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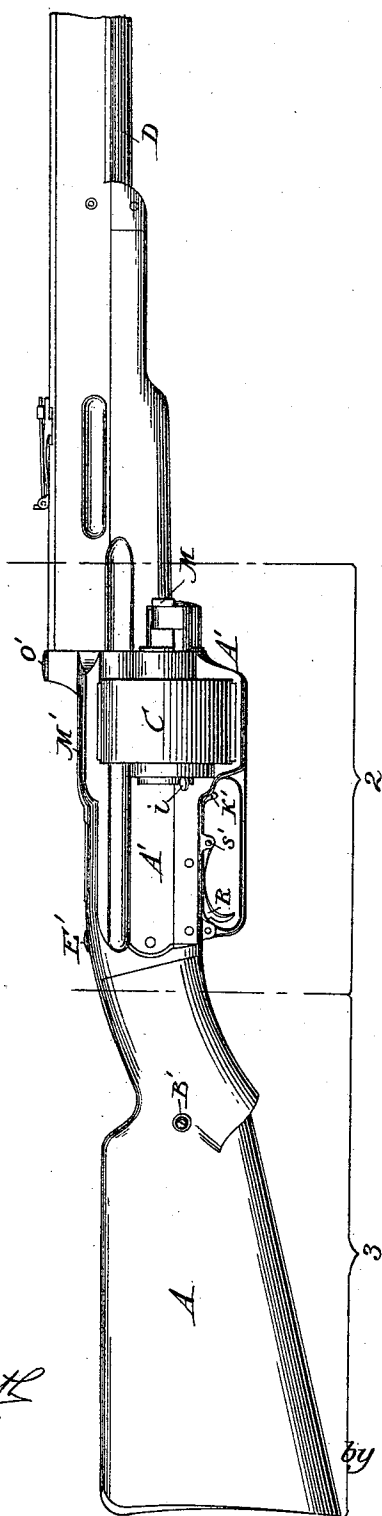
7 Sheets—Sheet 1.

D. E. GRANT.  
BREECH LOADING GUN.

No. 480,259.

Patented Aug. 9, 1892.

Fig. 1.



Witnesses

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(No Model.)

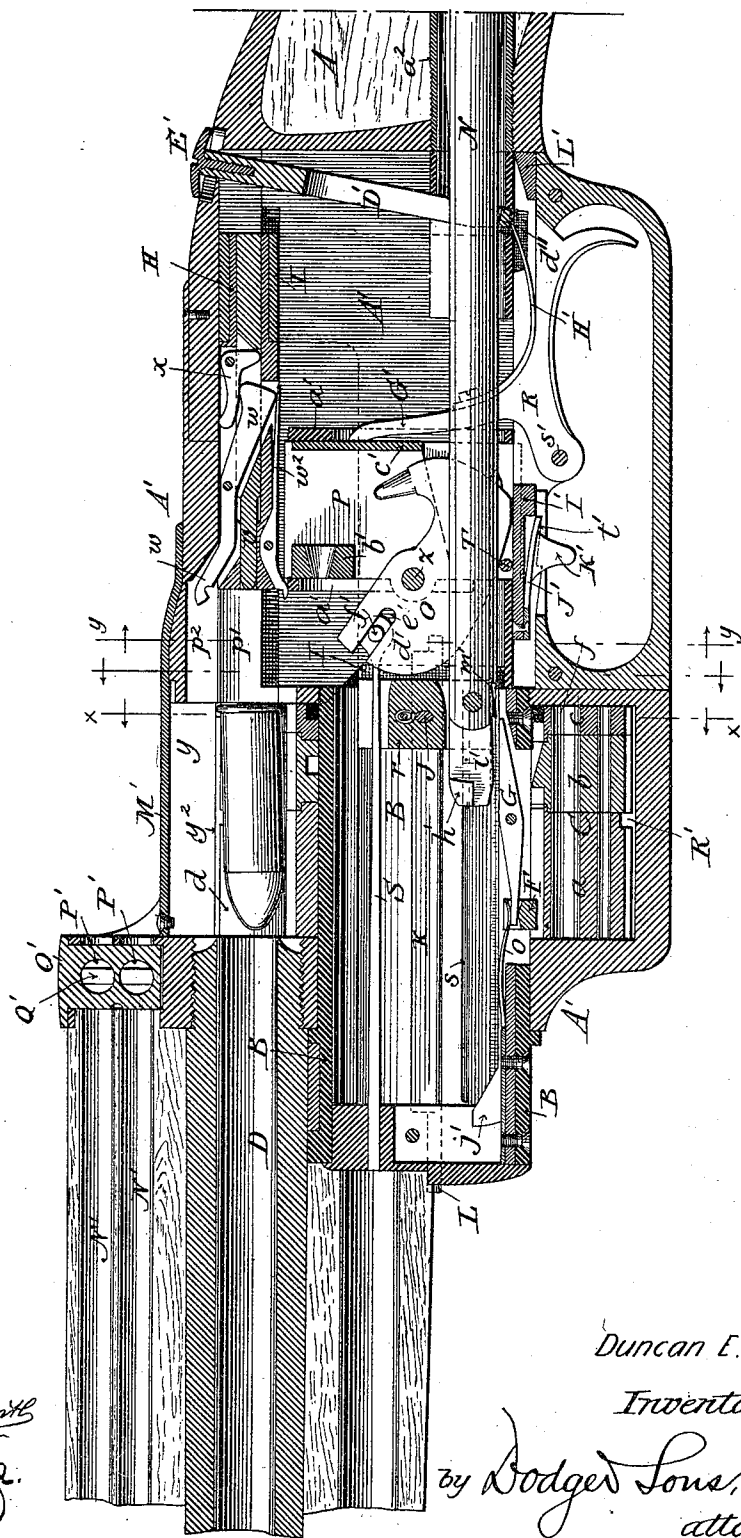
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Fig. 2.



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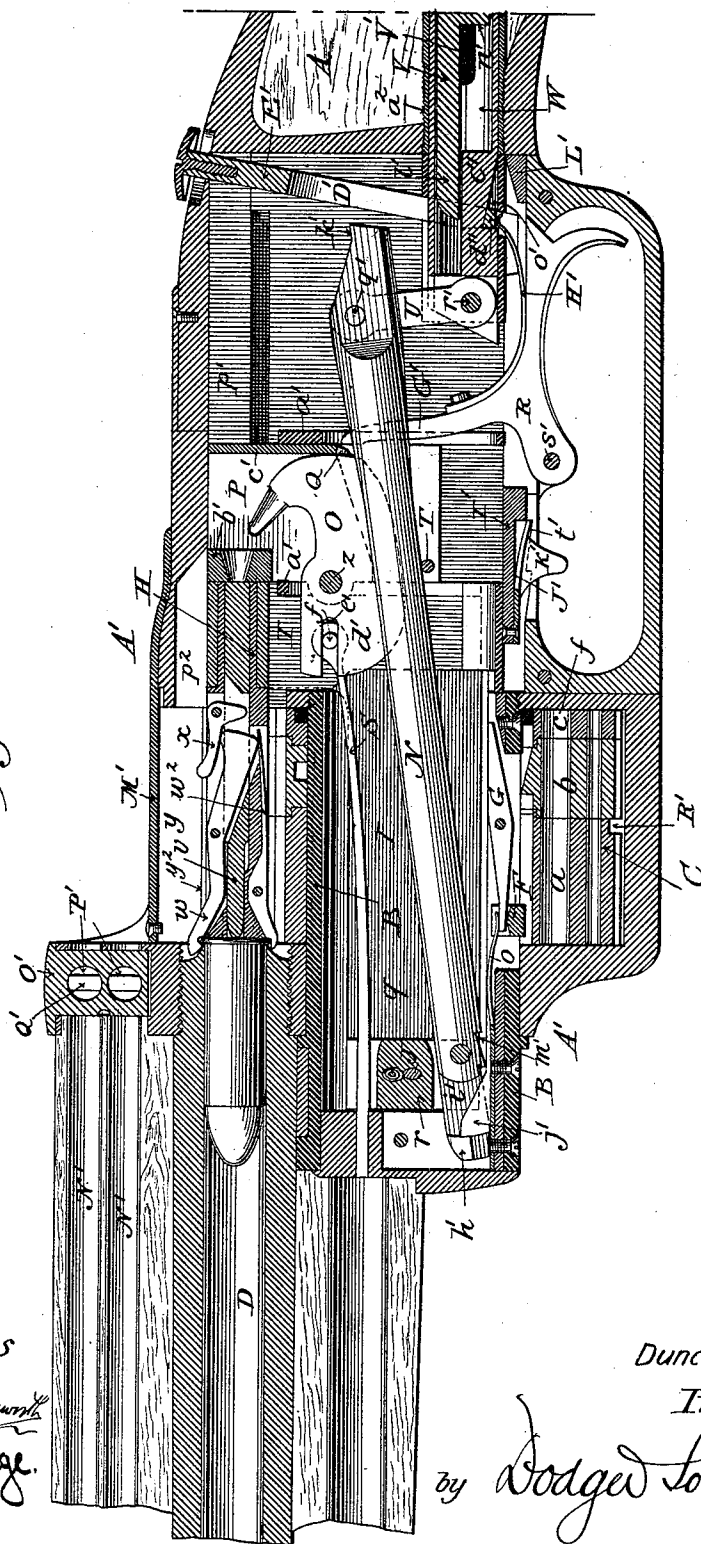
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Fig. 3.



