No. 624,145.

Patented May 2, 1899.

F. K. YOUNG.

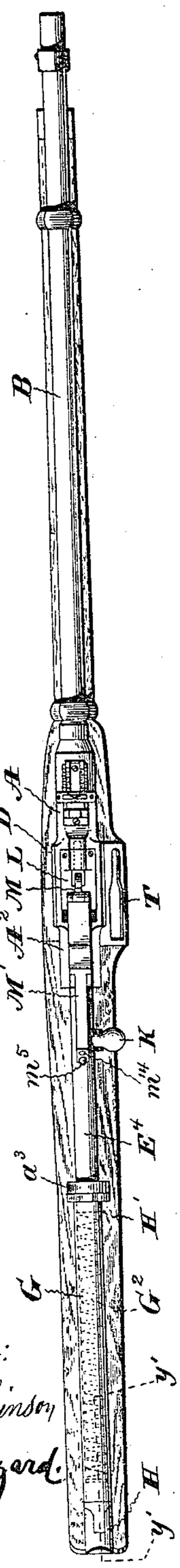
AUTOMATIC FIREARM.

(Application filed Nov. 22, 1897.)

(No Model.)

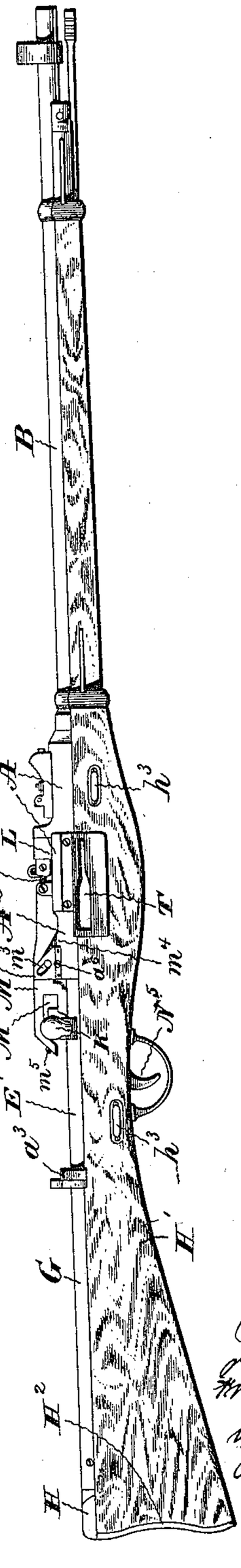
7 Sheets—Sheet 1.

Fig. 1.



Witnesses:
Jas. E. Hutchinson
Henry C. Hazard.

Fig. 2.



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No. 624,145. Patented May 2, 1899.

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(No Model.) 7 Sheets—Sheet 2.

Fig. 3.

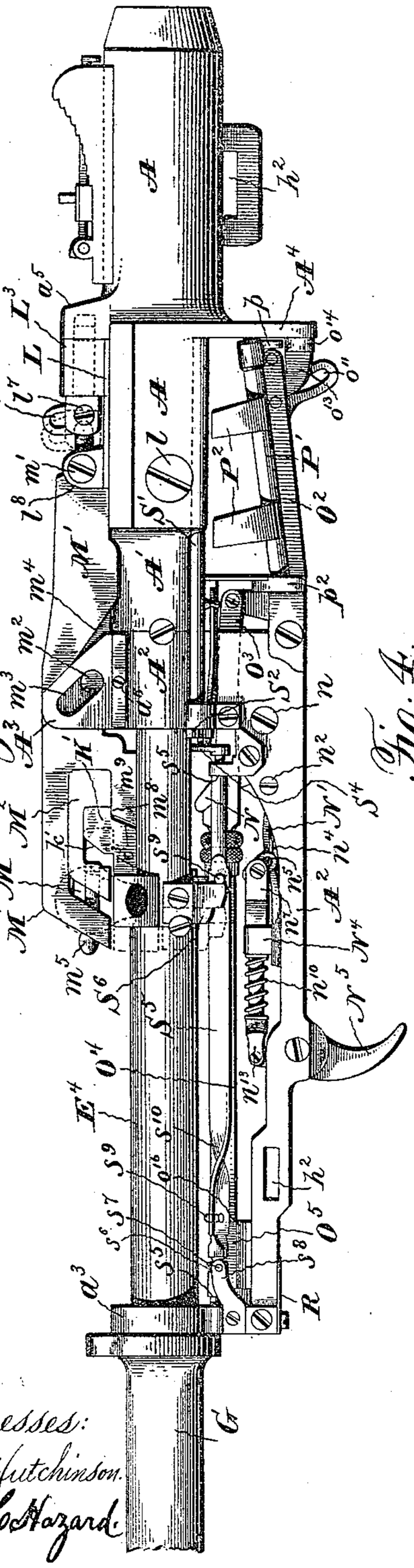
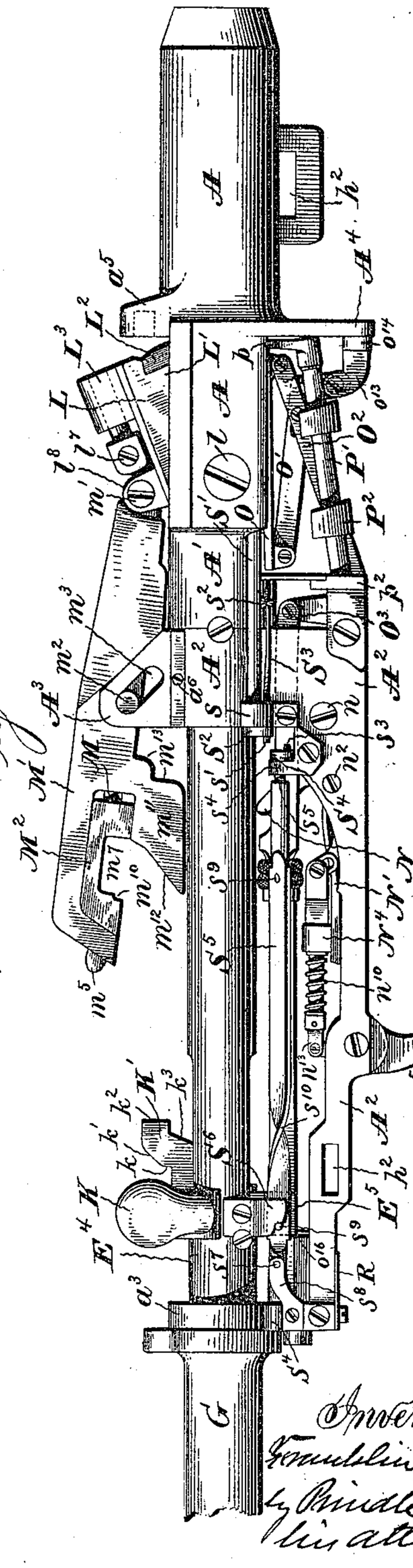


Fig. 4.



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No. 624,145. Patented May 2, 1899.

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AUTOMATIC FIREARM.

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(No Model.) 7 Sheets—Sheet 3.

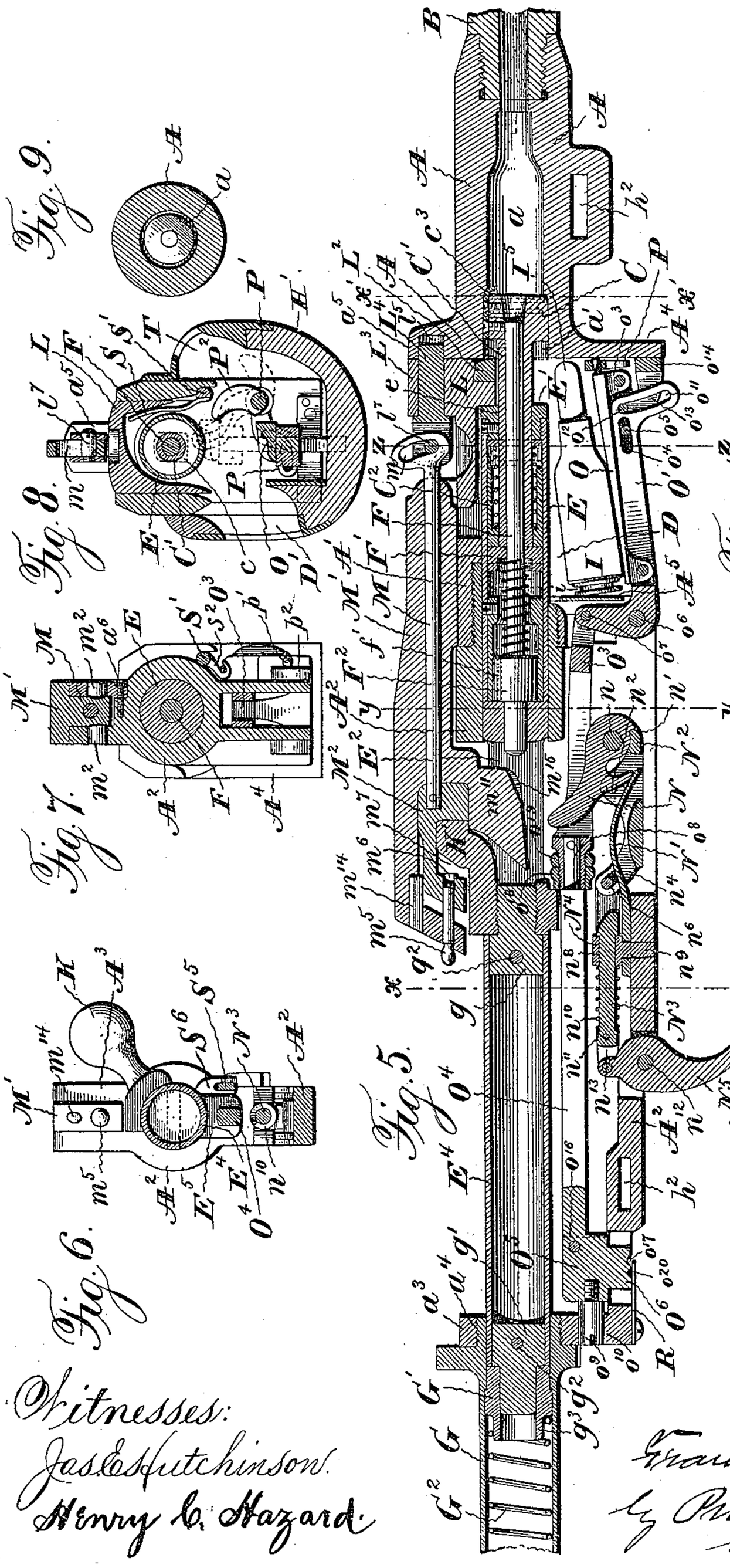

Fig. 9.

Fig. 8.

Fig. 11.

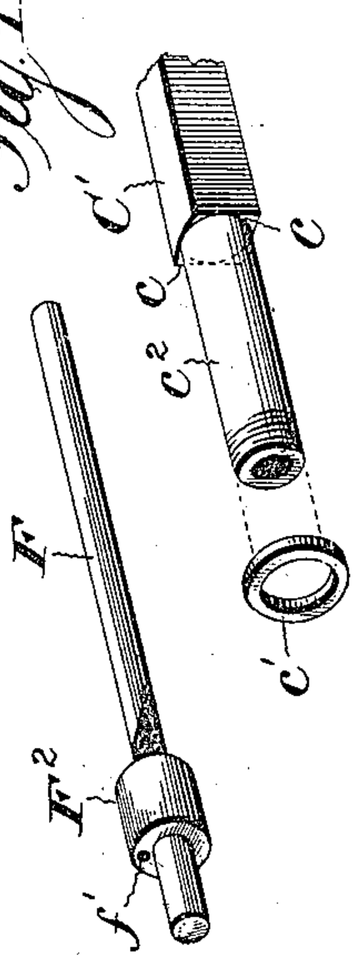

Fig. 11a.

Fig. 6.

Fig. 5.

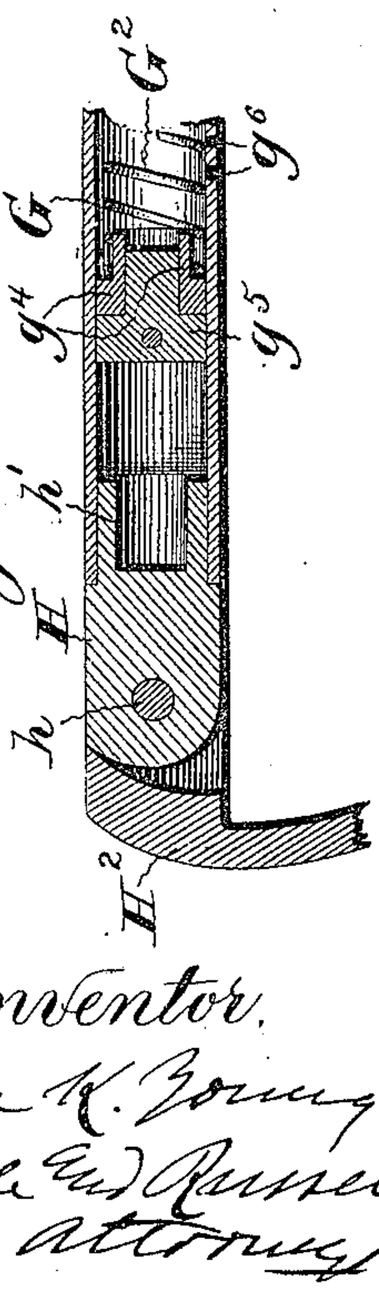

Fig. 10.

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(Application filed Nov. 22, 1897.)

