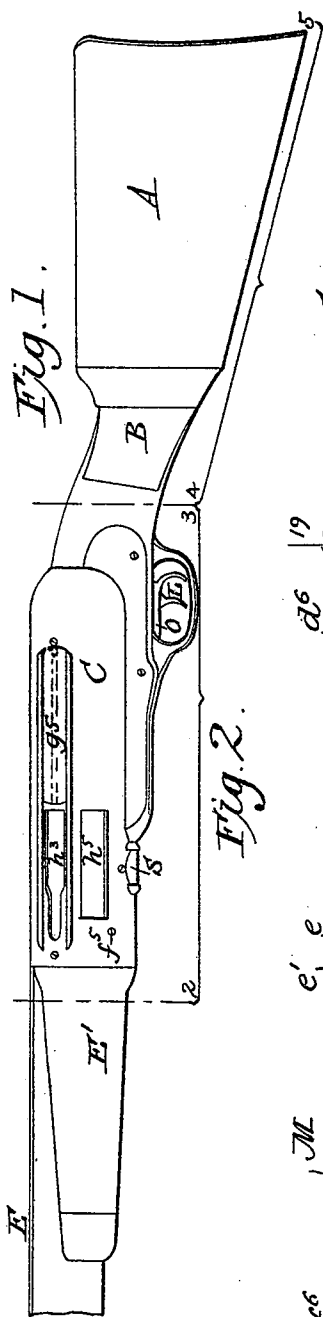


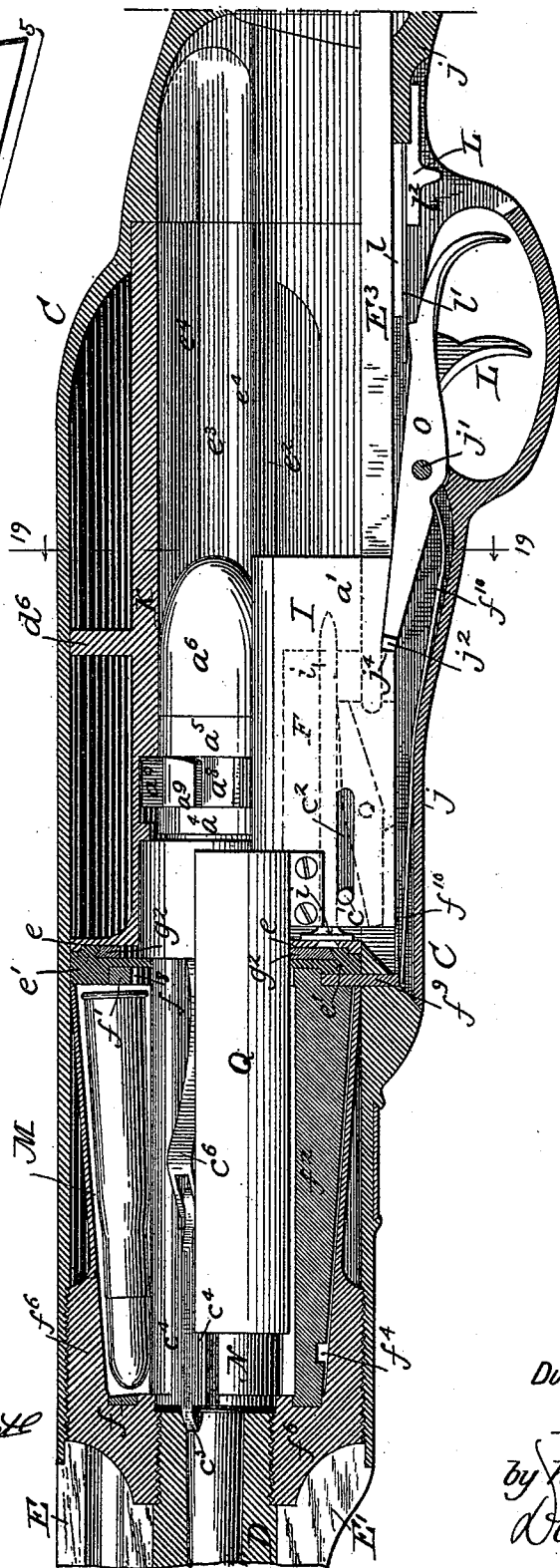
D. E. GRANT.
BREECH LOADING GUN.

No. 494,330.

Patented Mar. 28, 1893.



Witnesses
Edmund P. Springwell
Horace A. Dodge



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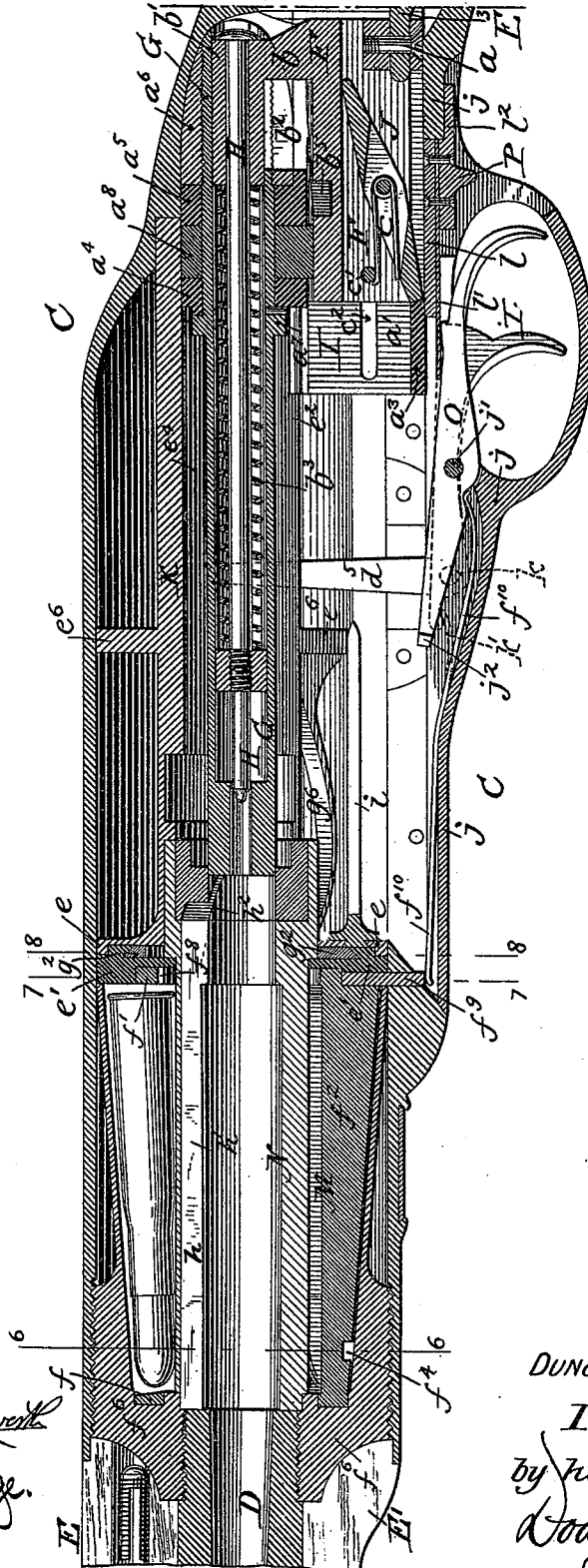
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BREECH LOADING GUN.