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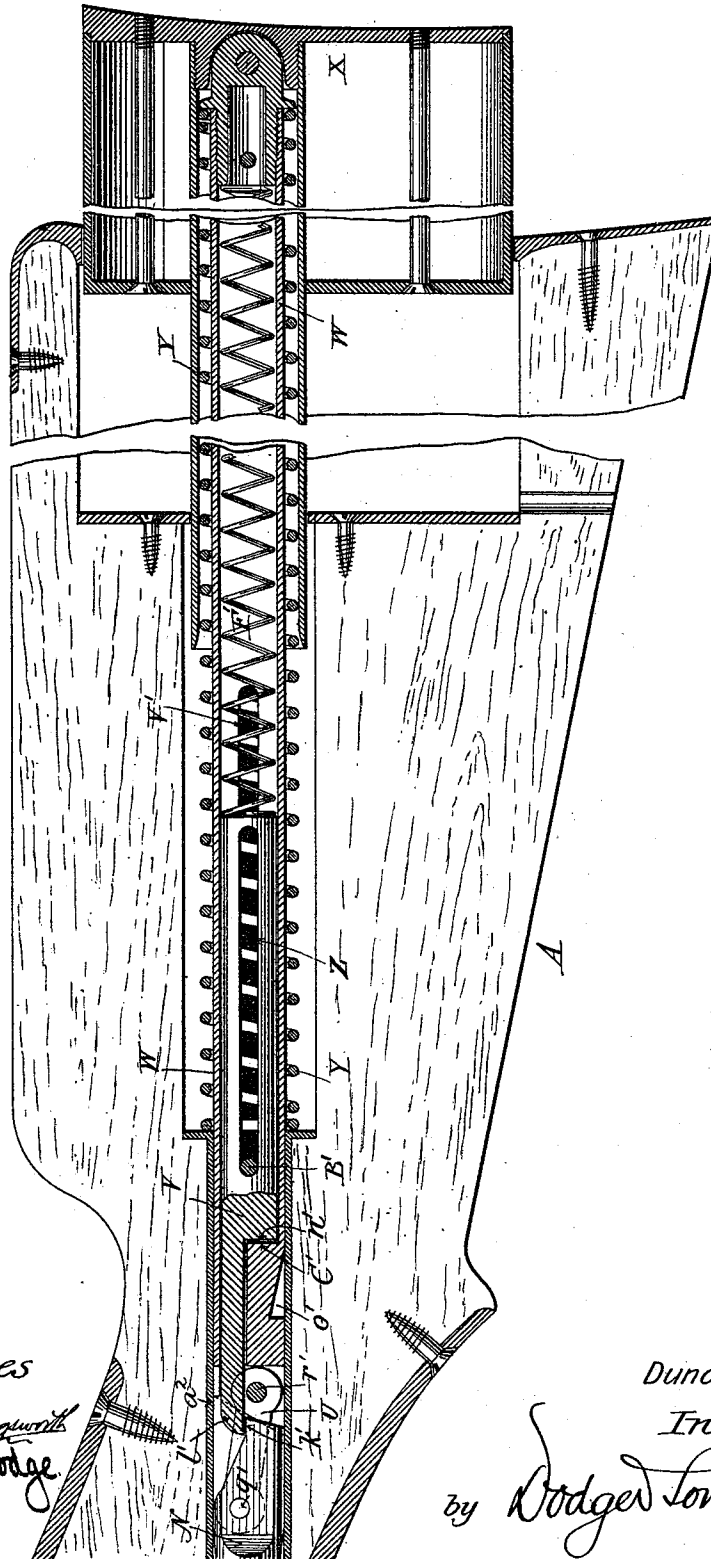
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Fig. 4.



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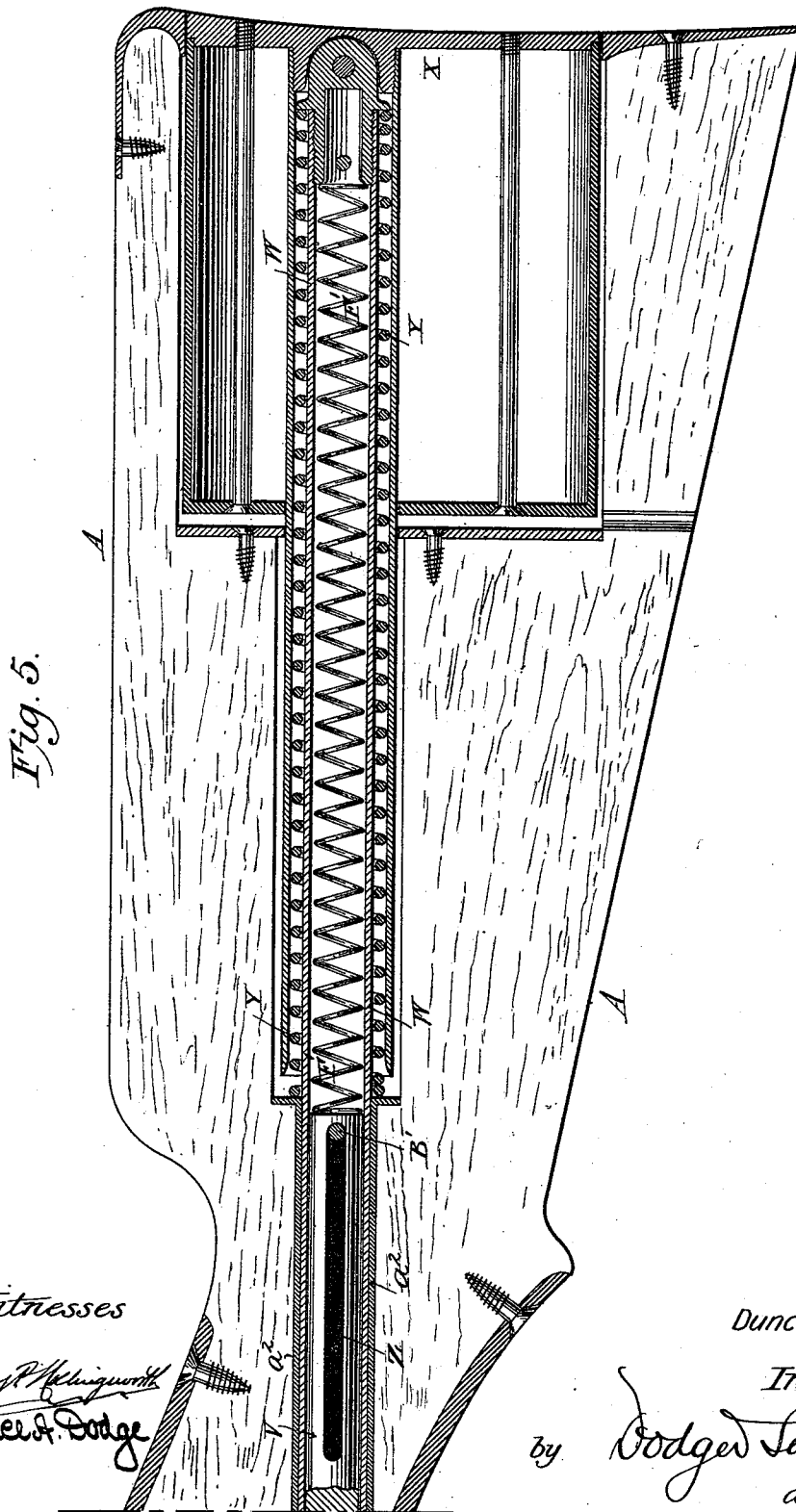
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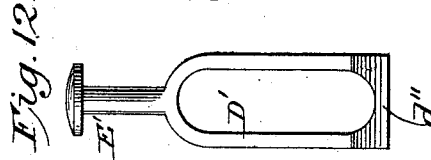
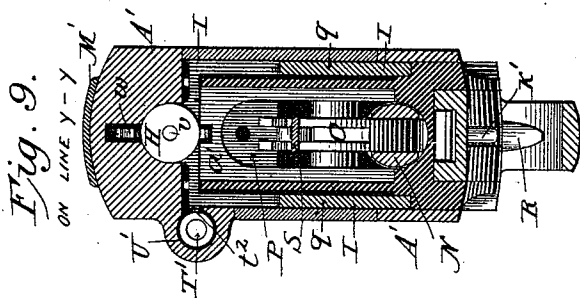