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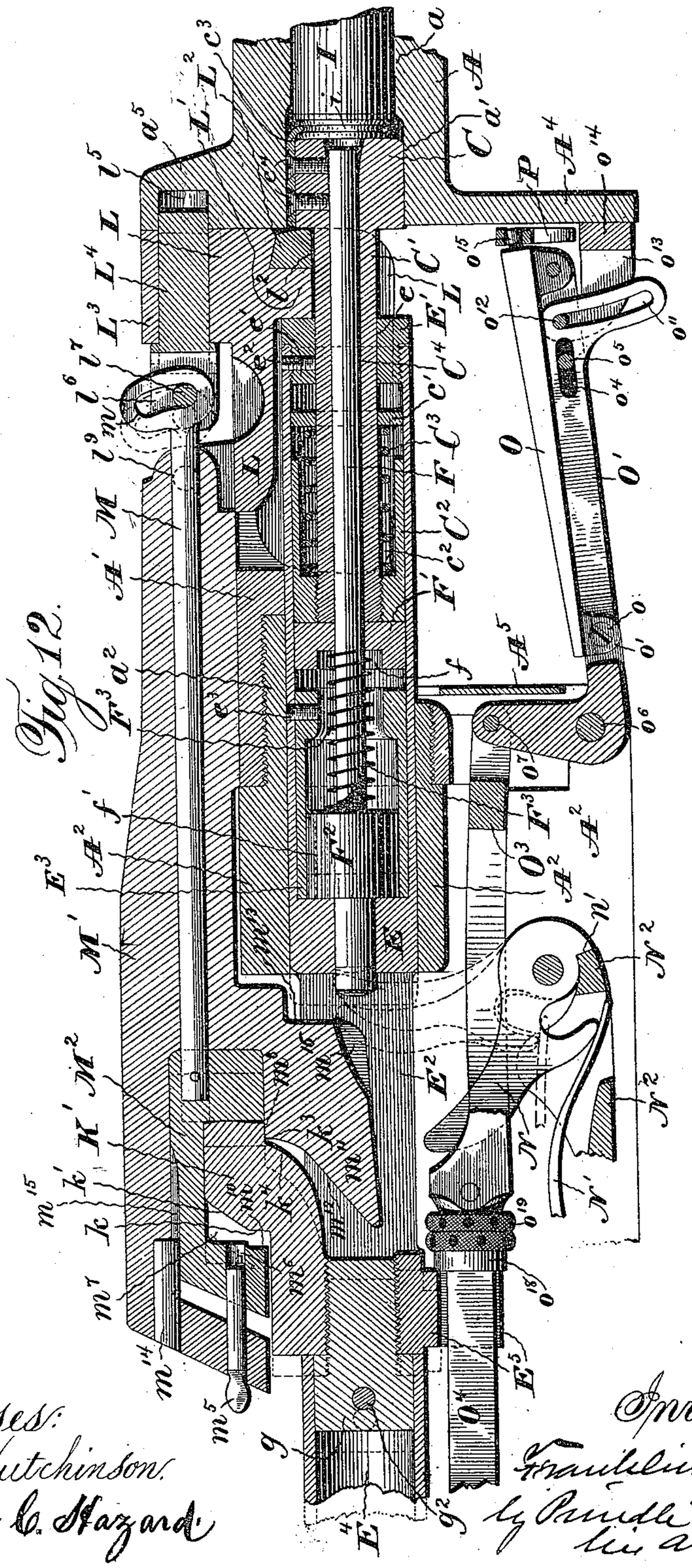
7 Sheets—Sheet 4.

Fig. 12.



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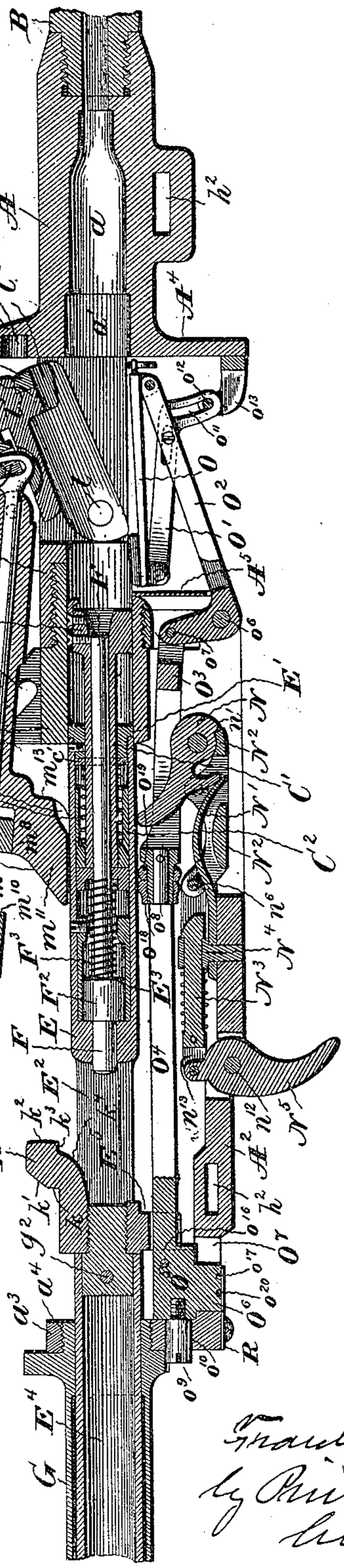
(No Model.)

7 Sheets—Sheet 5.

Fig. 13.



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(Application filed Nov. 22, 1897.)

(No Model.) 7 Sheets—Sheet 6.

Fig. 14.

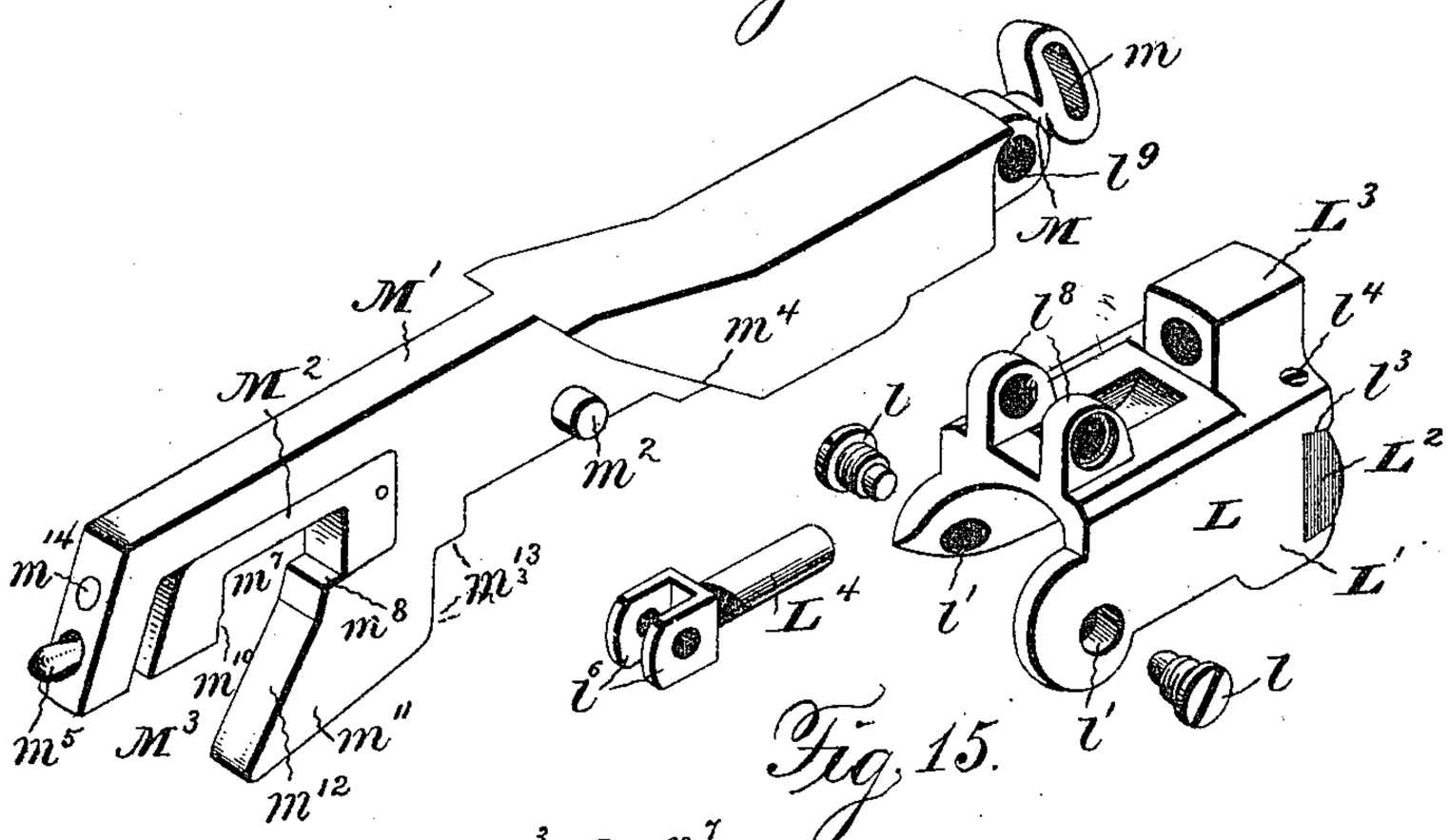


Fig. 15.

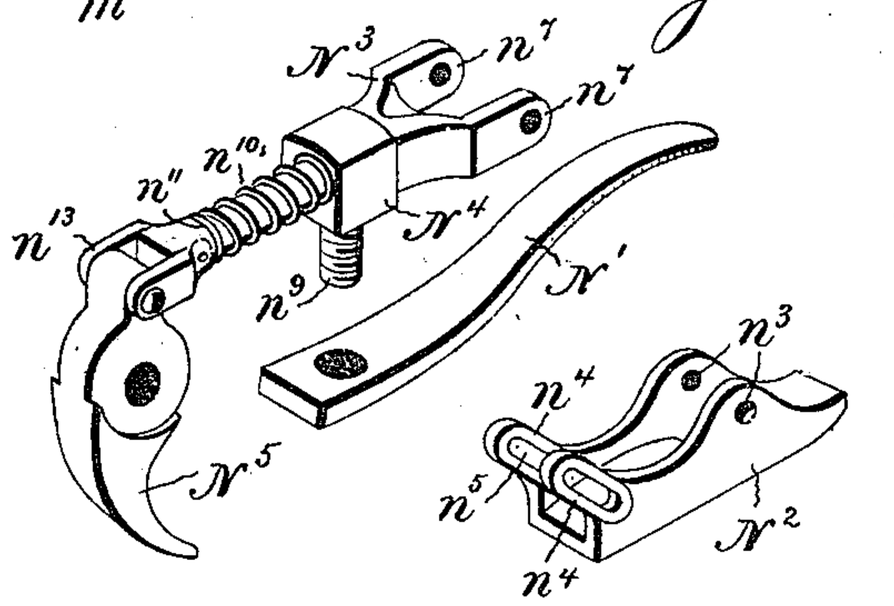
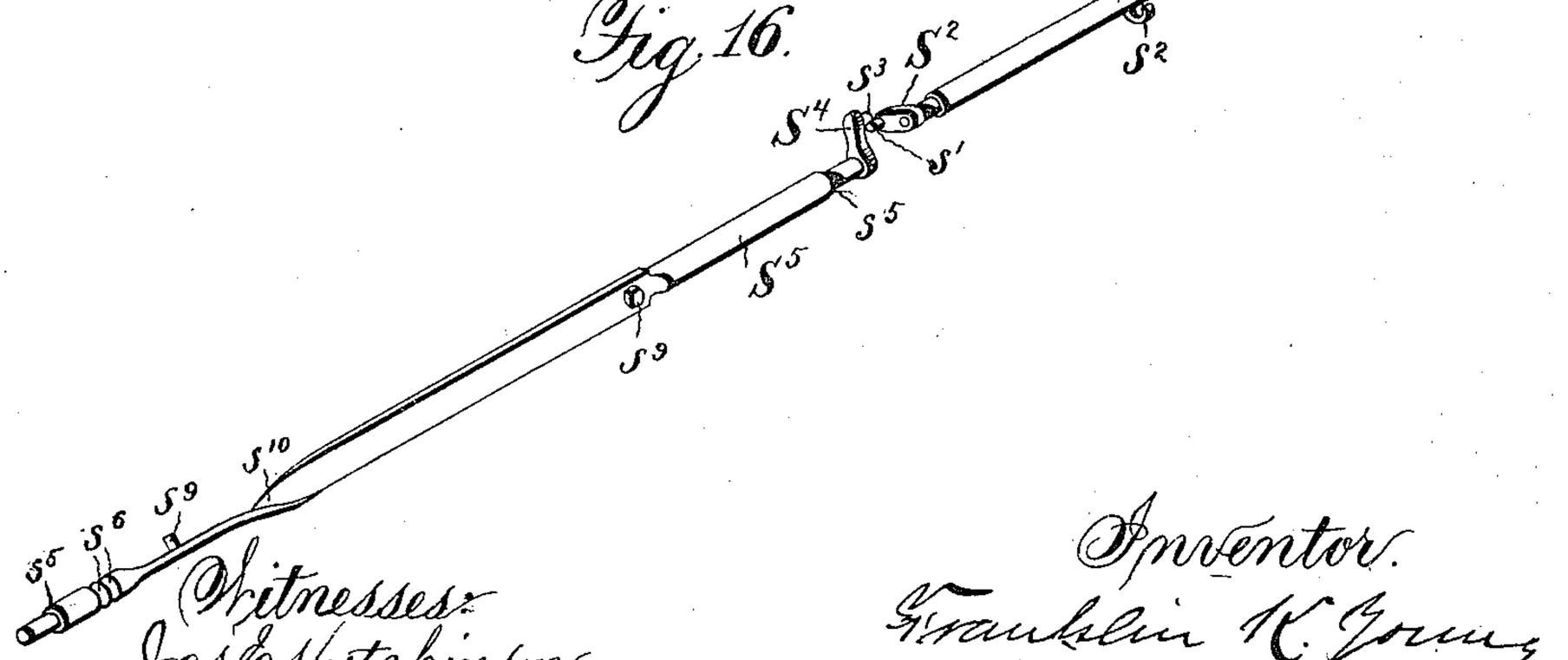


Fig. 16.



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(No Model.) 7 Sheets—Sheet 7.

Fig. 17.