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Witnesses.

Sidney P. Mellingsworth
Hornell A. Dodge.

DUNCAN E. GRANT

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Dodge & Sons.

(No Model.)

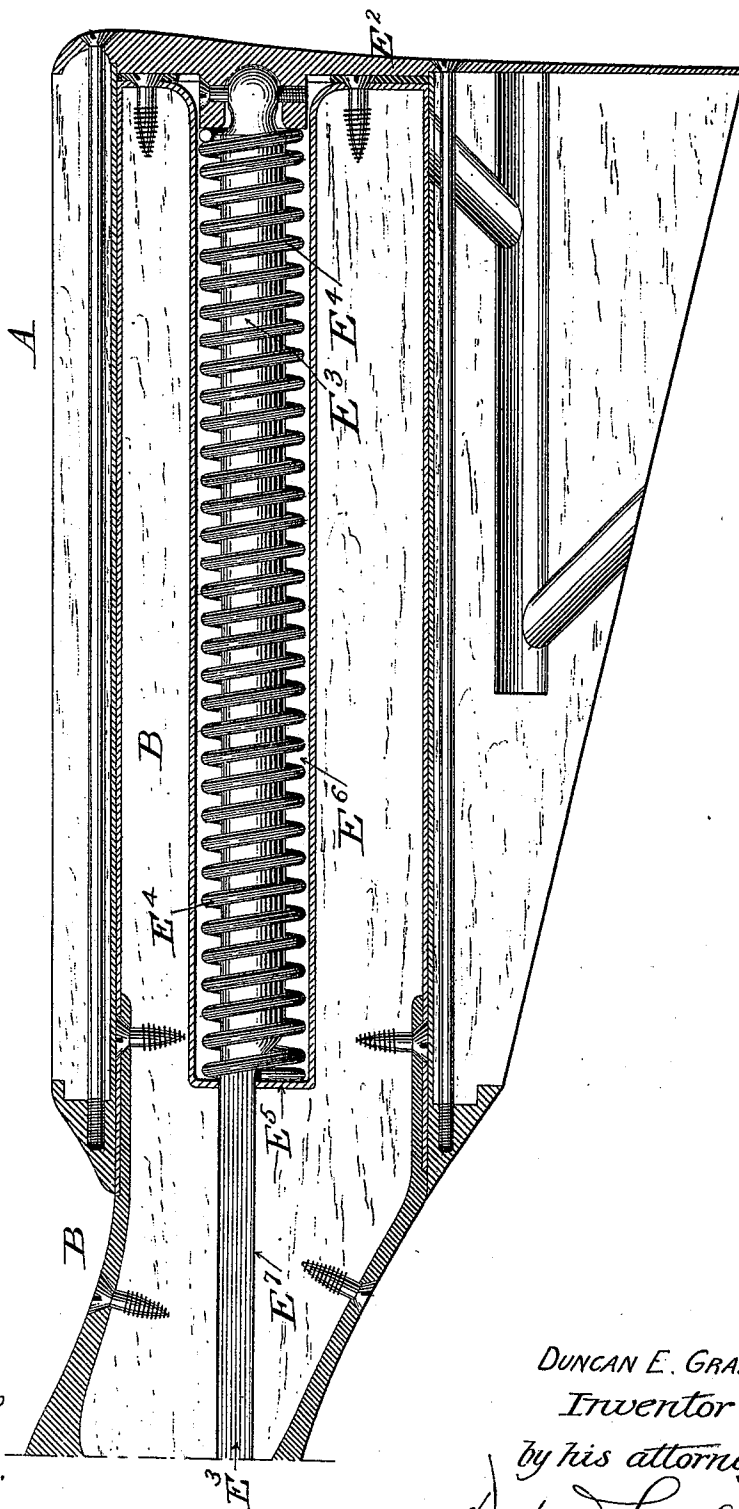
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Fig. 4.



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(No Model.)