Fig. 8.

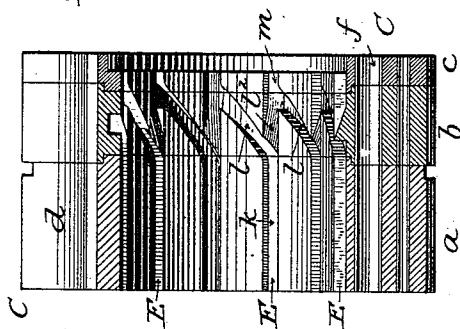


Fig. 11.

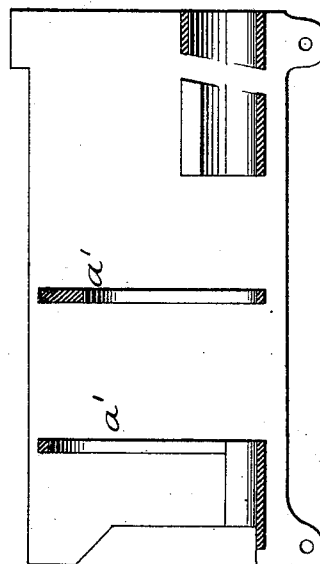


Fig. 7.

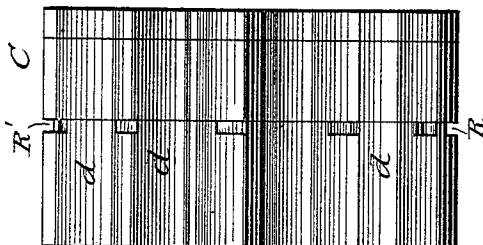
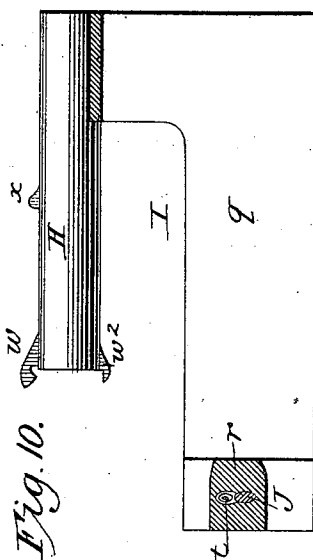
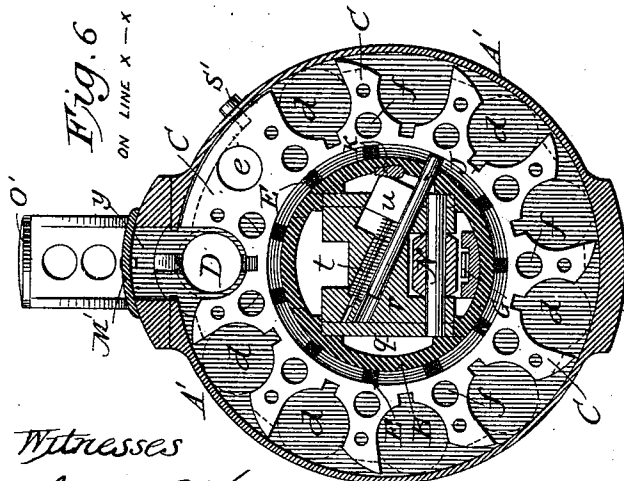


Fig. 6.



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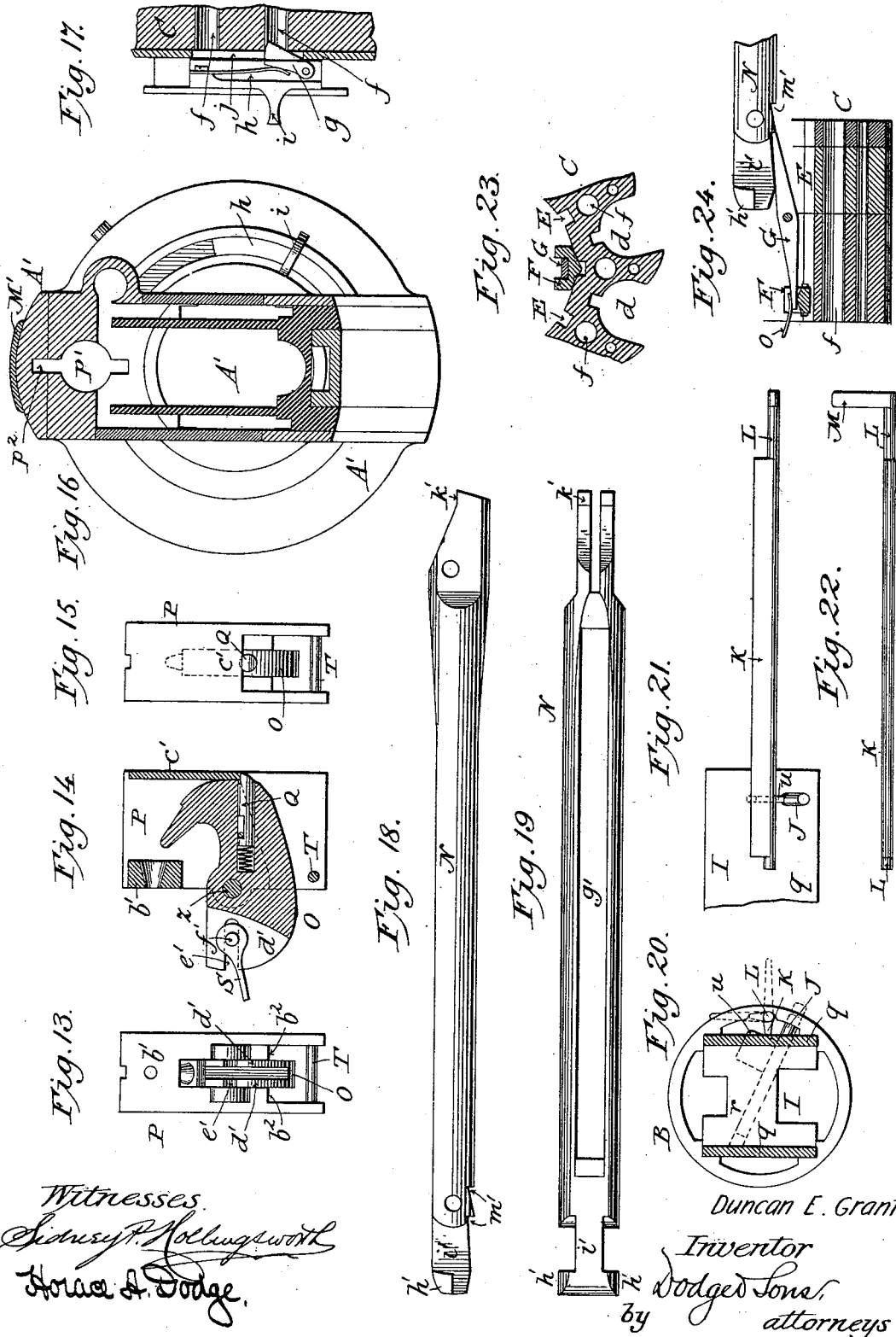
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D. E. GRANT.  
BREECH LOADING GUN.