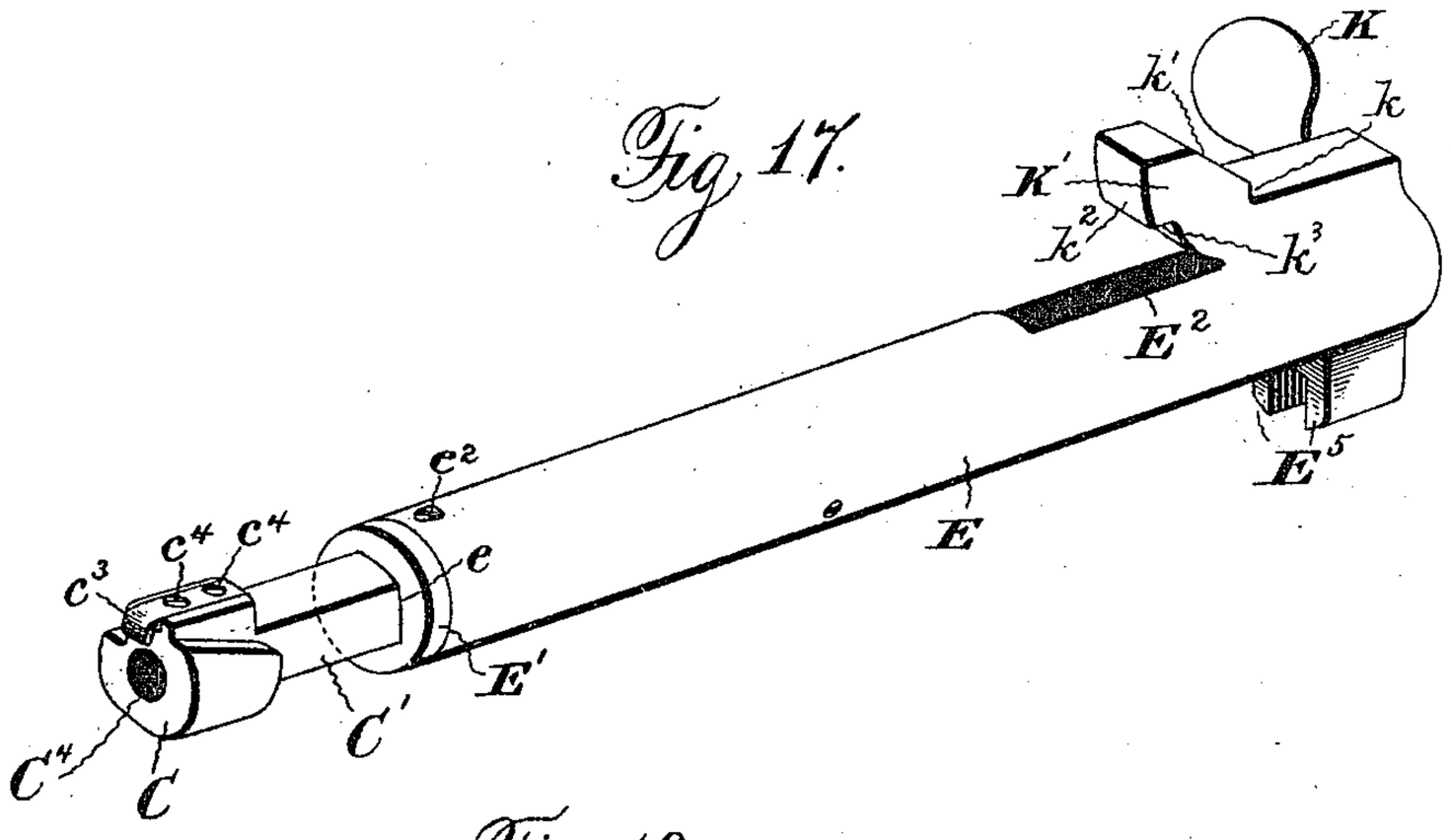


Fig. 18.

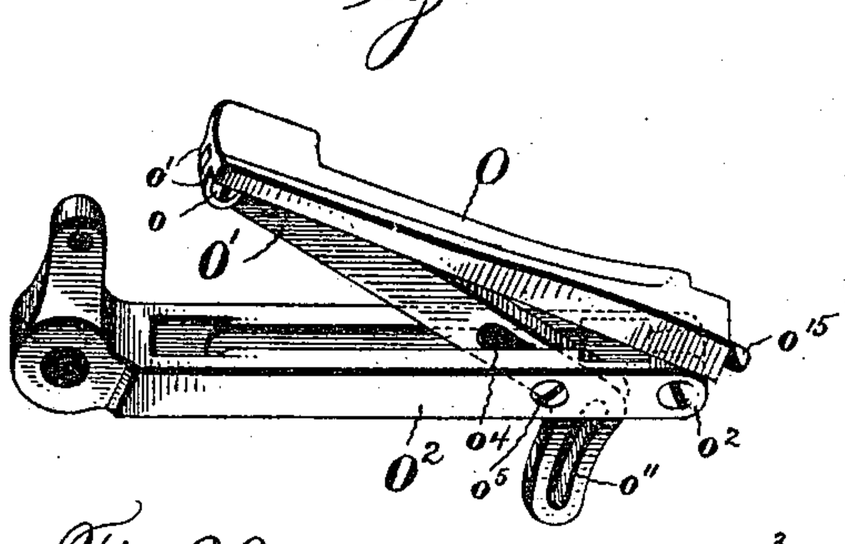


Fig. 19.

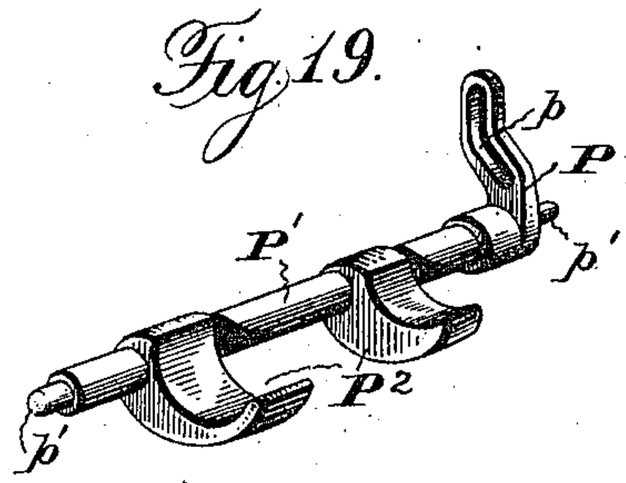


Fig. 20.

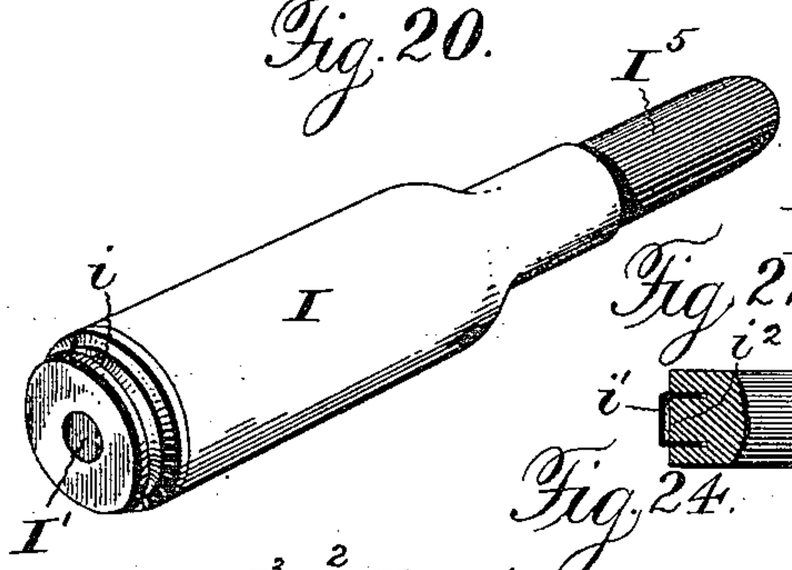


Fig. 21

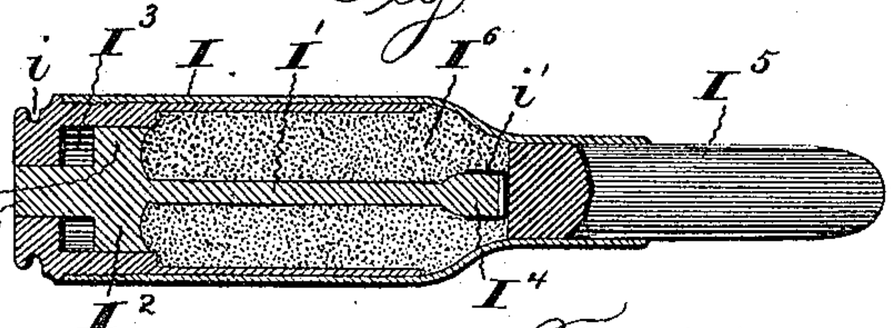


Fig. 22.

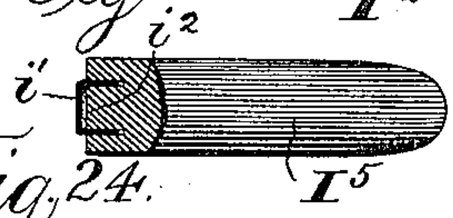


Fig. 23.

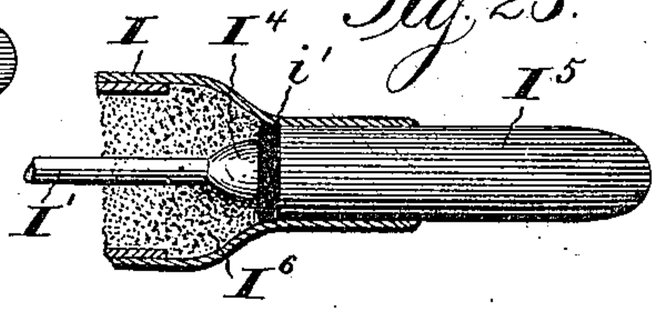


Fig. 24.

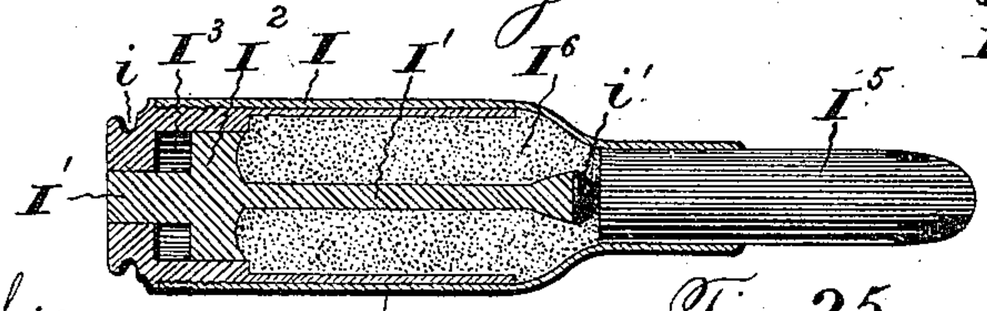
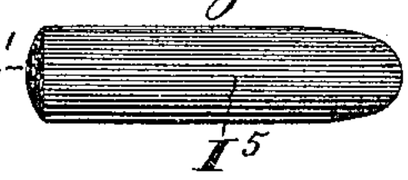


Fig. 25.



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UNITED STATES PATENT OFFICE.

FRANKLIN K. YOUNG, OF BOSTON, MASSACHUSETTS.

AUTOMATIC FIREARM.

SPECIFICATION forming part of Letters Patent No. 624,145, dated May 2, 1899.

Application filed November 22, 1897. Serial No. 659,502. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN K. YOUNG, of Boston, in the county of Suffolk, and in the State of Massachusetts, have invented certain new and useful Improvements in Firearms; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 shows a plan view of a military rifle or shoulder-gun with my improved mechanism applied thereto; Fig. 2, a view of the same in side elevation; Fig. 3, a view showing, in side elevation and on an enlarged scale, my breech mechanism with the stock or supporting-frame removed and a portion of the spring-containing tube or cylinder broken away, the parts of the mechanism being shown in position as when the gun is ready to be fired by a pull on the trigger; Fig. 4, a view similar to that shown in Fig. 3, but with the parts in position as when the breech mechanism is open; Fig. 5, a view of a vertical central longitudinal section of the mechanism as shown in Fig. 3, the breech-bolt being shown in full lines in the position occupied by it when there is no cartridge in the cartridge-chamber and in dotted lines in the position which it has when abutting against the base of a cartridge in place in the chamber for firing. Figs. 6, 7, 8, and 9 are views of sections on lines $x\ x$, $y\ y$, $z\ z$, and $x'\ x'$, respectively, of Fig. 5, Fig. 8 showing also a cross-section of the gun-stock; Fig. 10, a detail view showing, on an enlarged scale, a section on line $y'\ y'$ of Fig. 1; Figs. 11 and 11^a, detail perspective views of the firing pin or plunger and a portion of the breech-bolt, respectively; Fig. 12, a view showing, on an enlarged scale, a vertical longitudinal section of my breech mechanism with the trigger, the ejecting devices, the rear part of the piston of the secondary bolt, and the devices connected with such piston removed; Fig. 13, a view showing a longitudinal vertical section of the mechanism with the parts in position as shown in Fig. 4; Fig. 14, a detail perspective view, on an enlarged scale, showing separated from each other the locking-brace, the lock for such brace, and the rocking and sliding brace-actuating lever with its brace-lock-actuating slide; Fig. 15, a similar view showing the hammer, sear, hammer-spring, and the trigger with its connected sear-actuating slide; Fig. 16, a detail perspective view showing, on an enlarged scale, the ejector and the rocking and sliding device for actuating the same; Fig. 17, a similar view showing the breech-bolt and the secondary bolt; Fig. 18, a detail perspective view showing, on an enlarged scale, the cartridge-carrier; Fig. 19, a similar view showing the rocking cartridge-feeder; Fig. 20, a detail perspective view of my cartridge on an enlarged scale; Fig. 21, a view showing, partly in central longitudinal section and partly in elevation, one form of my cartridge; Fig. 22, a detail view, partly in section and partly in side elevation, of a form of bullet which can be used in my cartridge; Fig. 23, a detail view, partly in longitudinal section and partly in elevation, of the forward portion of another form of my cartridge; Fig. 24, a view showing, partly in longitudinal section and partly in elevation, another form of my cartridge; and Fig. 25, a view in elevation of another form of bullet for my cartridge.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention has been to provide an improved gun capable of use at will either as an automatically loading and firing repeating gun of great rapidity of fire or as one to deliver single shots, at the desire of the user, the time of firing being then dependent upon a pull on the trigger, as in single-shot or ordinary magazine guns; and to this end my invention consists in the mechanism and the construction, arrangement, and combination of the parts thereof, as hereinafter specified.