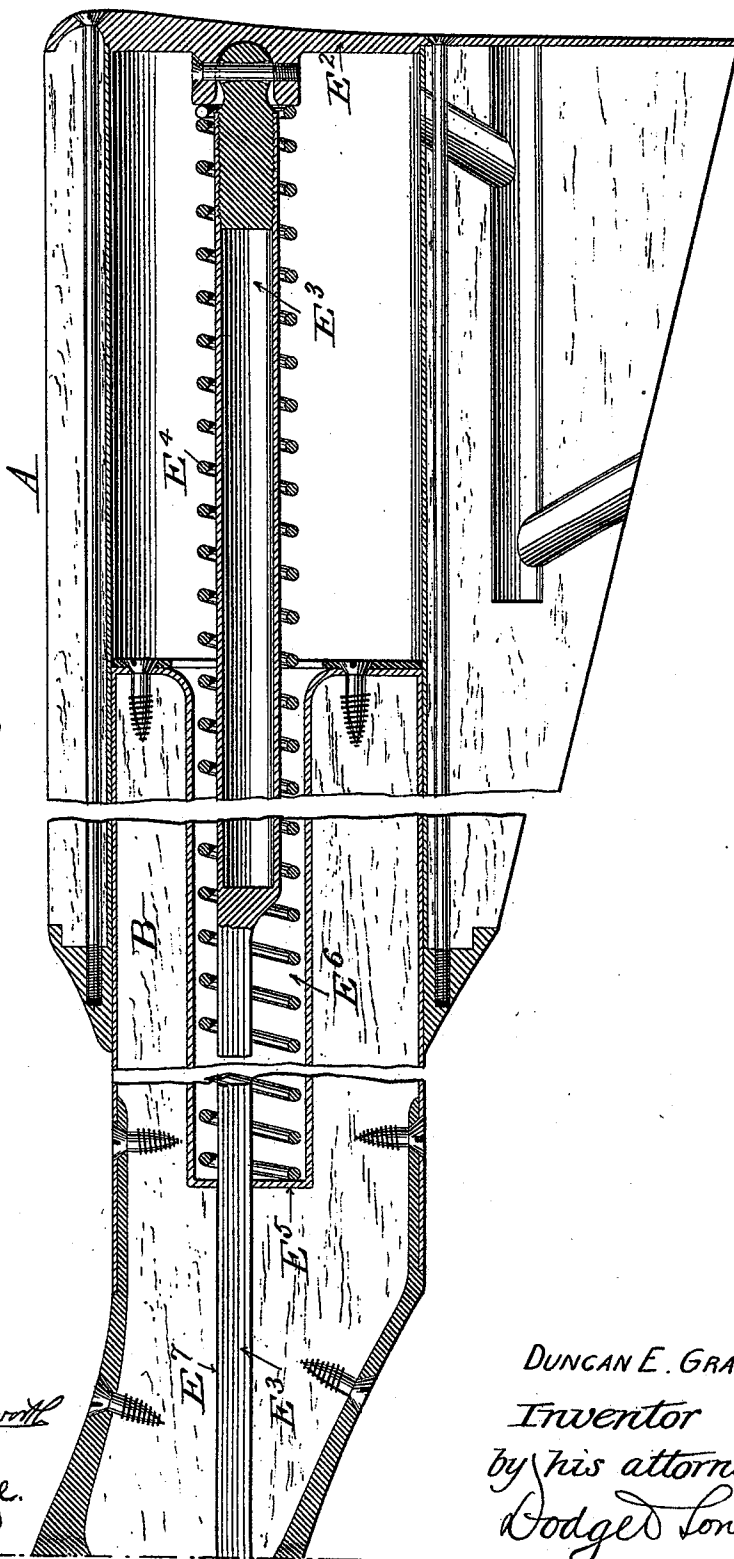
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Fig. 5.



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Fig. 8.

ON 8-8

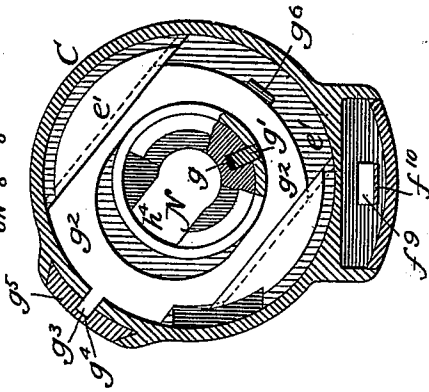


Fig. 7.

ON 7-7

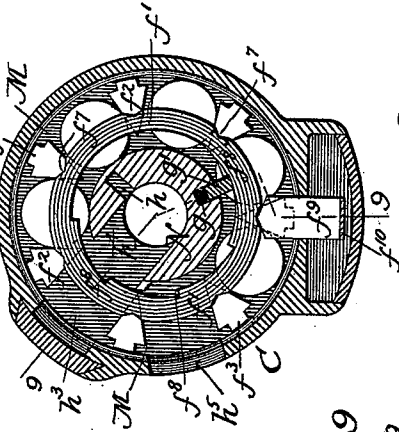
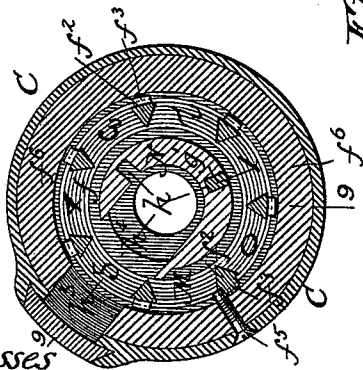


Fig. 6.

ON 6-6



Witnesses

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Fig. 9.

ON 9-9

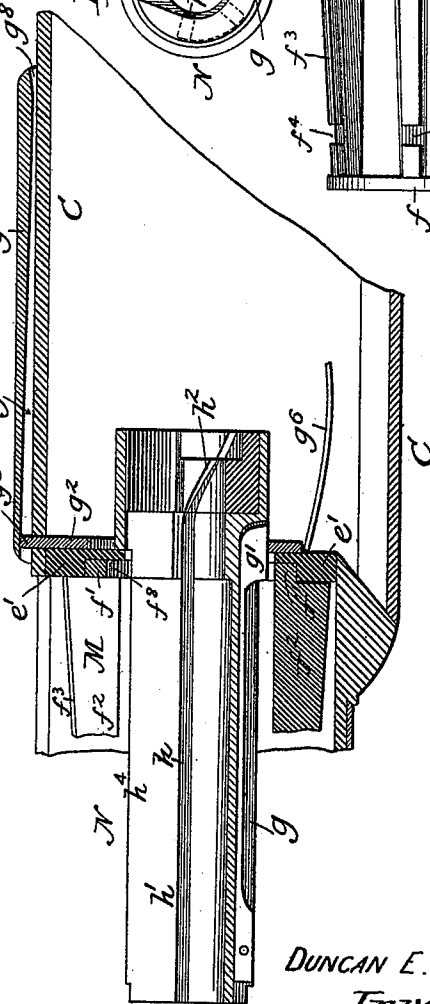


Fig. 10.

ON 10-10

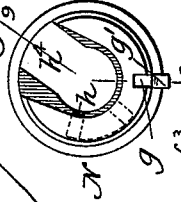


Fig. 11.

ON 11-11

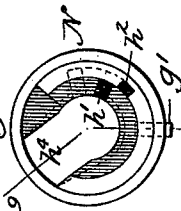
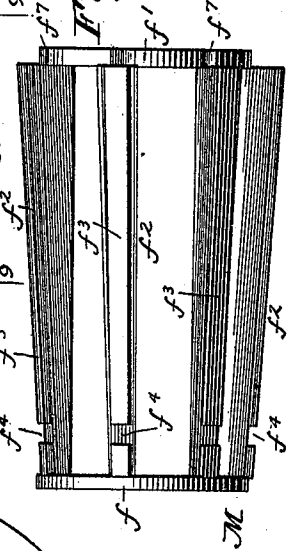


Fig. 12.

