclined slot in the rear link, and devices whereby said member is retracted during the return of the barrel to withdraw the breech-bolt and then returned to move the breech-bolt to normal position, substantially as described.

25. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, means for returning the barrel to normal position after recoil, a member movable longitudinally of the barrel and having a pin moving in grooves in the breech-piece and an inclined slot in the rear link, said slot having a portion parallel with the grooves for locking the links and an inclined portion for actuating the rear link to withdraw and return the breech-bolt, and devices whereby said member is retracted during the return of the barrel to withdraw the breech-bolt and then returned to move the breech-bolt to normal position, substantially as described.

26. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, means for returning the barrel to normal position after recoil, a hammer movable longitudinally of the barrel and having a pin moving in grooves in the breech-piece and an inclined slot in the rear link, said slot having a portion parallel with the grooves for locking the links and an inclined portion for actuating the rear link to withdraw and return the breech-bolt, devices whereby said hammer is retracted during the return of the barrel to withdraw the breech-bolt and then returned to move the breech-bolt to normal position, a sear holding the hammer at cock on its return, a firing-pin, and a trigger and connections for releasing the sear, substantially as described.

27. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, means for returning the barrel to normal position after recoil, a hammer movable longitudinally of the barrel and having a pin moving in grooves in the breech-piece and an inclined slot in the rear link, said slot having a portion parallel with the grooves for locking the links and an inclined portion for actuating the rear link to withdraw and return the breech-bolt, devices whereby said hammer is retracted during the return of the barrel to withdraw the breech-bolt and then returned to move the breech-bolt to normal position, a firing-pin, a bar sliding in the front link and actuated by the hammer to engage



the firing-pin, a sear holding the hammer at cock on its return, and a trigger and connections for releasing the sear, substantially as described.

5 28. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, means for returning the barrel to  
10 normal position after recoil, a hammer movable longitudinally of the barrel, and having a pin moving in grooves in the breech-piece and a slot in the rear link, said slot having a  
15 portion parallel with the grooves for locking the links and an inclined portion for actuating the rear link to withdraw and return the breech-bolt, devices whereby said hammer is retracted during the return of the barrel to  
20 withdraw the breech-bolt and then returned to move the breech-bolt to normal position, a firing-pin having a slot by which it is threaded on the breech-bolt pivot of the front link, a  
bar sliding in the front link and actuated by the hammer to engage the firing-pin, said bar  
25 and firing-pin engaging by curved surfaces concentric with the movement of the front disk, a sear holding the hammer at cock on its return, and a trigger and connections for releasing the sear, substantially as described.

29. The combination with a longitudinally-movable barrel actuated by the recoil, of a  
30 breech-bolt, links connecting said breech-bolt and barrel, a spring put under tension by the recoil of the barrel and by which the barrel is returned to normal position, a member engaging the rear link, and mechanism  
35 operated by said spring for moving said member to withdraw the breech-bolt and open the breech and for returning the breech-bolt to normal position, substantially as described.

40 30. The combination with a longitudinally-movable barrel actuated by the recoil, of a breech-bolt, links connecting said breech-bolt and barrel, a spring put under tension by the recoil of the barrel and by which the barrel  
45 is returned to normal position, mechanism operated by said spring for actuating the links to withdraw the breech-bolt and open the breech and for returning the breech-bolt to normal position, a magazine, a firing-pin, and  
50 a carrier and hammer actuated by said spring, substantially as described.

31. The combination with a longitudinally-movable barrel actuated by the recoil, of a  
55 breech-bolt, links connecting said breech-bolt and barrel, means for returning the barrel to position after recoil, mechanism for actuating the links to withdraw the breech-bolt and open the breech and for returning the breech-bolt to normal position, and a firing-pin  
60 formed in two parts, one of which is pivoted to swing with one of the links, substantially as described.

32. The combination with a hammer and recoil-operated cocking mechanism, of a sear,  
65 a trigger, and a tripper for releasing the sear, said tripper normally lying upon or above the trigger and being moved off the trigger by

the breech mechanism to permit the sear to return independently of the position of the trigger, substantially as described.

33. The combination with the longitudinally-movable barrel A and barrel extension B having the side grooves 50, of the breech-bolt C, the links K, L, the link L having the slot 24, the member *e* having the pin 23 moving in said slot and grooves, and mechanism  
75 for actuating said member, substantially as described.

34. The combination with a longitudinally-movable barrel A, and barrel extension B, of  
80 breech-bolt C, links K, L, a hammer moving longitudinally of and guided by the link L, a firing-pin engaged by said hammer, and mechanism for actuating said hammer.

35. The combination with the longitudinally-movable barrel A and barrel extension B having the side grooves 50, of the breech-bolt C, the links K, L, the link L having the slot 24, the hammer *e* having the pin 23 moving in said slot and grooves, the firing-pin *c*  
90 having a slot threaded on the pivot of the link K, and the bar *d* sliding in the link K, substantially as described.