While I have shown my invention in the drawings and will describe it hereinafter as applied to a military rifle or shoulder-gun, I desire it to be understood that I do not limit myself to its application to such a form of gun, but contemplate applying it to other forms of gun, as to field artillery and rapid-firing guns for use on land or shipboard.

I also desire it to be understood that while I have shown and will describe hereinafter my invention as applied to a gun in which

the breech-closing bolt has a simple rectilinear movement I do not intend to limit myself in the application of my invention to such form of breech-closing device, but contemplate also using my mechanism for opening, closing, and locking the breech-closing device and for closing and firing the piece in connection with any desired form of movable breech-closer, whether the same is a bolt or block and whatever the direction of its movements to carry it into and from its breech-closing position may be.

Where a block or bolt having its movements to open and close the breech-block in a direction other than one in or substantially in line with the bore is employed, it should, as is usual in such blocks or bolts as heretofore known and used in firearms, have a firing-pin or movable firing device carried in or on it. Such firing pin or device would be adapted to engage the igniting-plunger in my cartridge, to be described hereinafter, and to be engaged by the end of the firing-plunger, which in my mechanism shown and described hereinafter is arranged to be struck by the hammer and to be driven rearward by the plunger in the cartridge when the latter is fired. In such case the force with which the igniting-plunger in the cartridge is driven rearward by the pressure of the gases of explosion would be transmitted to the firing-plunger, which in my mechanism shown in the drawings and to be described hereinafter serves, when driven rearward, to cause unlocking and retraction of the breech-bolt, cocking of the hammer, extraction and ejection of the fired cartridge-shell, and the feeding of a new cartridge up into position to be forced into the cartridge-chamber by the subsequent forward travel of the bolt.

In the drawings, A designates the forward portion of the frame for supporting the parts of my mechanism. Such portion has the barrel B screwed into its forward end (see Fig. 5) and contains the cartridge-chamber a and to the rear of such chamber a short cylindrical passage a' to receive the head C of the breech-bolt, to be described hereinafter. The rear end of the frame A has the cylindrical portion A′, with an internally-threaded opening in line with the passage a', into which is screwed the tubular part a^2 of the rear part A^2 of my mechanism-supporting frame.

Upon the rear end of the frame part A^2 is an upright arm a^3, which also has an internally-screw-threaded opening a^4 in line with the threaded opening in the cylindrical portion A′ of the frame above, into which is screwed the forward end of a tube or cylinder G for a purpose to be explained hereinafter.

The part A of the frame has to the rear of the passage a' a rectangular-shaped opening D extending up through it, the side walls of such opening being in the form of upright plates adapted to accommodate between them the locking-brace and other parts to be described hereinafter. At the forward end of opening D the frame A has a downwardly-extending plate-like portion A^4.

Guided and sliding in the bore of the tubular portion a^2 of the part A^2 of the frame is the hollow secondary bolt E, which carries secured to its forward end the head E′, provided with a central opening e, non-cylindrical and preferably, but not necessarily, rectangular in cross-section, through which slides the shank C′ of the breech-bolt C, the portion of such shank which passes and slides through the opening e being made to correspond in shape with the latter, so that the shank, and consequently the breech-bolt C, while being free to reciprocate cannot rotate with reference to secondary bolt E. The head E′ is preferably, though not necessarily, made with a threaded part e', screwed into the end of the secondary bolt and further secured by a screw e^2 passing through the walls of the tubular end of the secondary bolt and tapped into the threaded part of the head. (See Figs. 5, 12, and 17.)

Within the bore of the tubular part of the secondary bolt E the shank of the breech-bolt C is provided with a hollow head C^2, screwed to the rear end of the shank and extending forward around the latter, its interior chamber being of larger diameter than the shank, so as to leave room for a spiral spring C^3, surrounding said shank. At a short distance forward of the front end of this hollow head C^2 the breech-bolt shank C′ is provided with a shoulder c, (see Figs. 8 and 11^a,) against which normally rests a loose annular collar or washer c' on the cylindrical portion c^2 of the shank. The forward end of spring C^3 abuts against this collar or washer and presses it toward the shoulder c. With this construction if the breech-bolt C be held stationary and the secondary bolt E be drawn rearward the head E′ when it comes in contact with the washer c' will force it back, so as to compress the spring C^3, the stress of which will then tend to return the breech-bolt and secondary bolts toward their former relative positions either by forcing the secondary bolt forward on the shank of the breech-bolt or, if the latter be released and left free to move, by forcing it rearward with reference to the secondary bolt.

A central passage C^4, extending through the head and shank of the breech-bolt, receives the reciprocating firing pin or plunger F, the forward end of which is adapted to be projected beyond the front end of the breech-bolt, as hereinafter described, so as to engage and operate the firing device of a cartridge seated in the cartridge-chamber a. This firing pin or plunger extending rearward beyond the end of the breech-bolt shank and through the main bore of the secondary bolt has its rear end passing through a reduced passage in the latter bolt to the rear of the said main bore. At a short distance to the rear of such main bore the secondary bolt is

slotted vertically at E^2, (see Figs. 5, 12, and 17,) the slot thus made affording an opening through which the firing-hammer, to be described more fully hereinafter, can reach the rear end of the firing-plunger, which when the plunger is in its normal rearward position projects into the slot E^2, as shown in the drawings. (See Figs. 5 and 12.)

Fitting within the main bore of the tubular part of the secondary bolt is a sliding collar F′, loosely surrounding the firing-plunger and provided on its rear side with the recess *f*. To the rear of such collar F′ the firing-plunger carries, fixed upon or made in one piece with it, the collar or enlargement F^2, adapted to abut against the rear end of the main bore of the secondary bolt E when the firing-plunger is in its normal rearward position with its end projecting back into the slot E^2, as hereinbefore described. A spiral spring F^3, with its forward end seated within the recess *f*, surrounds the plunger between the collar or enlargement F^2 and the sliding loose collar F′, and by its pressure on the collar or enlargement F^2 tends to hold the latter rearward seated against the bottom or end of the main bore of the secondary bolt. When the breech-bolt is not engaging and being held rearward by a cartridge in the chamber *a′*, the pressure of the spring F^3 upon the loose sliding collar F′ forces it, and consequently the breech-bolt C, forward with reference to the secondary bolt until the loose collar *c′* on the shank of the breech-bolt comes in contact with the inner or rear end of the head E′ on the secondary bolt, as shown in Figs. 5 and 13. The spring C^3, being stronger than the spring F^3, prevents further forward throw of the breech-bolt with reference to the secondary bolt by the spring F^3.

The fixed collar or enlargement F^2 on the firing-plunger fits and slides within the tubular bushing or bearing-piece E^3, fixed within the secondary bolt by a screw e^3 or otherwise, if desired, and is provided with a small opening *f′*, extending through it, to admit the passage of air by it as it reciprocates within the bushing, and so prevent the formation of any air-cushion or vacuum to retard the movements of the firing-plunger.

To the rear of the slot E^2 the secondary bolt has secured to it the extension E^4, forming a piston, which at its rear end extends into and is guided in the forward end of the tube or cylinder G, screwed into the threaded opening a^4 of the upright arm a^3 of the frame part A^2, hereinbefore described. Preferably, but not necessarily, the extension or piston E^4 is made hollow, as shown, and with solid pieces *g* and *g′* secured in its opposite ends by means of pins g^2 g^2 or otherwise, as desired. Both of such pieces have their parts which project beyond the ends of the body of the piston E^4 reduced in size, the one *g* having its projecting part threaded and screwed into the rear end of the body of the secondary bolt, as shown in Figs. 5 and 12.

Upon the projecting portion of the rear piece *g′* within the cylinder G is the tubular follower or piston-head G′, fitting the cylinder-bore and having on its rear side a projection g^3 to act as a guide and steadier for the forward end of the spiral spring G^2, which, extending rearward within the cylinder, has its rear end abutting against a bearing g^4 on the piece g^5, fixed within the cylinder near the rear end thereof. Just forward of the bearing g^4 and piece g^5, which serve to close the cylinder, I make one or more air-ports g^6 g^6 through the cylinder-walls to allow air to escape from and flow into the cylinder as the piston or extension E^4, with its follower or head G′, moves rearward and forward within the cylinder. The port or ports used are of such size that as the piston E^4 travels rearward the air can escape from the cylinder with such speed that the movement of the piston will be slowed down, but not checked, by the air-pressure, as it would be by the air-cushion which would be formed were the cylinder without any air port or ports g^6. The rate at which the piston, and consequently the secondary bolt and breech-bolt, will travel rearward under the influence of pressure or of their momentum will be regulated by the area of the port or ports used, being proportionate to the possible rate of flow of air through the latter. As the bolt extension or piston E^4, with the follower or head G′, moves rearward in the cylinder G the spring G^2 is compressed so that it will by its stress act subsequently to return the piston and head, and consequently the secondary bolt, to their normal forward positions after the rearward momentum of such parts has been overcome.

The cylinder G is to be held against rearward movement by being supported on or against any suitable abutment, the arrangement and construction of which can be varied as desired, according to the kind or construction of the gun to which my invention is to be applied. As shown in the drawings, its rear end is engaged by the piece H on the upper side of the gun-stock H′, such piece being pivoted to an arm of the butt-plate H^2 by a pin *h*. This pivoting of the piece H is only for convenience in putting in place or detaching my mechanism from the gun-stock. With the part so pivoted it can be swung upward, so that its reduced portion *h′* can be readily inserted in the rear end of the cylinder G, and then the piece, with the cylinder and all the parts of my mechanism, with the frame A, A′, and A^2, can be swung down into place in the grooves and cavities provided in the stock for their reception. For securing the frame in place in the stock when so swung down I provide such frame with the transverse keyways h^2 h^2, adapted to be engaged by sliding keys h^3 h^3 of the usual well-known form employed for securing the frames and parts of gun mechanisms to gun-stocks.

The breech-bolt C is at its forward end provided with a cartridge-extracting hook c^3,

which, as shown, is fastened to the bolt-head by screws c^4 c^4 and projects forward and downward over the front face of the bolt, so as to be adapted to engage with its hooked end the annular groove in the head of what is known as a "flangeless" cartridge. This cartridge I, which I have shown in the drawings, has the usual groove i for engagement by the extractor-hook, but in other respects and details, to be explained hereinafter, differs from the cartridges heretofore used.

The secondary bolt E is at a point to the rear of the tubular part of the portion A^2 of the frame through which it passes provided with a projecting handle or arm K, by which it can be moved back and forward, as desired, to open and close the breech mechanism. It has also fixed on its upper side, to the rear of the frame part A^2, an arm K', which projects upward and forward from the rear end of the slot E^2. This arm has on its rear side the short upright or abrupt shoulder k and the upwardly and forwardly inclined surface k' above such shoulder, while on its front side it has the upright face k^2 on its upper end, and just below such face a shoulder k^3, substantially in a plane parallel with the line of movement of the secondary bolt. From the rear end of this shoulder the arm has an inclined face k^4 extending rearwardly and downwardly and being preferably rounded or convexed, as shown. This incline is continued down into the slot E^2. (See Figs. 5 and 12.)

For locking and holding the breech-bolt C in closed position with its forward end resting against the base of a cartridge in the chamber a' I provide the swinging locking-brace L, (see Figs. 5, 12, 13, and 14,) pivoted to the sides of the frame A by the pivot screw-pins l l, tapped through the frame sides and having cylindrical portions engaging holes l' l' in opposite sides of the rear portion of the brace. This locking-brace, being cut away underneath to accommodate the forward portion of the secondary bolt E when the brace is down in position to lock the breech-block, as indicated in Figs. 5, 8, 12, and 14, has its forward portion L' adapted to pass well down behind the rear face of the breech-bolt head C, said portion L' being cut away centrally at l^2 to stride the shank C' of the breech-bolt just to the rear of the head C.

To enable the locking-brace to best resist wear, I prefer to have the part of it which engages the breech-bolt formed of a block L^2 of hardened metal, secured in any desired way in a suitable recess in the brace. As shown in the drawings, the wearing-block is inserted in a dovetailed groove l^3 in the brace and secured by one or more screws l^4. This construction, though not necessary, is desirable as allowing the block to be readily removed and replaced by a new one.

On top of the locking-brace is a projection L^3, having in it a longitudinal passage for the bolt L^4 of the lock for the locking-brace, such bolt being adapted when the locking-brace is down in its breech-bolt-holding position to enter an opening l^5, provided for it in the projection a^5 on the frame A. This bolt L^4 has on its rear end beyond the projection L^3 the two ears l^6 l^6, provided with a pin l^7, which passes through them and through the slot m in the forward end of the locking-bolt-actuating rod M, which projects in between such ears. This rod M is carried by and reciprocates in a swinging and sliding lever M', which at its forward end is pivotally connected with the locking-brace by pivot-pins m' m', screwed into ears l^8 l^8 on the locking-brace L and having cylindrical portions engaging the holes l^9 l^9 in the sides of the end of the lever M'.

The slot m in the forward end of the rod M is intended and adapted to allow for the relative swing of the locking-brace and the lever M' as they are both swung up or down to throw the brace into and out of breech-bolt-locking position in the manner to be described.

The lever M' has a sliding fulcrum formed of the two pivotal studs or bosses m^2 m^2 on opposite sides of the lever engaging the upwardly and rearwardly inclined slots m^3 m^3 in the uprights A^3 A^3 on the part A^2 of the mechanism-supporting frame. These uprights can be both formed in one piece with the frame part A^2; but I prefer for convenience in assembling the parts to make at least one of them separate from the frame and attach it to the latter by one or more screws a^6, as indicated in Figs. 3, 4, and 7. The forward sides of the two uprights are inclined rearward and upward, and the lever M' has on opposite sides upwardly and rearwardly extending inclined faces m^4 m^4 to ride up over the inclines on the uprights A^3 A^3 as the lever is drawn rearward. These inclined faces m^4 m^4 are not quite straight, but are rounded or convexed, so that they can both slide over and rock on the inclines on the uprights as the lever M' both moves rearward and swings to let its forward end move backward and downward with the ears l^8 l^8 as the locking-brace L swings to lift its breech-bolt-engaging forward portion up away from the breech-bolt.