ON 12-12



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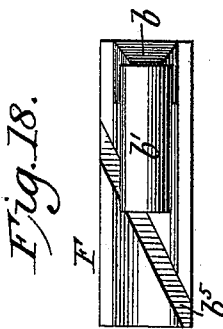
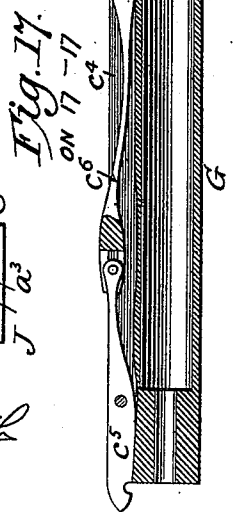
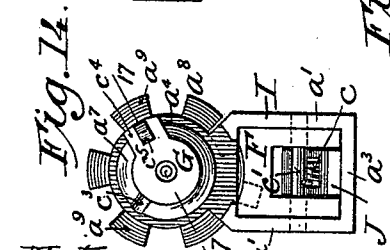
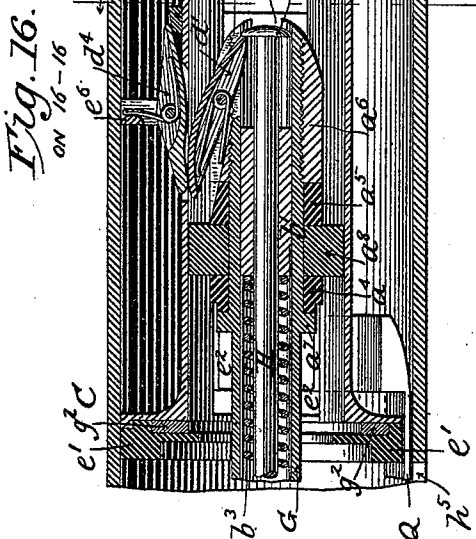
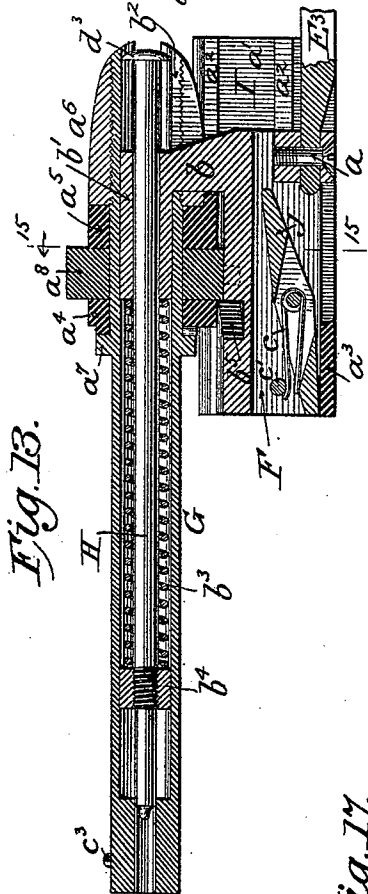
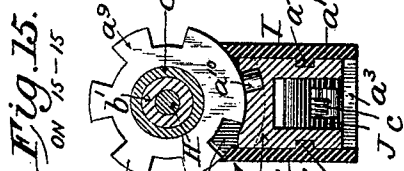
(No Model.)

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D. E. GRANT.
BREECH LOADING GUN.

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(No Model.)

7 Sheets—Sheet 7.

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BREECH LOADING GUN.

No. 494,330.

Patented Mar. 28, 1893.

Fig. 20.

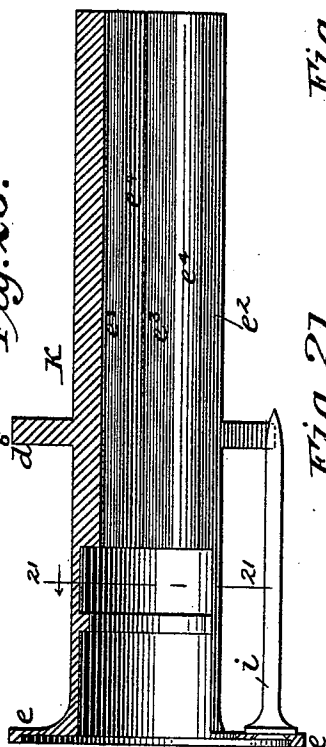


Fig. 21.

ON 21-21

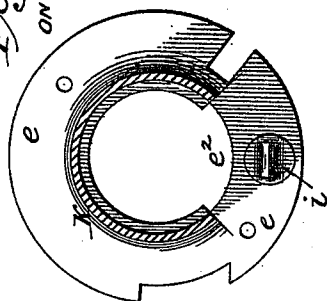


Fig. 22.

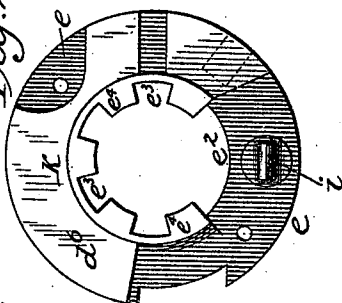


Fig. 25.

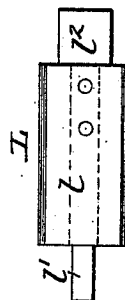


Fig. 24.

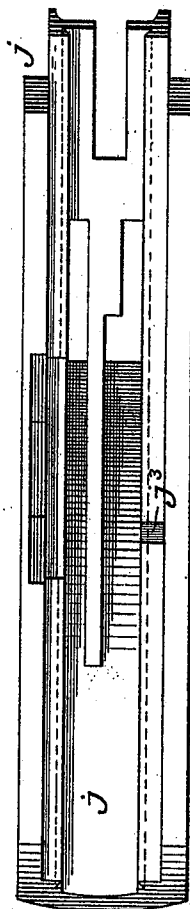


Fig. 19.