No. 480,259.

Patented Aug. 9, 1892.



# UNITED STATES PATENT OFFICE.

DUNCAN EDMUND GRANT, OF QUEBEC, CANADA, ASSIGNOR OF ONE-THIRD  
TO ANNIE RITCHIE, OF SAME PLACE.

## BREECH-LOADING GUN.

SPECIFICATION forming part of Letters Patent No. 480,259, dated August 9, 1892.

Application filed June 24, 1891. Serial No. 397,315. (No model.)

*To all whom it may concern:*

Be it known that I, DUNCAN EDMUND GRANT, a citizen of the Dominion of Canada, residing at Quebec, in the Province of Quebec and Dominion of Canada, have invented certain new and useful Improvements in Breech-Loading Guns, of which the following is a specification.

My invention relates to breech-loading guns; and it consists in various features and details hereinafter set forth and claimed.

In the drawings, Figure 1 is a side view of my improved gun; Figs. 2 and 3, sectional views of that portion of the gun embraced by the bracket 2 in Fig. 1; Figs. 4 and 5, sectional views of that portion embraced by the bracket 3 of Fig. 1, Fig. 4 being a continuation of Fig. 2, and Fig. 5 a continuation of Fig. 3; Fig. 6, a vertical transverse sectional view on the line *x x* of Fig. 2, looking forwardly; Figs. 7 and 8, respectively side and sectional views of the magazine; Fig. 9, a vertical transverse sectional view on the line *y y* of Fig. 2, looking rearwardly; Fig. 10, a side view, partly in section, of the bolt and its carriage; Fig. 11, a vertical longitudinal sectional view through a portion of the casing; Fig. 12, a view of the latch for locking the parts against action; Figs. 13, 14, and 15, views illustrating in detail the construction of the hammer and its carrying-block; Fig. 16, a vertical transverse sectional view looking toward the front, with the bolt mechanism removed; Figs. 17, 18, 19, 20, 21, 22, 23, and 24, views illustrating various details.

The object of this invention is to construct a magazine or repeating gun which can be fired with great rapidity until the gun is empty without removing the gun from the shoulder, the eye from the object aimed at, or the finger from the trigger, or without shifting the grasp of either hand on the gun; to construct a gun which can be worked with the same facility when the marksman is lying down under cover as when he is standing up, so that when he is lying down no change in the position of the body which might expose him to view shall be necessary in order to work the mechanism, and to construct a gun which can with equal convenience be used as a single-shot gun, while the contents of the magazine are

held in reserve. The barrel is placed lower than usual, thus bringing it nearer the level of the shoulder and reducing correspondingly the upward throw of the gun at the moment of discharge, while the sights remain at the usual level, thus obviating the inconvenience of too straight a stock, the space between the barrel and the sights being utilized as a receptacle for the cleaning-rod. The magazine is placed in rear of the barrel, and being only the length of the cartridge the balance of the gun is not destroyed by the diminution of its contents, as in the under or over barrel magazine-guns, and as the cartridges are not placed in line with each other, as in these guns, the points of the bullets do not require to be flattened as they do for tubular magazines, and therefore perfectly-formed bullets can be used. The hammer and breech-bolt, as well as the rest of the mechanism, are completely inclosed within the casing and effectually protected from dust, sand, or rain. The cartridge is thrust into the barrel, the breech-bolt locked, the hammer cocked, and a spiral spring contained in the stock compressed by pulling the gun against the shoulder with both arms, and the empty shell is drawn from the barrel by the recoil of the spiral spring in the stock as the gun is moved forward from the shoulder.

Both as a repeater and as a single-shot gun it can be worked with greater rapidity and ease than any of the bolt, lever, or forehand slide guns at present in use, because when loading the power of both arms is utilized to press the gun against the shoulder, and the resistance thus divided between the two arms is scarcely felt by a person of ordinary strength, while in unloading no muscular effort is required beyond supporting the gun.

In the bolt, lever, and forehand slide guns one arm is used to hold the gun while the other works the bolt, lever, or slide, as the case may be, and as one arm is thus working against the other the muscular effort required is doubled.

As a military arm the present gun possesses the distinctly-novel advantage that as soon as the magazine has been exhausted that fact is indicated by the mechanism refusing to act, so that no person in the excitement of an en-

gagement could continue to operate the mechanism of his gun after the magazine was empty under the impression that he was still firing, as has frequently been known to happen with guns giving no indication of the exhaustion of the magazine.

The present gun has also the advantage, from a military point of view, that the movement when the magazine is being used is different from that employed when the gun is used as a single-shot gun, so that the use of the magazine at once becomes apparent and proper control of fire can be enforced by the officer.

A indicates the stock, which carries the casing A', in which the hammer, trigger, and attendant parts are mounted.

At a point below the rear end of the barrel there is a sleeve or hollow core B, Figs. 2 and 3, which is affixed rigidly in position by any suitable device, and mounted upon this sleeve or core is a rotatable magazine or cartridge-holder C, which is held against endwise movement. This magazine C is made up of three sections *a*, *b*, and *c*, as shown in Figs. 7 and 8, suitably united so as to move in unison, and is provided with a series of parallel seats or recesses *d*, Fig. 6, in its periphery to receive the cartridges. There are ten of these seats of equal dimensions, open at both ends, and adapted to come one after another into line with the barrel D, and an additional chamber *e*, of smaller size, open at both ends, but covered or roofed over, so as to prevent the entrance of a cartridge when it passes below the box or holder from which the magazine is filled.

For the purpose of rotating the magazine by hand when it is necessary to fill it the magazine is provided between the seats or recesses with notches *f* at its rear end, said notches being conveniently formed by making openings in the magazine from end to end, as shown in Figs. 2, 3, 6, 8, and 17. These notches are adapted to receive, one after the other, a spring-pressed pawl *g*, carried by a sliding plate *h*, having a thumb-piece or handle *i*, the said pawl projecting through a segmental slot *j*, formed in a portion of the casing, as shown in Fig. 17. The thumb-piece *i* projects from the side of the casing, as shown in Fig. 1, and by alternately raising and lowering it with the right hand the pawl will engage the notches *f* in succession and turn or rotate the magazine so as to bring a new chamber or seat *d* into line with the barrel at each upward movement of the thumb-piece *i*. The downward movement of the thumb-piece *i* does not affect the magazine, as it is held stationary while the pawl *g* is passing downward by a V-shaped block F, Fig. 23, which will be described farther on.

For the purpose of revolving the magazine when it is in use it is provided on its interior with eleven slots or ways E, each of which comprises a long straight portion *k* in section *a*, a short straight portion *m* in section *c*, and

a diagonal portion *l* in section *b*, extending between the parallel straight slots, as shown in Fig. 8. In section *b* there are also in line with the slots *k* and *m* eleven straight slots *l*, the floors of which form inclined planes rising from the level of the floor of the straight slots *m* to the top of the walls of the straight slots *k*. These slots are acted on by a pin, as will be explained when the movement of the mechanism is described. The slot E, diametrically opposite the chamber *e* has its sides cut away slightly at the place where the block F, already referred to, bears on it, (see Fig. 23,) so as to permit the said block to enter farther into it than it does into the other ten slots. The block F is arranged beneath the forward end of a short pivoted lever G and held in contact with the magazine by a light spring, which bears on the said lever, as shown in Figs. 2, 3, 23, and 24. The sides of the block F are beveled to enable it to be pushed out of the slots by the revolution of the magazine.