The rear end of the rod M, extending through a guiding-passage in the brace-actuating lever M', is attached to a block M^2, reciprocating in a recess M^3 in the rear portion of the lever. This block, having its front end fitting and guided in a correspondingly-shaped part of the recess M^3, has its rear end supported upon a pin m^5, fixed in the lever M' and engaging a guide-opening m^6 in the block. In the under side of this block is a recess m^7, which when the lever M' is down in position, as when the breech mechanism is closed, (see Figs. 3, 5, and 12,) receives the arm K' on the secondary bolt, the space within such recess being of greater length from front to rear than the part of arm K' which projects into it, so that such arm can have some

movement with the secondary bolt independent of the block M². The forward end of the arm K′ when moved to force the block M² forward projects so as to bring its shoulder k^3 over the shoulder m^8 on the lever in position to lock the lever securely from any upward movement. To the rear of the shoulder k on the arm K′ the block M² has a shoulder m^{10}, adapted to be struck by the arm-shoulder as the secondary bolt is moved rearward to take the arm-shoulder k^3 off of the lever-shoulder m^8. The engagement of the arm with the block-shoulder m^{10} then forces the block M² back to actuate the rod M to withdraw the locking-brace fastening-bolt L⁴, so as to leave the brace free to be swung up by the subsequent movement of the lever M′.

Below the recess M³ the lever M′ has a downwardly and rearwardly extending arm m^{11}, which when the lever is down in the position shown in Figs. 3, 5, and 12 projects into the slot E² in the secondary bolt E. Such arm has on its rear side the downwardly and rearwardly inclined cam-face m^{12}, to be engaged by the arm K′ on the secondary bolt, and on its front side the rounded cam-face m^{13}, to be engaged by the forward end of the slot E², when the lever M′ is down in the position shown in Figs. 5 and 12 and the secondary bolt E is drawn or forced rearward far enough to carry the shoulder k^3 on the arm K′ to the rear of the shoulder m^8 on the lever M′. The block M² can, if desired, be further guided in its reciprocations within the recess M³ on the lever M′ by means of a pin m^{14}, passing through a suitable opening and groove in the rear part of the lever and engaging a groove m^{15} in the top of the block. (See Figs. 5 and 12.)

The lower and forward side of the arm m^{11} is slotted at m^{16} to allow the passage of the striking end of the hammer N to reach and strike the rear end of the firing-plunger F when the breech mechanism is closed and the lever M′ is down in its normal position. This hammer, being pivoted upon the pin n, supported on the part A² of the frame, is engaged and actuated by the spring N′, also secured to said frame part, and has a shoulder n', to be engaged by the nose of the sear N², pivoted to the frame by pins n^2 n^2 on the latter engaging pivot-holes n^3 n^3 in the sear sides. As shown, (see Figs. 5 and 15,) such sear is slotted or cut away to admit the passage of the mainspring N′ forward to the hammer and has on its rear end two slotted ears n^4 n^4, provided with the inclined slots n^5 n^5, engaged by the inner ends of pins n^6 n^6, screwed or, if desired, otherwise fastened to the arms n^7 n^7 of a fork formed on the forward end of the sliding sear-tripping device N³, which has its shank guided and sliding in a passage n^8 in the block N⁴, secured to the frame part A² by a screw-shank n^9, tapped into the latter. This screw-shank also passes through the mainspring N′, so that it and the block N⁴ serve to securely fasten the rear end of the mainspring in place.

A spiral spring n^{10}, surrounding the sear-tripper shank and at opposite ends engaging, respectively, the block N⁴ and a shoulder n^{11} on such shank, serves to force and normally hold the sear-tripper rearward to keep the hammer-engaging nose of the sear pressed upward against the hammer-cam by the stress of the spring n^{10}. The sear will be thus held pressed against the hammer-cam with a yielding pressure, so that its nose will fly up behind the shoulder n' when the hammer is cocked and will remain in engagement with such shoulder until the sear is rocked by the engagement of the pins n^6 n^6 with the inclined slots n^5 n^5 as the sear-tripping device N³ is forced forward by a swing of the trigger N⁵, which is pivoted to the frame part A² by the pin n^{12} and has its upper end pivotally connected with the arms n^{13} n^{13} of a fork on the rear end of the tripper-shank by a pin passing through such arms and an opening in the trigger.

To raise a cartridge up into the space D, within the part A of the frame, into position to be forced by the breech-bolt C into the cartridge-chamber a, I provide a rising-and-falling cartridge-carrier, having the cartridge receiving and supporting table O, having its rear end pivotally supported on the end of the lever O′ by a pin o passing through ears o' o' on the table and a perforated end of the lever between such ears and its forward end pivotally connected with a second lever O² by a pin o^2 passing through a lug o^3 on the table and the fork-arms of the latter lever. The lever O′ passes downward and forward between the fork-arms of the lever O² and is connected therewith by a slot o^4 in it engaging a pin o^5, carried by said lever fork-arms.

The lever O², being in the form of an elbow-lever, is pivoted at its angle to the frame A² by means of the pivot-pin o^6 and has its upright arm pivotally connected with the forward end of the piece O³ by pin o^7. This piece O³, which is slotted to admit the passage of the hammer N, has its rear end provided with a socket, in which is fastened the reduced shank o^8 of the bar O⁴, which is supported at its rear end by a head O⁵, sliding upon a portion of the frame A² and having a lug O⁶ projecting down through a slot O⁷ in such frame. The head O⁵ is kept down in place upon its supporting-surface, while left free to reciprocate thereon, by a guide-pin o^9 on the head engaging a guide-opening o^{10} in the upright part a^3 of the frame. The lever O′ has in its forward and lower end a curved slot o^{11}, engaged by a pin o^{12}, supported by lugs o^{13} o^{13} on a piece o^{14}, secured to the inner face of the part A⁴ of the frame at the forward end of the space or opening D in the frame.

Upon the forward end of the cartridge-carrier table O is a stud or pin o^{15}, engaging a slot p in the arm P, attached to or formed on the rock-shaft P′, having on its opposite ends pintles p' p', journaled, respectively, in a

bearing in the frame part A^4 and in a bracket p^2, secured to the frame part A^2. This shaft carries the two curved cartridge-feeding arms P^2 P^2, adapted, when rocked back away from the table O, to receive a cartridge within their concave sides and then to deliver such cartridge over onto the table when the shaft P′ is rocked to carry said arms inward. The rock-shaft is situated so as to be close beside the table when the latter is down, and the slot p in the arm P is so arranged that the engagement of the pin or stud o^{15} therewith will cause the shaft to be rocked to carry the arms P^2 P^2 outward and inward as the table rises and falls. The slot p is so formed that as the table descends the pin or stud o^{15}, passing down in the slot, will not cause the arm P, and consequently the rock-shaft P′, to be turned to carry the arms P^2 P^2 inward until just before the table comes to rest, and then the shaft will be rocked quickly to cause the arms to throw over upon the table O any cartridge which they may be engaging with their concave sides. The curvature of the slot o^{11} in the lever O′, engaged by the stationary pin o^{12}, is such that as the lever O^2 is rocked to raise its forward end, and consequently that portion of the table O connected with the latter lever, the lever O′ will also be rocked to raise its rear end to elevate the rear end of the table, the relative movements of the two levers O′ and O^2 being such that the table is, without being tilted, raised to carry the cartridge on it up into the desired position in front of the breech-bolt and with its bullet end in position to enter the cartridge-chamber a. (See Figs. 4 and 13.)

The bar O^4 is reciprocated to cause the cartridge-carrier table O to be raised and lowered at the proper times with reference to the movements of the breech-bolt C and secondary bolt E by an arm E^5, carried by the secondary bolt and forked to embrace the bar O^4. With the cartridge-carrier table down and the bar O^4 forward in its normal position, as shown in Figs. 3 and 5, as the secondary bolt E is drawn or forced rearward the arm E^5 just before the bolt reaches the limit of its rearward movement to retract the breech-bolt C strikes a shoulder o^{16} on the head O^5 and forces the latter rearward into the position shown in Figs. 4 and 13, so as to suddenly retract the bar O^4 and quickly rock the lever O^2 to lift the carrier-table O. The head O^5 and bar O^4 are held as thus retracted by the nose of the spring-pawl R engaging the notch o^{17} in the lug O^6 of the head O^5. To move the bar O^4 forward again to cause the carrier-table to be dropped as the secondary bolt approaches the limit of its forward movement, I provide a collar o^{18}, which is adapted to be engaged at the proper time by the forward side of the arm E^5 on the secondary bolt, as shown in Figs. 3, 5, and 12. This collar is a screw-threaded one screwed upon the rear portion of the piece O^3, which is connected and moves with the bar O^4, as hereinbefore described. This construction and arrangement of the abutment to be engaged by arm E^5 is not necessary, though I prefer it as being one allowing of adjustment of surface to be engaged by said arm E^5 to take up any wear. The collar o^{18} can be screwed forward and back upon the piece O^3 and can be securely fastened at any adjustment by the set-nut o^{19} being screwed up against it.

When moved in the manner just above described to cause the cartridge-carrier to be dropped to its normal depressed position, the bar O^4 is retained in its forward position not only by the weight of the carrier, but also by the nose of the spring-pawl R engaging the rearward notch o^{20} in the under side of the lug O^6 on the bar-head O^5.

An upright transverse plate A^5, secured to the frame part A^2, serves as an abutment and guide for the base or rear end of a cartridge resting on the carrier-table O.

To eject a cartridge-shell withdrawn from the chamber a by the extractor-hook c^3 when the breech-bolt C is retracted, I provide a rocking ejector having the shell-engaging plate S, carried by a rock-shaft S′, journaled at its forward end in a bearing in the frame and having its rear end supported in and extending through a bearing-piece s, secured to the frame part A^2. (See Figs. 3, 4, and 8.) The plate S is adapted when swung upward to stand to one side of the path of the breech-bolt C and secondary bolt E, as indicated in full lines in Fig. 8. From this position it can be swung by the rocking of the shaft S′ down to that indicated by dotted lines in said figure, so that in its swing it will force the cartridge-shell away from the extractor-hook c^3 and throw it downward and outward from the space D and out through an ejector-opening D′ in the stock H′. (Indicated in dotted lines in Fig. 1.) The shaft S′ bears upon its rear end, beyond the piece s, a crank-arm S^2, carrying a pin s'. It also has a hook-shaped arm s^2, engaged by a spring S^3, which has one of its ends secured in the bearing-piece s and its other free end seated in the hook of the arm s^2, so that its stress will tend to swing the latter arm inward in a direction to rock the shaft S′ to carry the plate S up into its retracted position, as shown in Fig. 8. To the rear end of the crank-arm S^2 is another crank-arm S^4, carrying an elongated lug s^3 to engage the pin s'. This arm S^4 is fixed on a sliding and rocking shaft S^5, journaled and sliding at its forward and rear ends, respectively, in bearing-pieces s^4 s^4, secured to the frame part A^2. To limit the sliding or longitudinal movement of the shaft in these bearing-pieces, the portions of the shaft engaged by the latter are preferably made smaller than the main part of the shaft, so as to leave the shoulders s^5 s^5.

As shown in Figs. 3 and 4, the shaft S^5 is out of line with the ejector-shaft S′, so that the paths of the lug s^3 and pin s' are eccentric to each other as the two shafts are rocked

on their bearings, and the lug s^3 is so arranged on the crank-arm S^4 that when the shaft S^5 is moved forward in its bearings and is rocked to carry the lug s^3 outward and downward such lug will first engage the pin s' on the crank-arm S^2 and force it outward to cause the shaft S′ to be rocked to carry the ejector-plate downward from its normal retracted position, and then will pass off of such pin to allow the shaft S′ to be rocked back again by the stress of the spring S^3. The rearward movement of the shaft S^5 in its bearings, allowed for in the manner hereinbefore described, is adapted to take the lug s^3 to the rear of the pin s', so that the shaft S^5 can be rocked back to its first position without engagement of the lug and pin. (See Fig. 4.)

To hold the shaft S^5 in its rearward and forward positions, respectively, until it is moved longitudinally by some power applied to it, I provide it with the two annular grooves s^6 s^6 to be engaged by the pin s^7 on the spring-pawl s^8, secured to the rear bearing-piece s^4. The pin s^7 snaps into the rear or forward one of these notches when the shaft S^5 has been moved forward or rearward and holds the shaft from longitudinal movement, while leaving it free to rotate.

In order that the shaft S^5 may be moved forward and rearward longitudinally as the secondary bolt E approaches, respectively, the forward and rearward limits of its reciprocation, I provide the shaft with the two pins s^9 s^9, adapted to be engaged by the arm S^6, secured to the secondary bolt.

In order to secure the proper rotary movement of the shaft S^5, a portion of the latter is flattened or made non-cylindrical in cross-section and the arm S^6 is forked to embrace the shaft, as shown in Figs. 3, 4, and 6. The rear part of this flattened or non-cylindrical part of the shaft is twisted, as shown at s^{10}, so that the forked arm S^6 engaging it will cause the shaft to be rocked to carry its arm S^4 outward and inward, as the secondary bolt approaches and moves away from the limit of its rearward movement. The engagement of the pawl-pin s^7 with forward or rearward groove s^6 serves to hold the shaft S^5 in its rearward or forward positions until the arm S^6 engages the forward or rearward one of pins s^9 s^9.

The cartridges which are to be fed to the cartridge-lifting carrier-table O are to be guided from any suitable magazine or source of supply down the cartridge-passage T, so that the lowest or first of them will rest against the outer curved convex sides of the arms P^2 in position to fall upon the inner concave sides of the latter when the arms are rocked backward by the rocking of the shaft P′, caused by the retraction of the secondary bolt E, by the means and in the manner hereinbefore described. The curvature of the outer sides of the arms allows them to be rocked back easily past the lowest or first of the cartridges which, when the arms are swung rearward, rests against them. The arms are of such length and form as to take only this one cartridge from the supply and carry it inward upon the table O as the arms swing inward again after such table has dropped to its normal depressed position again.