ON 19-19

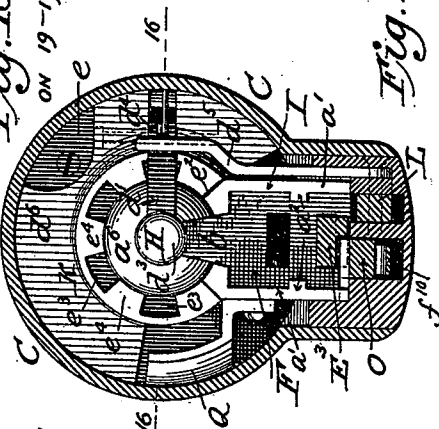
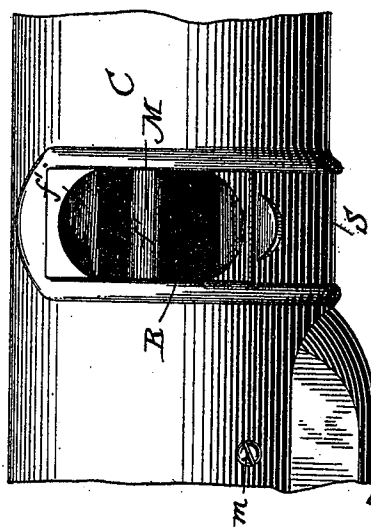


Fig. 23.



Witnesses

Samuel P. Hollingsworth
Ernest Dodge

DUNCAN E. GRANT
Inventor
by his attorneys
Dodge & Sons

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. 494,330, dated March 28, 1893.

Application filed May 3, 1892. Serial No. 431,694. (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.

This invention consists in certain improvements in the magazine and the operating mechanism of breech-loading fire-arms, whereby a gun may be constructed which can be operated with great rapidity as a single shot weapon, while the contents of the magazine are held in reserve; and can also be fired continuously as a repeater until the magazine is exhausted, without shifting the grip of either hand on the gun, and without removing the gun from the shoulder, the finger from the trigger, or the eye from the object aimed at; and which will at all times distinctly indicate by the position of the cover of the feed opening whether the magazine is in, or out of gear; and which will also always show how many cartridges there are at the time in the magazine. All the mechanism is inclosed within the frame or casing of the gun, and thereby protected from rain, snow, or dust. The discharge opening is closed by an automatic sliding cover attached to the breech-bolt carriage and traveling with it. The feed opening is closed by an independent sliding cover, which also operates the magazine "cut off,"—throwing the magazine into action when slid forward so as to close the opening, and throwing it out of gear when drawn backward so as to uncover the opening. This arrangement is specially of advantage for military arms, as by making the cover conspicuous either by form, or by being colored differently from the casing, the magazine cannot be used without that fact being clearly indicated, and the company officers are thereby enabled to control the consumption of ammunition. There are two triggers,—the right-hand one operating the hammer or firing-pin, and the left-hand one serving as a latch to prevent the movement of the heel-plate and consequently of the mechanism, should the pressure of the gun against the shoulder be relaxed. A "safety" by means of which both triggers may

be simultaneously locked, so as to prevent their accidental movement, is placed within the rear end of the trigger-guard where it can be conveniently operated by the right hand, and is at the same time securely protected by the trigger-guard, and the fingers of the right hand as they grasp the "grip" of the gun. The spring of the firing-pin which forms the hammer or striking apparatus, is only put under tension during the locking of the breech-bolt, and the connection between the trigger and the sear, which travels with the breech-bolt, is not completed until the breech-bolt is locked, so that discharge of the cartridge before the breech is locked is impossible. The magazine is a revolving one, but instead of being placed eccentric with the barrel, it is placed concentric with the barrel, and the cartridges are fed from it by gravity into a receiver passing through its center from whence they are transferred to the barrel by the breech-bolt; and the empty shell when withdrawn from the barrel is discharged from the receiver by gravity through one of the chambers, or compartments of the magazine.

The magazine shown in the drawings has seven compartments, but it may be made with either a greater or smaller number. By means of a figure on the magazine which is visible through the feed opening in the casing, and which changes with each reduction of the contents of the magazine, the number of cartridges contained in the magazine at the time is always indicated.

In the accompanying drawings,—Figure 1 is a side elevation of my improved gun; Fig. 2, a vertical sectional view with some of the parts in elevation, of that portion of the gun inclosed by the bracket 2—3, Fig. 1; Fig. 3, a longitudinal vertical sectional view of the same with the mechanism in the position it assumes when the empty shell has been withdrawn from the barrel and discharged from the receiver; Fig. 4, a longitudinal sectional view of that portion of the gun embraced by the bracket 4—5, Fig. 1, this view being a continuation of the view illustrated in Fig. 2; Fig. 5, a longitudinal vertical sectional view of the same with the parts in a position corresponding to the position of the parts represented in Fig. 3, of which figure

this is a continuation. Figs. 6, 7, and 8 are vertical transverse sectional views taken on the lines 6—6, 7—7, and 8—8 of Fig. 3. Fig. 9 is a longitudinal sectional view taken on the line 9—9 of Figs. 6 and 7. Figs. 10 and 11 are end views of the oscillating receiver; Fig. 12, a side view of the rotatable magazine; Fig. 13, a vertical longitudinal sectional view through the breech-bolt, its carriage and attendant parts; Fig. 14, a front end view of the same; Fig. 15, a vertical transverse sectional view of the same on the line 15—15 of Fig. 13; Fig. 16, a horizontal sectional view on the line 16—16 of Fig. 19, taken through the rear end of the breech-bolt; Fig. 17, a longitudinal sectional view showing the manner of pivoting the extractor; Fig. 18, a top plan view of the firing-pin carriage or block. Fig. 19 is a transverse sectional view on the line 19—19 of Figs. 2 and 16; Fig. 20, a vertical longitudinal sectional view of the tube or hollow block in which the breech-bolt is mounted; Fig. 21, a vertical transverse sectional view of the same on the line 21—21 of Fig. 20; Fig. 22, a rear end view of the same; Fig. 23, a side view of a portion of the gun showing the opening through which the magazine is rotated by hand. Fig. 24 is a plan view of the trigger-guard plate; and Fig. 25, a plan view of the safety device.

A, Figs. 4 and 5, indicates the butt made in the form of a sleeve to encircle the rear end of the stock B.

C, Figs. 2 and 3, is the main frame or casing of the gun.

D, Figs. 2 and 3, the barrel; E, the ridge formed or placed above the barrel and within which the cleaning rod is placed; and E', Fig. 3, is the fore end.