H, Figs. 2, 3, and 10, indicates the breech-bolt carried by a carriage I, which latter consists of two side plates *q* *q*, suitably connected at their front and rear ends, but separated one from the other, as shown in Figs. 6 and 10. At the forward end the sides of the carriage are united by a block *r*, which is recessed to receive a pin J, which projects out through the side of the carriage and through a slot *s*, formed in the side of core or sleeve B, Fig. 2, the outer end of the pin engaging the slots E, formed on the inner face of the magazine. This pin J is held normally in engagement with the slots E by a coiled spring *t*, Fig. 6, and is provided with a lug or projection *u*, against which the feather K on a shaft L is designed to act, as shown in Figs. 2, 6, 20, 21, and 22. When the feather K is in a vertical position, as shown in Fig. 6, the pin is permitted to enter the slots; but when the feather is turned down into a horizontal position the pin will be retracted and held out of the slots E. The position of the shaft L is shown in Figs. 2 and 6 and that of its handle M in Fig. 1. At its forward end the carriage I is pivotally connected with a lever or bar N, hereinafter referred to. The bolt proper H carries the firing-pin *v*, the pivoted extracting-lever *w*, with its spring *w*<sup>2</sup>, and the retractor *x*, as clearly shown in Figs. 2 and 3, and slides backward and forward in an opening *p*' in the casing A'.

Over the opening *p*' for a portion of its length and connecting with it is cut a slot *p*<sup>2</sup>, with a beveled end, as shown in Figs. 2, 3, and 9. As the breech-bolt moves backward the upper end of the retractor *x* strikes against the beveled end of the slot *p*<sup>2</sup> and is gradually depressed until it has passed out of the slot, thereby withdrawing the firing-pin *v*, bearing down the rear end of the extractor-lever *w*, and raising its forward end until the flange of the cartridge is released from its grasp, as shown in Fig. 2.

Contained in a bore  $U'$  in the casing parallel with the bore of the breech-bolt is the ejector  $T'$ , Fig. 9, which is connected with the carriage  $I$  by a lug  $t^2$ , which projects through a slot cut in the wall of the chamber  $U'$  for its entire length, as shown in Figs. 2, 3, and 9, and enters a recess formed for its reception in the shoulder of the carriage  $I$ .

$O$  indicates the hammer, which is pivoted on a pin  $z$  in a hollow block  $P$ , which latter forms the locking-block of the breech-bolt, as well as the sliding carriage of the hammer. Block  $P$  is mounted in the casing  $A'$  between two guiding ribs or ways  $a'$ , as shown in Figs. 2, 3, and 11, so that it may be raised to form a lock or abutment for the breech-bolt, as shown in Fig. 3, or lowered to occupy the position shown in Fig. 2. The lower portion of the front wall of the block  $P$  is cut away and the upper portion  $b'$  perforated to admit of the passage through it of the nose of the hammer when the gun is fired, as will be clearly seen on reference to Figs. 13 and 15. The lower portion of the back wall is also cut away to a considerable extent, and against the upper portion  $c'$  the outer end of the spring-actuated pin  $Q$ , carried by the hammer, rests when the hammer is cocked, as shown in Figs. 14 and 15. The sides of the locking-block  $P$  are also cut away internally, as shown in Figs. 2, 3, 13, 14, and 15, so as to form the shoulder  $b^2$ , and through the lower forward corners of the block a pin  $T$  is passed, as shown in the same figures. The lower end of the hammer is bifurcated or provided with two separated arms  $d'$ , between which the rear end of the mainspring  $S$  works, the forward end of said spring being attached to the casing  $A'$  at its front end. The arms  $d'$  are slotted, as at  $e'$ , Figs. 2, 3, 13, and 14, to receive a pin  $f'$ , passing transversely through the enlarged head or end of the spring, thereby producing a sliding connection between the hammer and the mainspring. The lever or bar  $N$ , hereinbefore referred to as being attached to the carriage  $I$ , is shown in plan and in side elevation in Figs. 18 and 19, upon reference to which figures it will be seen to have a longitudinal slot or opening  $g'$ , through which the hammer may work. This lever passes between the side walls of locking-block  $P$ , as shown in Figs. 2, 3, and 9, and bears on its upper side against the shoulders  $b^2$  of the block and on its lower side against the cross bar or pin  $T$ , so that when the lever is raised it will bear on the shoulders  $b^2$  and raise the block and when lowered will bear on the cross-pin  $T$  and draw down the block.

It will be observed upon reference to Figs. 2 and 3 that the point of attachment to the forward end of the mainspring is above the pivot of the hammer when the latter is in its lowest position and below said pivot when the hammer is in its highest position. In other words, the sliding connection between the hammer and the spring allows the spring to maintain its normal position when the block

and hammer are lowered, Fig. 2; but when the block and hammer are raised and the rocking of the hammer has been arrested by its pin  $Q$  the rear end of the spring will be raised and put under the tension necessary to actuate the hammer when the latter is released.

The lever or rod  $N$ , which rises and falls to perform the functions just alluded to, is provided at its forward end with a T-shaped head, or, in other words, is provided with two laterally-extending lugs  $h'$ , which project from a flattened neck  $i'$ , the rear face of the lugs being curved on the arc of a circle, as shown in Figs. 2, 3, 18, and 24, so as to engage the correspondingly-curved front faces of a pair of lugs  $j', j''$ , projecting upwardly from the bottom plate of the core  $B$  near its forward end. At its forward end the lever  $N$  is provided on its under face with one or more notches  $m'$ , with which when the magazine is empty and the mechanism in the position shown in Figs. 2 and 4 the rear end of the lever  $G$  engages, as shown in Fig. 24, thereby preventing a forward longitudinal movement of the lever or bar  $N$ . At its rear end it is bifurcated to receive the link  $U$ , which connects it with the rod  $W$ , attached to the movable portion of the heel-plate, and in rear of the pivotal connections with the link it is provided with the extension  $k'$ , Figs. 3 and 4.

The pivot  $q'$ , which hinges the link  $U$  to the lever  $N$ , is placed in a higher plane than the pivot  $r'$ , which hinges it to the hollow rod  $W$ , a construction and arrangement which results in the elevation of the rear end of the lever  $N$  when the hollow rod  $W$  is moved forward; but to prevent the rising of the lever  $N$  before the cartridge has been driven "home" in the barrel a locking-piece  $V$  is provided, which fits and slides freely within the hollow rod  $W$ , and, when the mechanism is in the position shown in Figs. 2 and 4, is pressed forward by a spiral spring  $F'$ , also contained in the hollow rod  $W$ , and its shoulder  $n'$  rests against the solid portion  $C'$  of the rod  $W$ , and its arm  $l'$  projects over the extension  $k'$  of the lever  $N$ . Both the locking-piece  $V$  and the hollow rod  $W$  are slotted horizontally, as at  $Z$ , Fig. 4, to admit a pin  $B'$ , which passes transversely through both them and the stock. The slot in the hollow rod  $W$  is considerably longer than that in locking-piece  $V$ , and the pin  $B'$  is so placed that when the lever  $N$  in its forward movement has reached within about an eighth of an inch of the point at which it requires to rise the locking-piece  $V$  will be held stationary by the rear end of its slot striking against the transverse pin  $B'$ , and the lever  $N$  being still urged forward by the rod  $W$ , its extension  $k'$  will pass clear of the arm  $l'$  of the locking-piece  $V$  and its rear end be immediately forced upward by the link  $U$ .

To prevent rearward longitudinal movement of the rod  $W$ , except when desired, a

latch D' is provided, as shown in front elevation in Fig. 12 and in section in Figs. 2 and 3, which consists of a stem E', which projects through the casing, and a yoke or open frame straddling the tube W, as shown in Figs. 2 and 3, and in the lower side of the solid portion at the forward end of the hollow rod W a notch o' is cut for the reception of the cross-bar d'' of the latch D'.

R indicates the trigger, pivoted at s' in the trigger-guard plate and provided with an upwardly-extending arm G', which, as shown in Fig. 3, is in position to bear against the pin Q of the hammer and release the latter.

A light spring H' serves the twofold purpose of keeping the trigger in proper position and holding the cross-bar d'' of the latch D' up in position to engage the tube W.