The cartridge I, which I use with my gun mechanism and which, as indicated hereinbefore, is preferably, though not necessarily, of the so-called "flangeless" kind, with a groove *i* to be engaged by the extractor-hook c^3, has within it a plunger I′, adapted to reciprocate in and project through a central opening in the cartridge-head and carrying an enlargement in the form of a piston I^2, fitting and movable in the passage I^3 within the cartridge-shell. To the front of this piston the plunger has a shank I^4, which, extending forward within the shell, is adapted at its forward end to act as an exploder to fire the cartridge-igniting primer. As shown in Fig. 21, such a primer, represented at *i*′, is placed over the end of the plunger-shank and is adapted to be exploded by being driven against the base of the projectile I^5 held in the front end of the cartridge-case. With this arrangement the cartridge charge of explosive I^6 will be ignited at its forward end, so that the best effect in propulsion of the projectile will be secured when the cartridge is fired.

The rear end of the plunger I′ is adapted to be engaged and driven forward by the hereinbefore-described firing-plunger F of my mechanism, as such latter plunger is driven forward by the blow of the hammer N after the closing and locking of the breech-closing devices, and to drive the firing-plunger rearward as the pressure of the gases of explosion within the cartridge forces the piston I^2 rearward in the passage I^3. The pressure of the gases thus transmitted to the firing-plunger F drives the latter rearward with such force and momentum that it acts through the secondary bolt to unlock and open the breech mechanism and actuate the other parts in the manner to be described hereinafter.

The primer *i*′ to be exploded by the igniting-plunger I′ can, as indicated in Fig. 22, be placed upon a suitable anvil i^2 in the rear end of the projectile or can be in the form of a percussion-disk resting against the projectile-base, as indicated in Fig. 23. It can also, if desired, be in the form of a pellet attached to the forward end of the shank of plunger I′, as shown in Fig. 24, or to the base of the projectile, as indicated in Fig. 25.

While the cartridge-shell can be made in one piece in the ordinary way, if desired, I prefer to make it as shown in the drawings—that is, with an outer and inner shell, the inner one of which carries the cartridge base or head and is screwed into the outer part, the rear end of the latter being for that purpose threaded interiorly to be screwed upon the threaded rear portion of the inner shell. The inner shell extends well forward within the

outer one, as shown. This construction I have found to be advantageous not only as enabling me to best and most easily make my cartridge with its passage I^3 for the piston I^2, but to most conveniently prime and load the cartridge. It has been found also to make a good strong durable cartridge-shell capable of being reloaded and used repeatedly without injury. When such a cartridge is fired within the cartridge-chamber of a gun, the pressure of the gases of explosion expands the inner shell against the walls of the outer shell, so that there can be no leakage of gas rearward and outward between the two shells, even where the threading of the screw-threaded rear parts of the shells is but small in depth and extent.

While I have shown and described my cartridge as arranged to be fired by a primer ignited by the forward end of the shank of the plunger within the cartridge, I do not intend to limit myself to the use of such a cartridge; but contemplate, where desired, employing other means for igniting the explosive charge.

A cartridge having a movable part to be driven rearward by the pressure of the gases of explosion and to engage and actuate the plunger F of my mechanism, and means whereby its charge can be ignited otherwise than in the manner described hereinbefore and indicated in the drawings, can be used without involving departure from my invention so long as there is in or on the cartridge a movable part adapted to be moved by pressure of the gases of explosion, and to engage and actuate directly or indirectly a part made movable with reference to the breech-closing head or bolt and adapted through suitable connections to actuate movable parts of the gun mechanism.

The operation of my mechanism as hereinbefore described, and shown in the drawings, is as follows: With the parts in the positions indicated in Figs. 1, 2, 3, and 5, with the tube or cylinder G supported against rearward movement in the manner shown in Figs. 1, 3, and 10 or in other desired way, and with cartridges supplied to passage T either by being dropped into such passage by hand or from a magazine or other suitable source of supply, so that there will be a cartridge in said passage resting against the arms $p^2 p^2$ of the cartridge-feeder, if there is no live cartridge in the chamber a or on the carrier-table O, the secondary bolt E is drawn back by the handle K until the arm E^5 strikes the shoulder o^{16} on the head O^5 on the bar O^4 and carries such head and bar rearward. This movement of the bar O^4, through the connection of the bar with the upright arm of lever O^2, causes such lever to be raised, so that the table O is elevated in the manner hereinbefore indicated and to be described hereinafter. The lifting of the table O causes, through the engagement of its pin or stud o^{15} with the slot p in arm P, the shaft P′ to be rocked to carry the arms $P^2 P^2$ outward under and past the cartridge resting against them in the cartridge-feeding passage. That cartridge then falls in front of the concave inner sides of the arms $P^2 P^2$, ready to be carried over inward by the latter when the shaft P′ is rocked inward again. The secondary bolt E is then moved forward, so that its arm E^5 strikes the abutment or collar o^{18} and causes it and the bar O^4 to move forward so as to cause the lever O^2 and table O to be depressed again. The fall of this table because of the described connections between it and the arm P on the shaft P′ causes the latter to be rocked inward to make the arms $P^2 P^2$ throw the cartridge engaged by them over upon the table O in the position shown in Fig. 5. With the passage T kept supplied with cartridges this feeding of a cartridge upon the table O will be repeated each time that the latter is returned to its normal depressed position after being raised to supply a cartridge to the place where the breech-bolt C can engage it and push it into the chamber a. With the parts in position as indicated in Fig. 5, there being no cartridge in the chamber a, if it be desired to load the gun for firing the secondary bolt E is drawn rearward by its handle K. Its first movement then causes the shoulder k on its arm K′ to engage the shoulder m^{10} at the rear end of the recess m^7 in the sliding block m^2, attached to the rod M, and move such block and rod rearward to retract the locking-bolt L^4 from its recess l^5, all as indicated by dotted lines in Fig. 12. The retraction of this locking-bolt L^4 leaves the locking-brace L free to be swung up on its pivots to disengage it from the rear side of the head of the breech-bolt C, and so leave the latter free to be subsequently retracted. Continued rearward movement of the secondary bolt E then causes the abutment at the forward end of the slot E^2 to engage the face m^{13} on the forward side of the arm m^{11} on the lever M′ and so force such lever rearward. As the lever is thus moved it is caused to swing upward by the camming action of its inclined cam-surfaces m^4 m^4 engaging the inclines on the uprights A^3 A^3 on the frame until the arm m^{11} has been raised out of the slot E^2 in the secondary bolt. The rearward movement and swing of the lever thus caused compel the locking-brace, which is pivotally connected with the forward end of the lever, to swing upward upon its pivotal supports on the frame A, so as to entirely disengage it from the breech-bolt C, as shown in Figs. 4 and 13. The slot m in the forward end of the rod M allows for the necessary relative movements of the rod end and the pin l^7, carried by the locking-bolt L^4, as the lever M′ and locking-brace swing upon their different fulcra, the slot being curved, as shown, so that the pin l^7 rides in it without causing any longitudinal movement of the locking-bolt as the brace swings up or down. The above-described movement of the secondary bolt to cause the locking-brace to be unlocked and swung up to release the

breech-bolt before the latter is started rearward out of the passage a', in which it rests when in its normal breech-closing position, is allowed for by the spring connections between the breech-bolt and secondary bolt hereinbefore described. As the secondary bolt first moves rearward the inner end of its head E′ strikes the sliding collar c' on the shank C′ of the breech-bolt and forces such collar back against the stress of the spring C^3, so that the latter will be compressed and will when the breech-bolt has been released and is free to move rearward force the same back quickly to return it to its normal position with relation to the secondary bolt. Should the breech-bolt tend to stick in the breech, the head E′ on the secondary bolt will force the collar or washer c' against the end of the hollow head C^2, secured to the shank of the breech-bolt, and will positively force said shank, and consequently the breech-bolt, rearward to withdraw the latter from the breech. The driving of the washer against the head C^2 by the head E′ will cause such a quick blow upon head C^2 as will insure the starting of the breech-bolt rearward in spite of any tendency of the bolt or a cartridge-shell engaged by the extractor-hook c^3 to stick in the breech. If the hammer N was not cocked before the beginning of the described retraction of the secondary bolt, it will be cocked or swung back to carry its shoulder n' in position to be engaged by the sear N^2 by the engagement of the forward end of slot E^2 with it as the said bolt moves rearward. The continued movement of the secondary bolt retracts it and the breech-bolt, so that the latter finally stands to the rear of the upward path to be taken by the base of a cartridge resting upon and raised by the table O. In the meantime the spring G^2 in the tube or cylinder G has been compressed by the movement of the extension or piston E^4 and the head or follower G′ with the secondary bolt. As the latter approaches the limit of its rearward movement its arm E^5, engaging the shoulder o^{16} on the head O^5 of the bar O^4, suddenly forces the latter rearward to swing the lever O^2 quickly upward in the manner hereinbefore described. This swing of the lever O^2 raises the front end of the cartridge-carrier table and at the same time, through the engagement of its pin o^5 with the slot o^4 in lever O′ and the engagement of the fixed pin o^{12} with the slot o^{13}, also in the lever O′, causes the latter lever to also swing to raise the rear end of the table O. In this way the table is raised to the position shown in Fig. 13, with the cartridge carried upon it in position to be engaged by the breech-bolt C, and forced by the latter during its subsequent forward movement into the chamber a. As the bar O^4 is driven rearward to cause the carrier O to be raised in the manner described the nose of the spring-pawl R snaps into the notch o^{17} in the lug O^6 of the bar-head O^5, so as to retain the bar and consequently the carrier O in the positions to which they have been moved until they are actuated by the arm E^5 on the secondary bolt as the latter subsequently approaches the limit of its forward movement again. The retracted bolt E can now be thrown forward by the arm K or, if such arm be released, by the action of the spring G^2, and will during its forward movement carry the breech-bolt C with it to force the cartridge on the carrier O into the cartridge-chamber and form a breech-closing abutment for the base of the seated cartridge. As the secondary bolt approaches the limit of its forward movement, so as to carry the breech-bolt head into the passage a' behind the cartridge, the arm K′ on it strikes the inclined face m^{12} on the arm m^{11} of lever M′ and cams the latter down from the position shown in Figs. 4 and 13 to that shown in Figs. 3 and 12. The movement of the lever M′ as it is thus cammed down is both a rocking and sliding one, the fulcrum of the lever consisting then of the lugs or studs m^2 m^2 on the lever sides, sliding downward and forward in the bearing-slots m^3 m^3, the result of the described camming down and movement of the lever being, because of the pivotal connections between the lever and locking-brace, a downward swing of the latter to carry its breech-bolt-engaging end down behind the breech-bolt. (See Fig. 12.) Should the head of the breech-bolt be not fully seated in place in the passage behind the cartridge, the downward and forward travel of the front end of the locking-brace will by the engagement of such end with the rear side of such head force the latter home. To facilitate such camming action and insure that the brace shall swing down without check into place to lock the breech-bolt, I round or bevel off the lower edge of the forward end of the brace, as indicated in Figs. 12, 13, and 15. The downward swing of the lever M′ to force the locking-brace into breech-bolt-holding position carries the arm m^{11} of such lever down into the slot E^4 in the secondary bolt, so that the arm K′ on the latter bolt is in the recess m^7 of the sliding block M^2 in position to engage the forward end of such recess and to pass forward to bring its shoulder k^3 over the shoulder m^8 on the lever M′ as the secondary bolt continues its forward movement after it has cammed the latter lever down. Such continued movement of the secondary bolt causes the arm K′ to force the block M^2 forward to reciprocate the rod M and so force the locking-bolt L^4 home in the recess l^5 on the frame to securely lock the brace L down in its breech-bolt-holding position. The shoulder k^3 on the secondary bolt-arm K′, then standing above the shoulder m^8 on the lever M′, securely locks the latter down. The gun is now loaded and ready for firing upon the pull of trigger N^5, and another cartridge has been fed over upon the carrier-table by the rocking of the arms P^2 P^2, caused through the hereinbefore-described connections by the de-

scent of the table O, due to the forward movement of the bar O^4 and piece O^3, which are actuated by the arm E^5 on the secondary bolt E engaging the collar o^{18} as such bolt approaches the limit of its forward motion. If now the trigger N^5 be pulled, the sliding sear-tripper connected with the trigger will be actuated against the stress of spring n^{10}, so that the pin n^6, carried by its fork-arms, will, by its engagement with the inclined slots n^5 n^5 on the sear N^2, trip the latter to release the shoulder n' on the hammer N. The hammer will then under stress of its spring N' strike the rear end of the firing-plunger F, projecting into the slot E^2 in the secondary bolt, and will drive such plunger forward against the stress of its retracting-spring F^3 to engage and actuate the igniting pin or plunger I' in the cartridge. The movement of this latter pin or plunger fires the primer i' to explode the cartridge charge, and the pressure of the gases of explosion then drives the piston I^2 rearward with great force and quickness, so as to throw back the firing-plunger F, which is engaging the rear end of the igniting-plunger. The firing-pin F, being thus driven rearward, forces the hammer N back with its rear end, and its momentum carries its fixed collar or enlargement F^3 against the bottom or rear end of the main bore of the tubular part of the secondary bolt E. The momentum of the firing-plunger then forces the secondary bolt quickly rearward to cause the locking-brace to be unlocked and swung up, the breech-bolt to be retracted, and a new cartridge to be raised by the cartridge-carrier up into the path of the forward end of the retracted breech-bolt just as such operation and movement of the parts were before caused by the rearward movement of the secondary bolt, as hereinbefore described. Before the table O is raised to bring the new cartridge into the just-above-described position the extracting-hook c^3 on the breech-bolt, engaging the groove i of the fired cartridge-shell, withdraws the latter from the chamber of the gun, and the forked arm S^6 on secondary bolt E, engaging the spiral or twisted part of the flattened shaft S^5, rotates such shaft to cause the lug s^3 on the crank-arm s^4 to engage and move the pin s' on the crank arm S^2 outward to rock the shaft S' and swing the ejector finger or plate S quickly downward and inward to strike the extracted shell from the extractor-hook c^3 and throw it out through the ejector-opening D'. The lug s^3 then passes off the pin s', and the spring S^3 quickly causes the shaft S' to rock back again to carry the plate S up into its normal retracted position again. As the secondary bolt approaches its extreme rearward position its forked arm S^6, engaging the rear pin s^9, drives the shaft S^5 rearward, so that its lug s^3 can swing back past the pin s' as the shaft is turned back by the subsequent forward movement of arm S^6 with the secondary bolt E. The air confined in the tube or cylinder G to the rear of the extension E^4 and piston head or follower G' and only able to escape through the port or ports g^6 g^6 serves to slow down the speed of the rearward throw of the secondary bolt E without stopping it, while the spring G^2, being compressed, is storing up energy, which when the secondary bolt has finished its rearward travel acts to throw it forward again toward and into its normal position, from which it was started by rearward driving of the firing-plunger F, caused by the firing of the cartridge, as hereinbefore described. On its way forward to such normal position the secondary bolt causes the movement of the various parts, as set forth hereinbefore in the description of the operation of the first loading of the gun, so that a new cartridge will be driven into the cartridge-chamber by the breech-bolt, the locking-brace will be forced down to lock such bolt and will itself be locked, the cartridge-carrier will be depressed and another cartridge from passage T will be fed upon the carrier-table by the arms P^2 P^2 of the feeder, and the shaft S^5 will by the engagement of the arm S^6 with the forward one of the pins s^9 be reciprocated to bring its lug s^3 over behind the pin s' on the crank-arm S^2 on the ejector-shaft S' in position to engage and actuate such pin when the shaft S^5 is next rotated to cause ejection of a shell, in the manner described hereinbefore. The firing-plunger F is held normally retracted in the secondary bolt by its spring F^3 to be ready to be driven forward by a blow of the hammer N. If after the hereinbefore-described firing the trigger N^5 be held retracted, the hammer will when the slot E^2 in the secondary bolt is brought over it by the forward travel of such bolt fly up under stress of its spring N' and strike the projecting end of the firing-plunger F to cause the latter to engage and actuate the igniting pin or plunger of the new cartridge inserted in the cartridge-chamber. The operation of the parts of the gun mechanism consequent upon the firing of the first cartridge will then be repeated and the gun will go on firing automatically with great rapidity as long as the trigger is held retracted and cartridges are kept supplied to the passage T from any suitable source of supply. When it is desired that the firing should cease, all that is necessary is to release the trigger, which will allow the sear N^2 to engage the cocking-shoulder n' on the hammer and hold the latter retracted. The mechanism will then cease its automatic operation with a cartridge inserted in the cartridge-chamber and the gun made ready to be again fired when the hammer is again released by a pull upon the trigger.