Secured to the end of the butt or sleeve A is a heel plate E², Figs. 4 and 5, to which is secured the rear end of a bar E³ which will preferably be made tubular throughout a portion of its length, as shown in Fig. 5. This bar or rod E³ is encircled by a coiled spring E⁴ which bears at one end against the inner face of the heel-plate, and at its opposite end against a shoulder E⁵ which forms the bottom of a socket or recess E⁶ made in the rear end of the stock B,—the tendency of the spring being to keep the parts distended as shown in Fig. 5. The bar or rod E³ extends forwardly through a hole or opening E⁷, formed in the stock, and is connected at its forward end by means of a pin or screw a, Figs. 3 and 13, with the rear end of the reciprocating firing-pin carriage F, which latter is mounted in the breech-bolt carriage I, Figs. 3, 13, 14 and 15. This carriage I, as shown in said figures, comprises the two side plates a' a', having on their inner faces the ribs or flanges a², and connected at their forward lower ends by a cross-bar a³. On its upper face or top, the carriage I is provided with two circular or ring-shaped projections a⁴ and a⁵, which are perforated to receive the rear end of the breech-bolt G, as

clearly shown in Figs. 3, 13 and 16. The extreme rear end of the breech-bolt G is threaded externally to receive a nut a⁶, Figs. 2, 3, 13 and 16, which, by bearing against the rear face of the collar a⁵ and drawing the annular flange a⁷ of the breech-bolt against the front face of the ring a⁴, securely locks the breech-bolt to its carriage and prevents any longitudinal movement of the one in relation to the other.

Mounted loosely upon the breech-bolt G between the collars a⁴ and a⁵, is a wheel a⁸, Figs. 3, 13, 14, 15, and 16, which has a series of arms or projections a⁹, and a pin or stud a¹⁰, for a purpose presently explained.

To prevent any movement of the breech-bolt carriage, except when the gun is being operated, a latch or trigger O, Figs. 2 and 3, is provided. This trigger is a lever pivoted to the trigger-guard plate j by the pin j', with the forward end urged upward by the rear end of a spring f¹⁰, Fig. 3,—the arrangement being such that when in the act of loading the trigger is passed under both carriages, and reaches the rear end of the firing-pin carriage, it is raised by the spring into engagement with the rear end of the firing-pin carriage, as shown in Fig. 2, and prevents any movement of the coiled spring E⁴ or the mechanism of the gun, should the pressure of the gun against the shoulder be relaxed.

Projecting from the left-hand side of the head of the trigger O is a lug j², Figs. 2 and 3, for the reception of which, when the breech-bolt carriage passes over the head of the trigger, a recess is cut in the floor of the trigger-guard plate, as shown at j³, Fig. 24. This lug j², by bearing on the lower edge of the left-hand wall of the breech-bolt carriage I, prevents the trigger O from being raised by the spring f¹⁰ until it reaches the rear end of the firing-pin carriage, as shown in Fig. 2.

The breech-bolt G is made hollow, as shown in Figs. 3, 13 and 16, to receive the firing-pin II, which is in turn mounted in the firing-pin carriage F, which latter, as before stated, is connected to the forward end of the rod or bar E³, and adapted to slide longitudinally with reference to the breech-bolt carriage a limited distance. This firing-pin carriage frame or block F has a vertically-extending arm b, which is provided with a forwardly-extending portion b' designed to fit and slide within the bore of the breech-bolt, as shown in Figs. 3, 13, 15 and 16,—the lower side of the breech-bolt being slotted or cut away at its end as shown at b², Figs. 13 and 16, to allow the upright arm b to move back and forth therein.

The firing-pin II is provided at its rear end with a head or enlargement, and toward its forward end with a collar or nut b⁴, which passes loosely through the forwardly-projecting portion b' of the carriage F, and moves freely in the bore of the breech-bolt. A coiled spring b³ encircles the firing-pin, and bears at

its forward end against the nut or block b^4 , and at its rear end against the portion b' of the firing-pin carriage.

In the upper face of the main body of the firing-pin carriage F there is formed an inclined groove or cam-way b^5 , Figs. 13 and 18, into which the pin or stud a^{10} , Fig. 15, of the wheel a^8 enters. From this it will be seen that as the firing-pin carriage F is reciprocated relatively to the breech-bolt carriage, or vice versa, the pin or stud a^{10} working in the inclined groove b^5 , will turn or rotate the wheel a^8 in one direction or the other according to the direction of movement of the carriage F or the carriage I. The firing-pin carriage F is further provided with a lever or rocking dog J, Figs. 3, 13, 14 and 15, which bears at its lower end upon the floor bottom or cross-bar of the breech-bolt carriage I,—the dog being held in such position by means of a spring c which is coiled about the axis of the lever and has one end extended forward to bear upon the lever, while the other end bears against a pin c' which passes through the carriage F and projects into the slots c^2 formed in the side walls of the breech-bolt carriage for the purpose of limiting the movement of the carriage F with reference to the carriage I to the length of the said slots c^2 , as clearly shown in Figs. 2 and 3. When the breech-bolt carriage moves forward relatively to the firing-pin carriage, or the firing-pin carriage F moves rearward relatively to the breech-bolt carriage I, the nose or lower end of the dog J will ride off the cross bar a^3 or bottom plate of the carriage I, and will, by the action of its spring c , be thrown downward so as to engage the rear wall of said cross bar a^3 , as clearly shown in Fig. 3, thus preventing any forward movement of the firing-pin carriage independently of the breech-bolt carriage, or any rearward motion of the breech-bolt carriage relatively to the firing-pin carriage.

Projecting from the rear face of the flange e of the tubular shell or casing K, Figs. 3 and 20, is a pin i adapted to enter the firing-pin carriage as the gun is drawn against the shoulder in the act of loading, and to pass between the roof of the carriage and the upper end of the lever J, so as to tilt the latter, and throw its lower end out of engagement from the floor of the breech-bolt carriage I, as indicated by the dotted lines in Fig. 2.

The hollow breech-bolt G is provided at its forward end with a lateral pin or stud c^3 , shown in Fig. 14, and is also provided with longitudinal laterally-extending flanges c^4 between which the extractor c^5 is pivoted, as shown in Figs. 2, 14 and 17. This extractor c^5 is connected at its rear end to a spring c^6 , also mounted between the flanges c^4 as shown in Fig. 17,—the forward end of the spring where it is connected with the extractor being slotted vertically and horizontally so as to afford a sliding connection between the extractor and the spring.