I' indicates a sliding plate or safety device (for preventing accidental movement of the trigger R or latch D' when the gun is not being used) mounted in a recess at the upper side of the trigger-guard plate and straddling the trigger, as shown in Figs. 2 and 3. This plate carries a spring or spring-arm J', having a thumb-piece K', said arm being adapted to engage one or the other of two notches l', formed in the upper face of the trigger-guard plate to hold the "safety" either "on" or "off." At its rear end the plate or safety is provided with a bar L', which when the said plate is moved forward comes under the cross-bar d'' of the latch D' and over the rear end of the trigger R, thereby preventing the actuation of either the latch or trigger.

In the shell or casing A' directly above the axis of the magazine there is formed an opening y, which is adapted to be closed by a sliding cover M', as shown in Figs. 1, 2, 3, and 6. This opening is formed with ledges y<sup>2</sup> on its inner walls to support the package or holder in which the cartridges for use in the magazine will advisably be placed.

Immediately above the barrel are one or more chambers or receptacles N', which are closed at their rear ends by a rotatable plug O', having one or more openings P' in line with the chambers or receptacles. This plug will be flattened on one side (not shown) to present a suitable bearing-face for a spring Q', placed vertically in the casing, as shown in Figs. 2 and 3, so as to prevent the plug from being accidentally turned.

When the magazine requires to be filled, the knob E' of the latch D' is depressed with the thumb of the right hand, so that the lower cross-bar d'' of said latch will ride out of the notch or recess o' in the lower face of the forward end of the tube W, and as soon as thus released the spring Y will carry the heel-plate X and its attached tube W rearwardly, as shown in Fig. 4, and as the rod N is connected with the forward end of the tube by the link U of course rod N will also be carried rearwardly and the parts will assume the position shown in Figs. 2 and 4. The package containing the cartridges is now inserted

into the opening y in the framework and is supported upon the ledges y<sup>2</sup>, while the cartridges fall one after another into the respective chambers d in the periphery of the magazine, rotation of the magazine in the direction of the arrow in Fig. 6 being effected through the instrumentality of the sliding plate h and the pawl g, which latter engages the notches or openings f, formed in the rear end of the magazine.

It will be noticed upon reference to Figs. 2, 3, 7, and 8 that the magazine is provided with a circumferential groove R', which extends partially around the same. This groove is adapted to receive one end of a screw or stud S', projecting through the side of the shell or casing, as shown in Fig. 6, the construction and arrangement being such that when ten cartridges have been inserted into the magazine the end wall of the slot or groove R' will come against the screw S' and prevent further rotation of the magazine in that direction. The empty cartridge-package is now removed and the gun raised to the shoulder and pressed against it with both arms. The pressure upon the sliding heel-plate X is transmitted through the tube or rod W to the link U and from it to the pivoted bar or lever N; but the rear end of the said bar or lever N is prevented from rising because the nose l' of the locking-piece V is at this time resting upon the extension k' of the bar or lever N, as clearly shown in Fig. 4. Thus tube W, link U, and lever N form for the time being, as it were, one rod, and as the heel-plate X yields to the pressure against the shoulder they push before them the carriage I of the breech-bolt H, and as the breech-bolt advances along the uppermost chamber of the magazine C it carries the cartridge from said chamber into the barrel. At the same time the ejector T' passes through the covered chamber in which there is no cartridge and the carriage I passes through the core B, on which the cylinder or magazine turns. As the carriage thus moves forward the pin J passes along the short slot m in the rear section c of the magazine C, and rises as it passes up along the inclined face of slot l<sup>2</sup>, formed in the central section b. After riding over this inclined face the pin drops into the slot k, formed in the front section a, and finally passes out of said slot into the forward end of the core B without having effected any movement or rotation of the magazine. As the head of the breech-bolt H approaches the rear end of the barrel D, the rear end of the slot Z in the locking-piece V strikes against the pin B', which passes transversely through it and through the longer slot V' in the tube W, and the locking piece or rod V is held stationary, while the tube W, link U, and lever or bar N continue to advance, pushing the carriage I before them until the cartridge is driven home into the barrel and the rear end of the lever N has passed clear of the nose or forward end l' of the rod V. The link U, the ends of which are pivoted above

and below the central line of the tube W, then forces the rear end of the lever N upward, while its forward end dips downward slightly, the lugs  $h'$  moving in the arc of a circle concentric with the rounded front face of the lugs or projections  $j'$  of the core B. As the lever N thus rises it raises the block P, carrying the hammer O, and as the block ascends the hammer is rocked or tipped forwardly on its pivot by the mainspring S until the spring-actuated pin Q of the hammer strikes against the rear cross-wall  $c'$  of the said block. Further rotation of the hammer O being thus prevented while the block continues to ascend, the rearward end of the mainspring S, which has a sliding connection with the hammer, is carried upward and put under tension, as before described. When the link U reaches a position about at right angles with the rod or lever N, the movable heel-plate X will be flush with the butt of the stock, the ascent of the block P will cease and the notch or recess  $o'$  at the forward end of the tube W will come into line with the cross-bar  $d''$  of the latch. When the parts reach this position, the spring H' throws the cross-bar  $d''$  of the latch D' upward into engagement with the notch of the tube W, thereby preventing said tube from being drawn rearward by its spring Y should the pressure of the gun against the shoulder be relaxed. The block P is now in firing position, and upon reference to Fig. 3 will be seen to be interposed between the rear end of the breech-bolt and the shoulders of the casing on either side of the bore in which the breech-bolt moves, thereby forming a solid support for the breech-bolt. Upon reference to this figure it will be observed that the hammer is also in firing position, the mainspring S having been put under tension by the ascent of the block P, the hammer being prevented from striking the shell by the pin Q, the end of which is directly opposite the upwardly-extending arm G' of the trigger.

To discharge the gun, it is only necessary to pull the trigger to cause its arm G' to push the pin Q into the body of the hammer and out of engagement with the rear cross-wall  $c'$  of the block P. When the gun has been discharged, the latch D' is again pressed with the thumb of the right hand and the tube W thereby released. The pressure of the gun against the shoulder is then relaxed and the coil-spring Y permitted to push it away horizontally, while the heel-plate X still rests against the shoulder. As this takes place the rear end of link U is drawn rearward horizontally by the tube W and pulls down the lever N, and as this lever rests upon the pin T of the block P the block will of course be carried downward with the lever. As the block P descends the hammer O is rocked backward upon its pivot  $z$  by the mainspring S, as before described, and, as shown in Fig. 2, the spring-actuated pin riding past the cross-wall  $c'$  resumes its normal position as soon as it passes by said cross-wall. As the rear end

of the lever N is drawn downward the forward end is raised, and as it reaches a horizontal position its lugs  $h'$ , which up to that time prevented any rearward movement of the lever, clear the projections or lugs  $j'$  on the floor of the core B and lever N begins its rearward movement, drawing with it the carriage I and the breech-bolt H'. As this rearward movement proceeds the forward end or nose  $l'$  of the locking-piece V is pushed over the rear end or extension  $l'$  of the lever N by the coiled spring F', contained within the tube W, so that when the heel-plate X is again forced forward the rear end of the lever N will not be able to rise and bear or bind against the interior surface of the sleeve or bushing  $a^2$ , through which it passes.