Where it is desired to use the gun to fire a single shot at the will of the user without automatic repetition of the firing, all that is necessary is to pull and quickly release the trigger. The gun will then be fired and reloaded, ready for firing again, as desired.

No claims are made herein to my cartridge by itself, as I have made such cartridge the

subject of a separate application, filed June 23, 1898, Serial No. 684,250.

It is to be understood that an equivalent embodiment in firearms other than automatic of features of my invention capable of such embodiment is deemed by me to fall within the scope of such of my herein claims as are drawn to said features, and that therefore I do not restrict such claims to automatic guns.

Having thus described my invention, what I claim is—

1. In a gun, in combination with a movable breech-closing device, a movable plunger adapted to be actuated by a movable part of a cartridge in the gun-chamber in rear of the projectile, means for locking the breech-closing device, and connections between such locking means and the plunger, whereby the movement of the latter causes the breech-closing device to be unlocked, substantially as and for the purpose described.

2. In a gun, in which the firing-plunger moves rearward to effect the unlocking of the breech-closing mechanism, in combination with a movable breech-closing device, a plunger movable with reference to such device and adapted to engage a movable part of a cartridge in the gun-chamber, a movable piece adapted to be driven rearward by the plunger, means for locking the breech-closing device, and connections between such locking means and the plunger, whereby the rearward movement of the latter causes the breech-closing device to be unlocked, substantially as and for the purpose described.

3. In a gun, in which the firing-plunger moves rearward to effect the unlocking of the breech-closing mechanism, in combination with a movable breech-closing device, a plunger movable with reference to such device, and adapted to engage a movable part of a cartridge, seated in the chamber of the gun, a locking-brace for the breech-closing device, means for moving the locking-brace, and connections between such means and the plunger, whereby movement of the latter causes the locking-brace to be moved to release the breech-closing device, substantially as and for the purpose described.

4. In a gun, in which the firing-plunger moves rearward to effect the unlocking of the breech-closing mechanism, in combination with a movable breech-closing device, a plunger movable with reference to such device, and adapted to engage a movable part of a cartridge seated in the chamber of the gun, a locking-brace for the breech-closing device, a lever connected with such device to actuate the same, and connections between such lever and the plunger, whereby rearward movement of the plunger causes the lever to be actuated to disengage the locking-brace from the breech-closing device, substantially as and for the purpose described.

5. In a gun, in which the firing-plunger moves rearward to effect the unlocking of the breech-closing mechanism, in combination with a movable breech-closing device, a plunger movable with reference to the latter, and adapted to be actuated by a movable part of a cartridge seated in the chamber of the gun, a locking-brace for the breech-closing device, means for moving the locking device, and a movable piece engaged by the plunger, as the latter moves rearward, and itself adapted to engage and actuate the locking-brace-moving means, substantially as and for the purpose described.

6. In a gun, in which the firing-plunger moves rearward to actuate the breech mechanism, in combination with a movable breech-closing device, a plunger movable with reference to the latter, a locking-brace for the breech-closing device, a lever connected with the brace, a movable piece adapted to be engaged and moved by a portion of the plunger, and a bearing on the lever to be engaged by the movable piece, substantially as and for the purpose described.

7. In a gun, in combination with a movable breech-closing device and a plunger movable with reference to the latter, and adapted to be so moved by the action of the gases of explosion, a locking-brace for the breech-closing device, a movable piece adapted to be engaged and actuated by the plunger, a lever connected with the locking-brace and having a bearing in the path of the movable piece, and inclines on the lever and on a stationary support, respectively, to cam the lever upward as it is moved by the movable piece, substantially as and for the purpose described.

8. In a gun, in combination with a movable breech-closing device adapted to engage and support the base of a cartridge seated in the gun-chamber and a plunger movable with reference to such device, a locking-brace for the breech-closing device, a movable piece having an abutment in the path of part of the plunger and an arm, and a lever connected with the locking-brace, having an arm with an abutment to be engaged by a bearing on the movable piece, and an inclined face to be engaged by the arm on such piece, substantially as and for the purpose described.

9. In a gun, in combination with a movable breech-closing device, a movable locking-brace for the latter, a movable piece having an abutment and an arm, and a lever connected with the locking-brace, having an arm with a bearing to be engaged by the abutment on the movable piece, as the latter moves in one direction, and an inclined face to be engaged by the arm on the piece, as the latter moves in the other direction, substantially as and for the purpose described.

10. In a gun, in combination with a movable breech-closing device and a movable locking-brace therefor, a movable piece having an abutment and an arm, a lever connected with the locking-brace, having an arm provided with a bearing to be engaged by the abutment on the movable piece, an inclined face to be engaged by the arm on such piece, and

a locking-shoulder to be engaged by a portion of such arm to lock the lever from movement, substantially as and for the purpose described.

11. In a gun, in combination with a movable breech-closing device and a movable locking-brace therefor, a movable piece having an abutment and an arm, a lever connected with the locking-brace, having an arm provided with a bearing to be engaged by the abutment on the movable piece, an incline to be engaged by the arm on such piece, and a shoulder at the upper end of the incline, substantially as and for the purpose described.

12. In a gun, in combination with a movable breech-closing device and a movable locking-brace therefor, a movable piece having an abutment and an arm, a lever connected with the locking-brace and having an arm with a bearing and an incline, to be engaged, respectively, by the abutment and arm on the movable piece, a sliding rod on the lever, having a head with a recess, into which the arm on the movable piece projects, and in which such arm can move, when the lever is down, and a locking-bolt, carried by the locking-brace, connected with the rod, and adapted to enter a locking-recess in a part supported on the gun-frame, substantially as and for the purpose described.

13. In a gun, in combination with a movable breech-closing device, and a pivoted locking-brace therefor, a lever pivotally connected with the locking-brace, and having an arm provided, on its rear side, with an inclined face, rearwardly and upwardly inclined bearing-faces on the lever and on a suitable support or supports, respectively, a sliding rod on the lever having a head with a recess, a locking-bolt on the locking-brace, to engage a suitable recess in a stationary part, connections between such bolt and the rod, and a movable piece having an abutment to engage the forward side of the lever-arm, as the piece is moved rearward, and an arm to engage the incline on the lever-arm, as the piece moves forward again, the arm on such movable piece projecting up into the recess in the head on the rod, substantially as and for the purpose described.

14. In a gun, in combination with a movable breech-closing device and a pivoted locking-brace therefor, a lever pivotally connected with the locking-brace and having an arm provided with an inclined face on its rear side, one or more upwardly and rearwardly inclined faces on the lever engaging one or more inclined faces on a fixed support or supports, a sliding rod on the lever having a head with a recess situated above the upper end of the inclined face on the lever-arm, a locking-bolt carried by the locking-brace, a fixed part carried by the gun-frame, to receive the end of such bolt, when the brace is down, a pin connected with the bolt and engaging a slot in the end of the sliding rod projecting from the lever, and a movable piece having an abutment or shoulder to engage the forward side of the lever-arm, and an arm, to engage the inclined face on the rear side of the lever-arm, projecting up into the recess in the head on the sliding rod, when the lever is swung down to put the locking-brace in position to hold the breech-closing device closed, substantially as and for the purpose described.

15. In a gun, in combination with a movable breech-closing device and a swinging locking-brace therefor, a lever pivotally connected with the brace and having an arm provided with a rearwardly and downwardly inclined face on its rear side, a shoulder at the upper end of such inclined face, and one or more upwardly and rearwardly inclined faces, engaging a correspondingly-inclined face or faces on a suitable support or supports independent of the lever, a sliding rod on the lever, having a head with a recess above the shoulder on the lever, a locking-bolt carried by the locking-brace and connected with the sliding rod by a pin engaging a slot in the rod, a fixed piece carrying a locking-recess for the bolt end, and a movable piece having an abutment to engage the forward side of the lever-arm, as the piece moves rearward, and an arm to engage the inclined face on the rear side of the lever-arm, as the piece moves forward, such arm on the movable piece having its upper end projecting forward to engage the forward end of the recess in the rod-head, and to stand over the shoulder on the lever-arm, as the movable piece is moved forward, after the lever is down, substantially as and for the purpose described.

16. In a gun, in combination with a movable breech-closing device and a pivoted locking-brace therefor, a lever pivotally connected with the locking-brace and having an arm with a rearwardly and downwardly inclined face on its rear side, and a shoulder at the upper end of such inclined face, rearwardly and upwardly inclined faces on the sides of the lever, engaging correspondingly-inclined faces on fixed supports independent of the lever, studs or pins on the lever engaging upwardly and rearwardly inclined slots in such supports, a sliding rod carried by the lever and having its forward end provided with a slot, a sliding bolt on the locking-brace having a pin engaging the slot in the rod end, a suitable fixed part carrying a recess to receive the bolt end when the latter is forced forward, a head on the sliding rod having a recess above the shoulder at the upper end of the inclined face on the lever-arm, and a movable piece having an abutment to engage the forward side of the lever-arm, and an upwardly and forwardly projecting arm, to engage the inclined face on the lever-arm, having shoulder to engage the ends of the recess in the rod-head, as the arm is moved forward and back within such recess, and a shoulder to engage the shoulder on the lever-arm, substantially as and for the purpose described.

17. In a gun, in combination with a movable

breech-closing device, a movable plunger adapted to be moved in one direction by the action of the gases of explosion, that at one point in its movement in the opposite direction engages a movable part of a cartridge seated in the chamber of a gun, a movable piece, engaged and actuated by such plunger, and connections between such piece and the breech-closing devices to retract the latter to open the breech, substantially as and for the purpose described.

18. In a gun, in combination with a movable breech-closing device, a movable plunger adapted to be moved rearward by the action of the gases of explosion, that at one point in its forward movement engages a movable part of a cartridge in the chamber of a gun, a movable piece, engaged and forced rearward by the plunger and connections between such piece and the breech-closing device, to open and close the latter as the movable piece moves rearward and forward, respectively, substantially as and for the purpose described.

19. In a gun, in combination with a movable breech-closing device, a movable plunger adapted to be moved by the action of the gases of explosion, a movable piece engaged and forced rearward by the plunger, and yielding connections between the movable piece and the breech-closing device, to force the latter rearward and forward, as the movable piece moves rearward and forward, substantially as and for the purpose described.

20. In a gun, in combination with a movable breech-closing device, a movable plunger adapted to be moved by the action of the gases of explosion, a movable piece engaged and forced rearward by the plunger, connections between such piece and the breech-closing device, whereby the latter is opened and closed, as the movable piece moves rearward and forward, and spring mechanism compressed by the rearward travel of the movable piece, to throw such piece forward again, substantially as and for the purpose described.

21. In a gun, in combination with a movable breech-closing device, a movable plunger adapted to be moved by the action of the gases of explosion, a movable piece engaged and forced rearward by the plunger, connections between such piece and the breech-closing device, whereby the latter is opened and closed by the rearward and forward movements, respectively, of the piece, a head connected and traveling with the movable piece, and a spring engaged by such head, substantially as and for the purpose described.

22. In a gun, in combination with a movable breech-closing device, a movable plunger adapted to be moved by the action of the gases of explosion, a movable piece engaged and forced rearward by the plunger, connections between such piece and the breech-closing device, whereby the latter is opened and closed by the rearward and forward movements, respectively, of the piece, a piston-head connected and traveling with the movable piece, a closed cylinder, in which such head fits and travels, having one or more air-ports, and a spring in such cylinder engaged by the head, substantially as and for the purpose described.

23. In a gun, in combination with a movable breech-closing device and a plunger adapted to be moved by the action of the gases of explosion moving through the same, a reciprocating piece engaged and forced rearward by the plunger, as the latter is driven rearward, connections between such piece and the breech-closing device, whereby rearward and forward travel of the piece opens and closes the breech-closing device, and spring mechanism, to throw the reciprocating piece forward again, when it has been driven rearward, substantially as and for the purpose described.