36. The combination with the longitudinally-movable barrel A and barrel extension  
95 B having the side grooves 50, of the breech-bolt C, the links K, L, the link L having the slot 24, the member *e* having the pin 23 moving in said slot and grooves, lever *f*, the link 27 between said link and barrel extension, the  
100 spring 29 and connections to said lever, and a catch forming a fulcrum for said lever and tripped for the return of the breech-bolt, substantially as described.

37. The combination with the longitudinally-movable barrel A and barrel extension  
105 B having the side grooves 50, of the breech-bolt C, the links K, L, the link L having the slot 24, the hammer *e* having the pin 23 moving in said slot and grooves, lever *f*, the link 27 between said link and the barrel extension, spring 29 and connections to said lever, rotating the catch *h* on said lever, the sear *i* having hooks 1, 2, a firing-pin, means for tripping said catch for the return of the breech-bolt, and a trigger and connections for tripping the catch for firing the gun, substantially as described.

38. The combination with the longitudinally-movable barrel A and barrel extension  
120 B having the side grooves 50, of the breech-bolt C, the links K, L, the link L having the slot 24, the hammer *e* having the pin 23 moving in said slot and grooves, lever *f*, the link 27 between said link and the barrel extension, spring 29 and connections to said lever, rotating the catch *h* on said lever, the sear *i* having hooks 1, 2, a firing-pin, the trip-arm 3 on the catch *h*, the arm 4 on the catch *h* carrying the tripper *k*, and the trigger *l*, substantially as described.

39. A gun or other firearm having a longitudinally-movable barrel A and barrel extension B having side grooves 50, the breech-bolt



C, the links K, L, the link L having the slot 24, the member *e* having the pin 23 moving in said slot and grooves, and mechanism for actuating said member, substantially as described.

40. A gun or other firearm having the longitudinally-movable barrel A and barrel extension B having the side grooves 50, the breech-bolt C, the links K, L, the link L having the slot 24, the member *e* having the pin 23 moving in said slot and grooves, the lever *f*, the link 27 between said link and barrel, the spring 29 and connections to said lever, a catch forming a fulcrum for said lever and tripped for the return of the breech-bolt, and mechanism for actuating said member, substantially as described.

41. The combination with the longitudinally-movable barrel A, the breech-bolt C, and links K, L, of the slotted firing-pin *c* threaded on the front pivot of the link K, and the bar *d*, sliding in the link K, substantially as described.

42. The combination with the longitudinally-movable barrel A, breech-bolt C, and a breech mechanism having links K, L, of a carrier actuated by the links as they return to position to close the breech, substantially as described.

43. The combination with the longitudinally-movable barrel A, breech-bolt C, and a breech mechanism having links K, L, of a carrier having levers 33 and rearwardly-extending arms 34 pivoted on short arms 6 of said levers and actuated by the links, substantially as described.

44. The combination with the longitudinally-movable barrel A, breech-bolt C and a breech mechanism having links K, L, of a carrier consisting of plates *m*, *m'* carried by levers 33, and rearwardly-extending arms 34 pivoted on short arms 6 of said levers, and the lug 36 on the link K actuating said arms on its return to raise the carrier and returning the carrier by engagement with plate *m*, substantially as described.

45. The combination with the longitudinally-movable barrel A, breech-bolt C, and a breech mechanism having links K, L, of a car-

rier consisting of plates *m*, *m'* carried by levers 33, and rearwardly-extending arms 34 pivoted on short arms 6 of said levers, the lug 36 on the link K actuating said arms on its return to raise the carrier and returning the carrier by engagement with plate *m*, and wings 37 on the link K forming a cartridge-stop, substantially as described.

46. Carrier H consisting of plates *m*, *m'* carried by levers 33, and actuating-arms 34 pivoted on the short arms 6 on said levers, substantially as described.

47. The combination with a breech-bolt, magazine, carrier, and means for actuating the breech-bolt and carrier, of spring-pressed dog *n*, and sliding plate 38 actuated by the breech-bolt to depress the dog independently of the carrier, substantially as described.

48. The combination with the magazine F having a loading-opening near its forward end and a spring-pressed follower *o*, of the sliding fore-stock G normally closing said opening and connected to the follower whereby the fore-stock G carries the follower beyond said opening when drawn forward, substantially as described.

49. The combination with the magazine F having a loading-opening near its forward end and a spring-pressed follower *o*, of the sliding fore-stock G normally closing said opening and connected to the follower whereby the fore-stock carries the follower beyond said opening when drawn forward, and spring-catch 9 for holding the fore-stock, substantially as described.

50. The combination with the magazine F having a loading-opening near its forward end and a spring-pressed follower *o* having the lug 7 sliding in a slot in the magazine, of the sliding fore-stock G normally closing said opening and having the ring 8 engaging said lug 7, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HOWARD CARR.

Witnesses:

HOLLAND SMITH,  
JOHN FAUBEL.