When the parts are in firing position, as represented in Fig. 3, the extractor-lever is in engagement with the flange of the cartridge-shell, and as the breech-bolt moves rearwardly after the gun has been discharged the empty shell is withdrawn from the barrel until it is well within the magazine C. At this point the upper end or nose of the retractor  $x$  comes into contact with the beveled end wall of the slot  $p^2$  above the opening through which the breech-bolt moves and is depressed by said end wall into such position as to bear upon the rear end of the extracting-lever  $w$  and to raise the forward end of said lever sufficiently to release the flange of the shell from its hold, as clearly shown in Fig. 2. The bore or opening formed in the frame or casing to receive the breech-bolt is of a diameter slightly less than the diameter of the flange of the cartridge, and the empty shell cannot therefore follow the breech-bolt in its backward movement and is consequently left in the magazine when released by the extractor. During the forward movement of the breech-bolt the pin J at the forward end of the carriage I was passing along the straight portion  $k$  of the slot E, formed in the magazine, and by the time that the head of the breech-bolt passes out of the magazine the pin J reaches the central section  $b$  of the magazine, where it strikes against the vertical wall at the forward end of the slot E. As the pin cannot ride up this vertical wall, it enters the diagonal slot  $l$ ; but as the carriage to which the pin is attached moves only in a straight line the working of the pin along the spiral or inclined slot serves to turn or rotate the magazine until the pin reaches the short straight slot  $n$ , formed in the rear section  $c$  of the magazine. As the pin J reaches this rear section  $c$ , the rotation of the magazine ceases and the pin finally passes out of the rear end of the slot; but the slot remains in line with the pin, as any movement of the cylinder is prevented by the pawl F, Figs. 23 and 24, which, pressed downward through the floor of the core by the spring  $o$ , engages whichever slot for the time being is beneath it and holds the magazine stationary. The rotation of the magazine C, just described, has brought the chamber in which

the empty shell was left opposite to the ejector T' and one containing an unexploded cartridge opposite the breech-bolt II. When, therefore, the breech-bolt again advances, the empty shell will be driven out by the ejector through the circular opening in the front of the casing and the unexploded cartridge will be carried by the breech-bolt from the magazine into the barrel. When ten cartridges have been fired and the empty shells extracted, as described, the covered chamber *e* of the magazine has come opposite the barrel and the chamber containing the empty shell of the cartridge last used comes opposite the ejector T'. As before stated, the groove E, formed in the cylinder or magazine directly opposite the chamber *e*, is somewhat deeper or wider than the other slots E at the point where the pawl F bears on it, so that when the cartridges have all been fired and the covered opening *e* has come opposite the barrel, as above stated, the pawl F will descend deeper into the slot E, diametrically opposite the barrel at that moment, than it did into the others and throw the rear end of the lever G upward into engagement with one of the notches of the lever N, so as to prevent reciprocation of the lever N and the pushing of the movable heel-plate X into the stock. This refusal of the mechanism to work is the intimation that the magazine is exhausted, and the gun is therefore taken from the shoulder, and as it is lowered the empty shell of the last cartridge slides out of the opening in line with the ejector.

In using the gun as a single-shot arm the cover M' is slid back and the feather K of the shaft L, which when the magazine is in use is in a vertical position, is now turned down by means of its handle M, Fig. 1, to a horizontal position, as shown in Fig. 20, so as to bear upon the lug or projection *u* of the pin J and force the said pin backward until it is clear of the slot or slots E of the magazine. There being nothing then to cause the revolution or rotation of the magazine or cylinder, it will remain stationary, while the rest of the mechanism operates precisely as before stated. The empty shell when withdrawn from the barrel is left by the extractor in the top chamber of the magazine or cylinder, which is then opposite the barrel, and may be removed by simply tipping the gun as it is taken from the shoulder to insert the next cartridge.

Having thus described my invention, what I claim is—

1. In a gun, the combination, with a longitudinally-reciprocating breech-bolt and means for reciprocating the same, of a vertically-reciprocating locking-block carrying the hammer, means for raising and lowering the block, and ways or guides formed in the casing, the said block being adapted to move upward behind the rear end of the breech-bolt, so as to lock the breech-bolt and at the same time bring the hammer in line with the firing-pin.

2. In a gun, the combination, with the longitudinally-reciprocating breech-bolt, of a carriage or carrier for said breech-bolt, comprising two separated plates *q q*, means for moving the said carrier and breech-bolt longitudinally, a vertically-reciprocating locking-block provided with a hammer and adapted to move between the plates of the breech-bolt carriage, and means for raising and lowering the block.

3. In a gun, the combination, with the reciprocating breech-bolt, of the carriage or carrier for said breech-bolt, comprising two separated plates *q q*, guides or ways *a' a'*, formed in the sides of the shell or casing of the gun to permit the longitudinal movement thereof through of the bolt-carriage, a vertically-reciprocating locking-block P, mounted in the ways or guides *a' a'* of the frame between the plates *q q* of the carriage, a hammer carried by said block, and means, substantially such as shown and described, for raising and lowering the block.

4. In a gun, the combination, with the longitudinally-reciprocating breech-bolt, the vertically-reciprocating locking-block provided with a hammer, and means for reciprocating the block and the breech-bolt, of a mainspring connected with the hammer, substantially as shown and described, whereby when the block is lowered the mainspring will rock the hammer backward and when the block is raised the mainspring will serve to cock the hammer.

5. In a gun, the combination, with the longitudinally-reciprocating breech-bolt, the vertically-reciprocating locking-block provided with a hammer, and means for reciprocating the block and the breech-bolt, of a mainspring affixed at one end to the main frame of the gun and having a sliding connection at its opposite end with a hammer, the attachment of the mainspring to the frame of the gun being at a point between the limits of the vertical movement of the pivot of the hammer.

6. In a gun, the combination, with a locking-block P, having a shoulder *c'*, of a hammer O, pivoted in the block and provided with a spring-actuated pin Q, adapted to engage the said shoulder *c'*, a mainspring connected with the hammer, means for raising and lowering the block, and a trigger having an arm G', adapted to act upon the exposed end of the pin Q, all substantially as shown.

7. In a gun, the combination, with the hollow block P, of a hammer O, mounted therein and having the separated slotted arms *d'*, a mainspring affixed rigidly at one end to the frame of the gun and provided at its opposite end with a pin *f'* to project into the slots formed in the arms *d'* of the hammer, and means for raising and lowering the block.

8. In a gun, the combination, with the vertically-moving block P, having a shoulder *c'* and a pin T, of a hammer O, pivoted in the block, a mainspring connected with the hammer, and means for raising and lowering the block.

9. In a gun, the combination, with the lon-

5 longitudinally-reciprocating breech-bolt having a carriage composed of two separated plates, of a block P, provided with a hammer and adapted to work vertically through the carriage of the breech-bolt, and a lever connected at its forward end with the carriage and passing therethrough and also through the block P, and means for reciprocating the bar or lever and also for raising and lowering the same.

10 10. In a gun, the combination, with the reciprocating breech-bolt provided with a carriage, of a bar or lever N, pivoted at its forward end to the forward end of the carriage, a lug *j'*, adapted to engage the lever and to hold the same against longitudinal rearward movement while being raised and lowered, a vertically-sliding block provided with a hammer and adapted to be raised and lowered by the bar or lever, and means, substantially such as shown and described, for raising and lowering the rear end of the bar or lever and also for reciprocating the said bar or lever longitudinally.

25 11. In a gun, the combination, with the longitudinally-reciprocating breech-bolt provided with a carriage, of a vertically-reciprocating locking-block provided with a hammer, a lever pivoted near its forward end to the carriage and provided with laterally-extending lugs *h'* and a flattened neck *i'* in rear of said lugs, and lugs *j'*, formed in the frame of the gun and having their upper faces on the level of the lower faces of the lugs *h'* and their front faces curved on the arc of a circle concentric with the pivot of said bar or lever N, whereby when the rear end of said bar or lever is raised the engagement of the lugs will prevent rearward longitudinal movement of the lever.

40 12. In a gun, the combination, with a rotatable magazine, of a longitudinally-reciprocating breech-bolt provided with a carriage, means, substantially such as shown and described, for causing the rotation of the magazine at the backward movement of the carriage, a bar or lever N, pivoted to the carriage and adapted to move the latter lengthwise, and a lever G, adapted to automatically engage the bar or lever N when the magazine is exhausted and prevent the forward movement of said lever.

55 13. In a gun, the combination, with a rotatable magazine, of a longitudinally-reciprocating breech-bolt having a carriage which is adapted to cause the rotation of the magazine by its reciprocation, and means for reciprocating said carriage and breech-bolt.

60 14. In a gun, the combination, with a rotatable magazine having chambers or seats in its periphery for the reception of the cartridges, of a hollow core upon which said magazine is adapted to turn or rotate, a series of slots, substantially as shown and described, formed on the inner face of the cylinder or magazine, a longitudinally-reciprocating breech-bolt having a carriage which slides

within the hollow core, a pin projecting from the carriage and adapted to engage the slots formed in the magazine, and means for reciprocating the said carriage and breech-bolt longitudinally.