Upon reference to Fig. 16 it will be observed that the conical nut a^6 before referred to, is slotted on the right-hand side as at d , to receive the sear d' , whose rear end is adapted to engage the head or enlargement d^3 of the firing-pin. The sear d' is designed to be rocked and to be thrown out of engagement with the firing-pin, by means of a lever d^4 pivoted in the casing of the gun, as shown in Fig. 16,—the said lever d^4 being adapted to be actuated by means of an upright arm d^5 Figs. 3 and 16, which works between the rear end of said lever d^4 and the tubular shell K, into and through which the breech-bolt moves back and forth.

The arm d^5 to which I have just referred, and which is shown in Figs. 3, 16 and 19, is secured to the forward end of the trigger L, Figs. 2, 3 and 19, so that when it is desired to fire the gun, it is only necessary to pull the trigger L and move the upper end of the arm d^5 forwardly and thereby rock or tip lever d^4 , which in turn rocks or tips the sear d' and throws the latter out of engagement with the firing-pin. As soon as the firing pin is thus released, the spring b^3 which was put under compression when the breech-bolt carriage I moved backward relatively to the carriage F, immediately carries the firing-pin forward and effects the discharge of the gun.

The trigger L is pivoted to the trigger guard plate at k , Fig. 3, and its forward end engages with a flat spring k' shown by dotted lines in Fig. 3, which returns the trigger to its normal position after it has been pulled.

The safety device P, Figs. 2, 3 and 25, consists of three pieces,—an upper plate l , a flat spring l' , and a lower plate l^2 , which are riveted or otherwise fastened together as shown. The upper plate l slides in grooves formed in the trigger guard plate, and when "on" projects over the rear ends of both triggers and prevents their movement.

The spring l' , which is slightly curved outward, holds the safety stationary in the different positions in which it is placed, by pressing on the trigger guard plate, while the lower plate l^2 has formed on it a handle, and is so arranged that its rear end, which projects under a portion of the casing of the gun, acts as a cover for the opening into the interior of the casing when the safety device is pushed forward.

The tubular shell K to which I have before referred, is shown in longitudinal section in Figs. 2, 3, 16 and 20, and in transverse section in Figs. 21 and 22. Upon reference to these figures it will be observed that a slot, of the width of about one-fourth the circumference of the shell, is cut in the lower side, from the flange at the forward end to the rear end which rests against the casing of the gun.

The shell is provided at a point between its ends on its exterior, with a lateral projection or flange e^6 which forms a brace for the circular casing C, and a bearing for the lever d^4 , Fig. 16, and for the cut-off spring hereinafter

referred to. The rear end of shell K is seated in a recess made to receive it in the frame of the gun, while its forward end is provided with a recessed flange or head e which fits upon a shoulder formed on the rear face of the cross wall e' rigidly affixed in position within the gun case or frame, (see Fig. 16.)

The main body of the shell or casing K is slotted or cut away on its under side as described above and as shown at e^2 , Figs. 20, 21 and 22 so as to allow of the passage of the connections between the breech-bolt and its carriage as the gun is moved in relation to the breech-bolt. It will also be noticed upon reference to Figs. 20 and 22 that the inner face of the shell or casing is for the greater part of its length provided with longitudinally-extending grooves e^3 which correspond in size, position and number with the arms or projections a^9 formed upon the wheel a^8 of the breech-bolt carriage, the construction and arrangement being such that when the arms a^9 are brought opposite the grooves in the shell or casing K, the breech-bolt and attendant mechanism may move relatively to the said shell or casing K, or vice versa; but when the arms a^9 of the said wheel are brought into line with the ways or ribs e^4 , longitudinal movement of the breech-bolt and its carriage relatively to the shell or casing K, or vice versa, is prevented.

M, Fig. 12, indicates a rotary or rotatable magazine, which comprises two rings f and f' connected by the bars f^2 . The bars f^2 are V-shaped in cross section, are larger at one end than at the other, and are separated a distance from each other equal to the width of cartridge, as clearly shown in Figs. 6 and 7. Along the edge of each bar is a longitudinal flange or web f^3 , all of the webs of said bars except one being provided with a transverse slot f^4 , as clearly shown in Figs. 6 and 12, to allow the end of a screw f^5 , shown in Fig. 6, to project into the slot. From this arrangement it will be seen that when the magazine is rotated or turned around to such a point that the bar not having the groove, comes in contact with the screw f^5 , the latter will prevent further rotation of the magazine in that direction.

The magazine is journaled concentric with the barrel,—the front ring f , Fig. 6, being seated in a circular recess in a block f^6 secured rigidly in position within the frame C of the gun, as clearly shown in Figs. 2 and 3, while the rear ring f' , which is seated in a similar recess in the transverse wall e' , Figs. 1 and 2, is provided on its outer edge with a series of notches or recesses f^7 , Fig. 12, corresponding in number and position to the ribs or bars f^2 on the said magazine; the said ring or end piece f' being further provided with a series of ratchet teeth f^8 , Fig. 7, on its inner face or circumference for a purpose presently explained. The notches or recesses f^7 cut in the periphery of the rear ring f' are adapted to receive the V-shaped pawl or dog f^9 , Figs.

2, 3, and 7, which is urged upward and held in engagement with the ring by means of a flat spring f^{10} , the engagement being such that while the magazine is prevented from accidental rotation by the pawl or dog, yet the latter is readily depressed and thrown out of engagement with the notch when the magazine is turned or rotated in the proper manner.

On the rear face of the forward ring f' are placed the figures 5, 4, 3, 2, 1, 0, (see Fig. 6) which show the number of cartridges in the magazine. When the magazine is full, the figure 5 is visible through the feed opening, indicating that that number of cartridges is then in the magazine, and as each time the magazine rotates a space, the number of cartridges in the magazine is reduced by one cartridge dropping into the receiver, the figure that is visible to the eye is changed correspondingly. By this means the figure visible at any time through the feed opening indicates the number of cartridges that are at that time remaining in the magazine.

Through the center of the magazine passes the receiver N, Figs. 2, 3, 6, 7, 8, 9, 10 and 11, which is also journaled concentric with the barrel; the front portion of the said magazine being supported by the block f^6 , while the rear end is supported by the transverse cross wall e' . This receiver, as will be seen upon reference to Fig. 7, forms the inner side or wall of the compartments for the cartridges; the cup-shaped portion f^6 of the casing forms the outer side of these compartments, while the bars f^2 form the division walls. In the longitudinal slot g in the outer face of the receiver is secured the spring pawl g' , Figs. 6, 7, 8, 9, 10, and 11, which, when in the position shown in Fig. 7, engages whichever tooth f^8 of the magazine happens to be opposite it.