24. In a gun, in combination with a movable breech-closing device, a plunger adapted to be moved by the action of the gases of explosion moving through the same and having a head or enlargement, a reciprocating piece having an abutment to be engaged by the rear end of the head or enlargement on the plunger, a head on the reciprocating piece, connections between such head and breech-closing device, to allow the reciprocating piece to travel rearward a certain distance with relation to the breech-closing device, and then to carry the latter with it, spring mechanism to throw the reciprocating piece forward again, and connections between such piece and the breech-closing device, whereby the forward movement of the piece closes such device, substantially as and for the purpose described.

25. In a gun, in combination with the breech-closing device, having a shank provided with a head, at or near its rear end, a plunger adapted to be moved by the action of the gases of explosion moving through such device, and having an enlargement or head, a reciprocating piece having an abutment to be engaged by the rear end of the head on the plunger and a head through which the shank of the breech-closing device passes, a loose collar on this shank, a spring between the collar and a bearing on the head on the shank of the breech-closing device, a sliding collar on the plunger, to the rear of the latter head, and a spring engaging such collar and the forward side of the head or enlargement on the plunger, substantially as and for the purpose described.

26. In combination with the reciprocating breech-bolt, a plunger moving through the bolt and having an enlargement or head, a secondary bolt having a head through which the shank of the breech-bolt passes, a head on such shank within the secondary bolt, a loose collar on the shank engaging a shoulder on the latter, adapted to hold the collar normally a certain distance to the rear of the head of the secondary bolt, a spring on the breech-bolt shank between the collar and a

portion of the head on such shank within the secondary bolt, a loose collar on the plunger abutting against the rear of the latter head, and a spring engaging this collar and the forward end of the head or enlargement on the plunger, substantially as and for the purpose described.

27. In combination with the reciprocating breech-bolt having a shank with a head at or near its rear end, a secondary bolt having a head through which such shank passes, a loose collar on the breech-bolt shank, a spring engaging such collar and the head on the latter shank, a plunger moving through the breech-bolt and having an enlargement or head beyond the rear end of the breech-bolt shank, a loose collar on the plunger abutting against the end of the breech-bolt shank, a spring engaging such collar and the head on the plunger of less strength than the former spring, and a shoulder on the shank of the breech-bolt, to hold the loose collar thereon normally at a certain distance to the rear of the head on the secondary bolt, substantially as and for the purpose described.

28. In a gun, in combination with the breech-bolt and the plunger moving through the same and having an enlargement or head, a secondary bolt having an abutment to be engaged by the enlargement or head on the plunger and a head, through which a shank on the breech-bolt passes, and connections between the breech-bolt shank and the secondary bolt, whereby the secondary bolt can travel rearward a certain distance, with reference to the breech-bolt, and then the latter is caused to move with the secondary bolt, substantially as and for the purpose described.

29. In a gun, in which the firing-plunger moves rearward to actuate the breech mechanism, in combination with the breech-bolt and the firing-plunger, moving with reference to the same, means for driving the plunger forward to fire a cartridge, a movable piece, a head or abutment on the plunger to engage such piece and drive it rearward, and connections between the piece and the breech-bolt, whereby, after the piece has moved rearward a certain distance, the breech-bolt is retracted, substantially as and for the purpose described.

30. In a gun, in which the firing-plunger moves rearward to actuate the breech mechanism, in combination with the breech-bolt and the cartridge-firing movable plunger, means for driving it forward to fire the cartridge, a spring for retracting the plunger, a head or enlargement on the plunger, a piece made movable with reference to the breech-bolt, having an abutment to be engaged by the head on the firing-plunger, and connections between such piece and the breech-bolt, allowing the piece to travel rearward a certain distance, with reference to the breech-bolt, and then compelling the latter to travel with the piece, substantially as and for the purpose described.

31. In a gun, in which the firing-plunger moves rearward to actuate the breech mechanism, in combination with a breech-bolt and a cartridge-firing plunger provided with a head or enlargement, means for driving it forward to fire the cartridge, a spring for retracting the plunger, a piece made movable, with reference to the breech-bolt, and having an abutment to be engaged by the head or enlargement on the plunger, connections between this piece and the breech-bolt, allowing only a certain amount of movement of the piece with relation to the breech-bolt, and spring mechanism to throw the piece forward, when it has been driven rearward by the plunger, substantially as and for the purpose described.

32. In a gun, in which the firing-plunger moves rearward to actuate the breech mechanism, in combination with a breech-closing device, and the cartridge-firing plunger, a piece made movable with reference to the breech-closing device, engaging abutments on this piece and the plunger, whereby the rearward movement of the latter actuates the piece, and connections between such piece and the breech-closing device, for retracting and closing the latter as the piece moves rearward and forward, substantially as and for the purpose described.

33. In a gun, in which the firing-plunger moves rearward to effect the unlocking of the breech mechanism, in combination with a breech-closing device, a cartridge-firing plunger, and means for locking and unlocking the breech-closing device, a piece made movable with reference to such device, and connected with the means for locking and unlocking the breech-closing device, abutments on this piece and the plunger by the engagement of which the plunger, moving rearward, actuates the movable piece, to cause the breech-closing device to be unlocked, substantially as and for the purpose described.

34. In a gun, in which the firing-plunger moves rearward to effect the unlocking of the breech mechanism, in combination with a breech-closing device, a cartridge-firing plunger, and means for locking and unlocking the breech-closing device, a piece made movable with reference to such device, and connected with the means for locking and unlocking it, engaging abutments on this movable piece and the plunger, by the engagement of which the rearwardly-moving plunger drives the movable piece rearward, to cause the breech-closing device to be unlocked, and means, as a spring, for driving the movable piece forward, to cause the breech-closing device to be locked again, substantially as and for the purpose described.

35. In a gun, in which the firing-plunger moves rearward to actuate the breech mechanism, in combination with a breech-closing

device and a cartridge-firing plunger, a piece made movable with reference to the breech-closing device, connections between said device and piece, whereby the latter causes the breech-closing device to be opened and closed, engaging abutments on the piece and the plunger, respectively, by the engagement of which the plunger drives the piece rearward, means for feeding a cartridge up into position to be driven into the cartridge-chamber of the gun by the breech-closing device, connections between such cartridge-feeding means and the movable piece, and means for moving such piece forward again, after it has been driven rearward by the firing-plunger, substantially as and for the purpose described.

36. In a gun, in which the firing-plunger moves rearward to actuate the breech mechanism, in combination with a breech-closing device and a cartridge-firing plunger, a piece made movable with reference to the breech-closing device, connections between the latter and the piece whereby the rearward and forward travel of the piece causes the breech-closing device to be opened and closed, engaging abutments on the moving piece and the firing-plunger, respectively, by the engagement of which the plunger drives the piece rearward, means for extracting a cartridge-shell from the chamber, as the breech-closing device is being opened, ejector mechanism actuated to eject the extracted shell, and connections between the movable piece and such mechanism, for actuating the latter, substantially as and for the purpose described.

37. In a gun, having a cartridge-chamber, in combination with a cartridge having a movable part, adapted to be driven outward by the gases of explosion, when the cartridge is fired, a breech-closing device, means for locking the same closed, a plunger engaged by the movable part of the cartridge, a piece made movable with relation to the breech-closing device, connections between the same and the locking means for the breech-closing device, and abutments on the plunger and movable piece, by the engagement of which such piece is driven rearward by the movement of the plunger, substantially as and for the purpose described.

38. In a gun, having a cartridge-chamber, in combination with a cartridge having a movable part adapted to be engaged and actuated by the gases of explosion in the cartridge, a breech-closing device, a piece made movable with reference to the same, a plunger to be engaged by the movable part of the cartridge, suitable abutments on the movable piece and the plunger, by the engagement of which the movable piece is actuated by the plunger, and connections between such piece and the breech-closing device, whereby the latter is opened by movement of the movable piece, substantially as and for the purpose described.

39. In a gun, having a suitable cartridge-chamber, in combination with a cartridge having a movable part adapted to be actuated by the pressure of the gases of explosion in the cartridge, a breech-closing device, a plunger engaged by the movable part of the cartridge, a movable piece, made movable with reference to the breech-closing device, and driven rearward by movement of the plunger, connections between such piece and the breech-closing device for moving the latter, means for feeding a cartridge into the path of the retracted breech-closing device, and operating connections between such means and the movable plunger-actuated piece, substantially as and for the purpose described.

40. In a gun, having a suitable cartridge-chamber, in combination with a cartridge having a movable part adapted to be actuated by the pressure of the gases of explosion within the cartridge, a plunger engaged by the movable part of the cartridge, a movable piece actuated by the plunger, cartridge-feeding mechanism, and operative connections between such mechanism and plunger-actuated piece, whereby the movement of the latter causes operation of the mechanism, to feed a cartridge along, substantially as and for the purpose described.

41. In a gun, having a suitable cartridge-chamber, in combination with a cartridge having a movable part to be actuated by the pressure of the gases of explosion within the cartridge, a plunger engaged and driven rearward by such part, a breech-closing device, a movable piece actuated by the plunger, connections between such piece and the breech-closing device, for retracting the latter, as the piece moves rearward, means for extracting a fired cartridge-shell from the gun-chamber, an ejector to eject the shell so extracted, and operative connections between such ejector and the movable plunger-actuated piece, whereby the ejector is actuated by the rearward movement of the latter, substantially as and for the purpose described.

42. In a gun having a suitable cartridge-chamber, in combination with a cartridge having a fixed base, and a plunger adapted to be driven outward by the pressure of the gases of explosion when the cartridge is fired, a second movable plunger, actuated by the plunger of the cartridge, movable breech mechanism having a breech-closing part, and a locking device to lock such part in closed position, and operative connections between such locking device and the second plunger, whereby movement of the latter actuates the locking device, substantially as and for the purpose described.

43. In a gun having a suitable cartridge-chamber, in combination with a cartridge having a fixed base provided with an opening and a movable plunger adapted to be driven rearward by the pressure of the gases of explosion, when the cartridge is fired, a second plunger to engage the former plunger, a movable piece actuated by the second plunger, movable breech mechanism having a breech-closing

part and a locking device to hold it closed, connections between the movable plunger-actuated piece and the locking device, whereby the latter is actuated to unlock the breech-closing part, when the plunger-actuated piece is moved rearward, substantially as and for the purpose described.

44. In a gun, having a suitable cartridge-chamber, in combination with a cartridge having a fixed base provided with an opening, and a movable plunger within the cartridge adapted to be driven rearward by the pressure of the gases of explosion, when the cartridge is fired, a second plunger to engage the plunger in the cartridge, a movable piece actuated by the second plunger, movable breech mechanism and connections between the latter and the movable piece whereby movement of the piece actuates the breech mechanism, substantially as and for the purpose described.

45. In a gun mechanism, in combination with a movable breech-closing device, a swinging locking-brace therefor, a sliding and swinging lever pivotally connected with the brace, and sliding fulcrum-bearings for the lever, to cause it to swing, as it is moved longitudinally, substantially as and for the purpose described.

46. In a gun mechanism, in combination with a movable breech-closing device and a swinging locking-brace therefor, a sliding and swinging lever pivotally connected with the locking-brace, one or more inclined faces on a suitable support or supports independent of the lever, and one or more bearings on the lever to engage such inclined face or faces, substantially as and for the purpose described.

47. In a gun mechanism, in combination with a movable breech-closing device, and a swinging locking-brace therefor, a sliding and rocking lever pivotally connected with the brace, one or more inclined faces on the lever, an inclined face or faces on a suitable support or supports independent of the lever, one or more lugs or studs on the lever, and a part independent of the lever having an inclined slot engaging each of such lugs or studs, substantially as and for the purpose described.

48. In a gun mechanism, in combination with the cartridge-carrier, having a rising and falling cartridge supporting and lifting table, a rock-shaft having one or more cartridge-engaging arms to throw a cartridge over upon the table, a pin moving with the table, and an arm on the rock-shaft having a slot engaged by such pin, substantially as and for the purpose described.

49. In a cartridge-carrier, in combination with the cartridge receiving and supporting table, a lever having one arm pivotally connected with the table, a second lever also pivotally connected with the table and having a slot engaging a pin on the first lever, and its outer portion, beyond this slot, provided with a second slot at an angle to the first slot, engaged by a pin on a support independent of the two levers, substantially as and for the purpose described.

50. In a cartridge-carrier, in combination with the cartridge receiving and supporting table, a lever having an arm pivotally connected with the table, a second lever similarly connected with the table at a different point, and having a sliding fulcrum connection with the first lever and a curved slot beyond such fulcrum connection, and a pin on a support, independent of the two levers, engaging the slot in the second lever, so as to cause such lever to swing and slide, with reference to the first lever, as the latter swings to raise the table end connected with it, so that both ends of the table will be raised to substantially the same extent, substantially as and for the purpose described.

51. In combination with a rising and falling cartridge-carrying table, a lever, connections between the latter and the table whereby such table is caused to rise and fall as the lever is swung, a bar connected with such lever, shoulders or abutments connected with the bar, a reciprocating piece having an arm to engage such shoulders or abutments, an arm connected with the bar having the two notches, and a spring-pawl having a nose or pin to engage either one of such notches, substantially as and for the purpose described.

52. In combination with a hammer provided with a retaining-shoulder, a pivoted sear to engage the latter, a reciprocating sear-tripping bar, a pin and inclined slot connection between such bar and the sear, a spring actuating the bar to cause the sear to be pressed against the hammer, and a trigger pivotally connected with the bar, substantially as and for the purpose described.

53. In an ejector mechanism for guns, in combination with a rock-shaft having an ejecting finger or plate, and a crank-arm provided with a pin, a spring engaging an arm on the shaft to rock the latter to carry the finger or plate into its retracted position, a rocking and reciprocating shaft journaled out of line with the former rock-shaft, having a lug to engage the pin on the crank-arm of such shaft, a portion twisted to offer parallel spiral faces on its opposite sides, two pins, and two annular grooves, a reciprocating piece having an arm embracing this rocking and reciprocating shaft, and a spring-pawl having a pin or nose to engage one or the other of the annular grooves, according as the shaft carrying them has been moved longitudinally in one direction or the other, substantially as and for the purpose described.

In testimony that I claim the foregoing I have hereunto set my hand this 15th day of November, 1897.

FRANKLIN K. YOUNG.

Witnesses:
J. CAMPBELL,
EDWARD M. ALDEN.