15. In a gun, the combination, with a rotatable magazine provided with a series of chambers or seats in its periphery to receive the cartridges and with a series of slots corresponding in number to the seats or chambers in its periphery, one of which slots is wider at one portion of its length than the others, of a longitudinally-reciprocating breech-bolt provided with a carriage having a pin to engage the slots in the magazine, a bar or lever N, adapted to reciprocate the carriage and breech-bolt and thereby cause the rotation of the cylinder or magazine, a V-shaped block or pawl F, adapted to enter each slot in succession as they pass under it, a pivoted lever G, which rests with its forward end on the block F and the rear end of which is adapted when sufficiently raised to engage the lever N, and a spring which presses the lever G and block F downward, as shown and described, so that as the deepest slot passes under the pawl F the said pawl and the forward end of lever G shall descend farther than when the other slots pass under them, while the rear end of the lever is correspondingly raised into engagement with the lever N, and thereby prevents the forward movement of the same.

16. In a gun, the combination, with the rotatable magazine provided with a series of seats or chambers *d* in its periphery open at both ends and on the outer side and with an additional seat or opening *e*, open at both ends, but closed on its outer side, of a stud or projection *S'*, secured to the casing and adapted to project into a peripheral slot cut partially around the magazine for the purpose of limiting the backward movement of the magazine, and means for rotating the magazine.

17. In a gun, the combination, with a rotatable magazine provided with a series of notches or openings *f* in its rear face, of a vertically-reciprocating plate *h*, provided with a thumb-piece *i* and with a pawl *g*, the said pawl projecting through a slot *j*, formed in the casing of the gun and adapted to engage the notches or openings *f* for the purpose of revolving the magazine by hand, all substantially as shown and described.

18. In combination with a rotatable magazine provided with the slots E, the breech-bolt provided with a carriage adapted to slide through the center of the magazine, a spring-actuated pin J, carried by the carriage and adapted to engage the slots, and a shaft journaled in the frame of the gun and adapted to retract the said pin and to hold the same retracted, as and for the purpose set forth.

19. In combination with a rotatable magazine provided with the slots E, the breech-bolt provided with a carriage, a pin J, mounted in the carriage and provided with a lug or shoulder *u*, and a shaft L, journaled in the

frame and provided with a feather or lateral projection K, adapted to bear against the lug *u* and to thereby retract the pin and to hold the same out of the slots E.

20. In combination with the hollow core B, the rotatable magazine mounted thereon and means, substantially such as shown, working through the hollow core and adapted to rotate the magazine.

21. In combination with the reciprocating breech-bolt and its carriage, the pin J, mounted upon the carriage, and a rotatable cylinder provided with a series of grooves E, said grooves comprising a long straight portion *k*, a short oblique portion *l*, and a short straight section *m* in line with the straight section *k*, and a straight section *l*<sup>2</sup>, having an inclined bottom.

22. In combination with the reciprocating breech-bolt and carriage having the pin J, the rotatable magazine provided with a series of slots E, with which the pin is adapted to engage, each of the said slots comprising two straight portions *k* and *m*, an intermediate oblique portion *l*, and a straight portion *l*<sup>2</sup>, formed between the slots *l* and *m* and inclined upward, as shown.

23. In combination with the rotatable magazine or cylinder having a series of straight slots *m*, a series of diagonal slots *l*, and short straight slots *l*<sup>2</sup>, the floors of which incline upward, as shown, a longitudinally-reciprocating carriage and breech-bolt, and a pin carried by the carriage to engage the slots.

24. In combination with the reciprocating bolt H, the extracting-lever *w*, pivoted thereto, and a spring *w*<sup>2</sup>, attached to the forward end of the breech-bolt in the opposite side from the lever and bearing with its rear end on the rear end of the lever.

25. In combination with a reciprocating breech-bolt, the extracting-lever *w*, the spring *w*<sup>2</sup>, and the longitudinally-moving firing-pin *v*, a retracting-lever *x*, pivoted in the breech-bolt and having its forward arm projecting over the rear end of the extracting-lever *w*, so that when in the course of the rearward movement of the breech-bolt the forward arm of the retractor is depressed by contact with the casing it bears down the rear end of the extracting-lever *w*, tilting its forward end or head, and releases the flange of the cartridge from its grasp at the same time that the vertical arm withdraws the firing-pin *v*, and when on the forward movement of the breech-bolt the retractor passes clear of the casing, the spring *w*<sup>2</sup>, acting on the rear end of the extractor-lever *w*, bears it and the forward arm of the retractor *x* upward and moves the vertical arm clear of the course of the firing-pin.

26. In a gun, the combination of the reciprocating breech-bolt moving in a bore *p*' in the shell or casing of the gun and the carriage I of the breech-bolt with an ejector T', moving in a chamber U', parallel with the bore *p*' and connected with the carriage I by the lug or projection *l*<sup>2</sup>, substantially as shown.

27. In combination with the trigger R, the

sliding plate J', provided with a spring-pawl K', adapted to engage the recesses *l*', and the bar L', carried by said plate I' and adapted to move inward over the rear end of the trigger and under the rear end of latch D, as and for the purpose set forth.

28. In a gun, the combination, with the reciprocating breech-bolt, the lever N for actuating the same, the hollow rod or tube W, connected with the lever for actuating the latter and provided with a notch or recess *o*' on its lower face, of a latch D', provided on its lower end with a cross-bar *d*'', adapted to engage the notch or recess *o*' and having its upper end projecting through the rear end of the casing in such a position as to allow of its being conveniently depressed by the thumb of the right hand without shifting the grip of the hand on the gun when it is necessary to release tube *w* from engagement with the cross-bar *d*'.

29. In a gun, the combination, with a longitudinally-reciprocating breech-bolt, of the lever N, the link U, a tube or rod W, connected with the lever by said link U, a movable heel-plate X, connected with the rear end of the tube W and adapted to slide within the stock, as shown and described, a spring Y, surrounding tube W and serving to urge said tube rearwardly, a rod V, mounted within the tube and having a nose *l*' to engage the rear end of the lever N, and a spring E', serving to maintain the rod V in engagement with the lever N.

30. In a gun, the combination, with the reciprocating breech-bolt and its actuating-lever N, of the tube or rod W, connected at its forward end with the rear end of the lever by a link U and at its rear end with the heel-plate X and provided with a locking-rod V, the forward pivot of the link U being located above the axis of the tube W, whereby when the tube is moved forward longitudinally and the rear end of the lever N released from the locking-rod V the said rear end of the lever will be raised or elevated, substantially as and for the purpose set forth.

31. In combination with the reciprocating breech-bolt, the lever N for actuating the same, the rod or tube W, connected with the lever by a link U and provided with a shoulder C' and also with a longitudinal slot Z, the rod or locking-rod V, provided with a similar but shorter slot Z and with a shoulder *n*', and a nose *l*', projecting over the rear end of lever N, of a pin B', passing transversely through the slots Z in the rod V and tube W and the stock of the gun for the purpose of limiting the movement of locking-rod V, and thereby releasing lever N, substantially as shown and described.

32. In a gun of the class described, the combination, with the trigger R and the latch D', of the single spring H', adapted to hold the trigger and the latch in their proper positions.

33. In a gun, the combination, with a reciprocating breech-bolt and its carriage, of a rotatable magazine actuated by the carriage as the latter reciprocates, a movable heel-

ate, and intermediate connections, substantially such as shown and described, between the heel-plate and the bolt-carriage.

34. In a gun, the combination, with a reciprocating breech-bolt and its carriage, of a vertically-moving locking-block carrying the hammer, a movable heel-plate, and intermediate connections, substantially such as shown and described, between the heel-plate and the breech-bolt carriage and hammer-block.

35. In a gun, the combination, with a reciprocating breech-bolt and its carriage, of a vertically-moving locking-block carrying a hammer, a movable heel-plate, intermediate

connections between the heel-plate and the bolt-carriage and hammer-block, and a locking device which when the heel-plate or the main body of the gun move one with reference to the other a predetermined distance shall automatically release the said intermediate connections and permit the raising of the hammer-block and hammer.

In witness whereof I hereunto set my hand in the presence of two witnesses.

DUNCAN EDMUND GRANT.

Witnesses:

JOHN RITCHIE,  
A. R. DRYDEN.