In the rear face of the cross wall e' is cut a broad groove in which is mounted a cut-off plate g^2 , which has an opening sufficiently wide to permit the head of the receiver to pass freely through it and long enough to admit of a transverse movement of the plate relatively to the head of the receiver, as is more clearly illustrated in Fig. 8. The lower end of this central slot or opening in the plate g^2 is cut on the same radius as the head of the receiver N, while the upper end of the plate is fashioned into or provided with a pin or stud g^3 which passes through an aperture in the casing of the gun and enters a slot g^4 formed on the inner face of the sliding cover g^5 , as clearly shown in Figs. 8 and 9. It will be noticed upon reference to Fig. 9 that this slot g^4 in the underface of the cover g^5 has the form of a cam or is inclined, so that when the cover is moved backward the cut-off plate may be raised to the position shown in Figs. 8 and 9, by means of its spring g^6 , Figs. 3 and 8, but when the cover is slid forward the plate will be moved inward, or depressed against the tension of its spring g^6 . When this plate is in the position shown in Figs. 8 and 9, the lower wall of its slot or central opening bears against the spring pawl g'

and holds the said pawl within its slot g and out of engagement with the ratchet teeth f^8 on the inner face of the ring f' ; but when the cover is slid forward and the plate is depressed or pushed inward, the said spring pawl g' is free to engage the ratchet teeth f^8 , as clearly shown in Fig. 7. Spring g^6 , Figs. 8 and 9, is considerably stronger than the spring of the spring pawl g' , and keeps the upper end of the pin g^3 of the cut-off plate constantly pressed upward against the bottom of the slot g^4 in the sliding cover g^5 , so that when the cover is drawn back, the cut-off plate will be carried upward by its spring g^6 , and will also carry the spring pawl g' upward and into its slot in the receiver and clear of the teeth of the magazine as the receiver oscillates.

At the rear end of the slot g^4 there is a short portion g^8 where the upper side of the slot is sloped in the opposite direction from the forward portion (see Fig. 9) to enable the pressure of the pin on the said slot to hold the cover stationary in its forward position.

The receiver N is provided on its inner wall with a long slot h , comprising a straight portion h' parallel with the axis of the receiver, and an inclined or spiral portion h^2 , as clearly shown in Fig. 9, the said slot being designed to receive a pin or stud c^3 , Fig. 13, formed on the forward end of the breech-bolt G, the arrangement being such that as the receiver in the act of loading is drawn back relatively to the breech-bolt, the stud c^3 , acting upon the spiral portion h^2 of the slot h , will revolve the receiver to the right until the horizontal portion of the slot is reached, whereupon the revolution of the receiver will cease. This slot is so disposed with reference to the opening h^3 in the casing of the gun, that when the receiver has been turned or rotated as just described, the opening h^4 in the receiver will come opposite the feed opening h^3 in the casing of the gun, as shown in Fig. 6, so as to allow a cartridge to pass directly from the magazine into the receiver, if the magazine be in gear, or if the magazine be out of gear, to permit a cartridge to be dropped through the feed opening and the vacant compartment of the magazine under it, into the receiver. When in the act of unloading the receiver is moved forward relatively to the pin on the breech-bolt, the magazine will be turned or rotated to the left, and its opening h^4 will be brought opposite the discharge opening h^5 formed in the casing of the gun, as shown in Fig. 7, so that the exploded shell may roll through the vacant compartment in the magazine, which is always opposite the discharge opening, and out of that opening in the casing.

Attached to the breech-bolt carriage at its forward end is a cover or door Q, Fig. 2, which passes through an aperture on the left hand side of the cross wall e' , and closes the discharge opening h^5 in the casing of the gun when the mechanism is in the firing position; but which, when the gun is moved forward in

the act of unloading, is withdrawn, thereby opening the discharge port h^5 for the exit of the empty shell.

On the right hand side of the casing C is an opening R through which the magazine may be turned with the finger, as will be described when the filling of the magazine is referred to, and to close the opening a curved cover S sliding in grooves in the casing is provided, as shown in Fig. 23. In this same figure is shown the head of a screw m which, passing through the casing of the gun, enters the cross wall e' for the purpose of preventing the shell or casing K from turning within the casing of the gun.

The action of the magazine when the gun is used as a single shot weapon is as follows:

In loading, the cover g^5 is drawn back to the position shown in Fig. 9, the rear trigger O is pressed, and the mechanism allowed to assume the position shown in Fig. 3. A cartridge is then dropped into the feed opening, and the gun drawn against the shoulder with both arms. As the spring E^4 is compressed, the rod E^3 holds the firing pin carriage F stationary, and the lever J being in engagement with the floor of the breech-bolt carriage I, the breech-bolt G and its carriage are also held stationary along with it, while the main body of the gun and other mechanism are drawn rearward. At the commencement of this movement, the breech-bolt pin c^3 is in the rear end of the inclined portion h^2 of the slot h , and as the inclined right wall of the slot is drawn against it, the receiver N revolves to the right hand until the horizontal portion h' of the slot h is reached and the revolution of the receiver ceases. As this point is reached, the opening h^4 in the receiver N has come opposite the compartment in the magazine into which the cartridge was dropped through the feed opening; and the cartridge descends by gravity into the receiver in front of the breech-bolt, and as the receiver continues to be drawn over the breech-bolt, the barrel is drawn over the cartridge until the cartridge is entirely within it, the hook of the extractor c^5 rising over the flange of the cartridge, and dropping again in front of it as the cartridge is finally driven "home" in the barrel. As the cartridge is about driven "home" in the barrel, the knock-off pin i comes in contact with the upper end of lever J and raises its lower end out of engagement with the breech-bolt carriage I, and the breech-bolt and its carriage commence to be drawn backward with the main body of the gun, while the firing-pin carriage F alone remains stationary. In this way the pin a^{10} of the locking-wheel a^8 is drawn against the inclined rear wall of the slot b^5 which turns the wheel to the left until its teeth a^9 are opposite the ends of the ribs e^4 of the tube K and the breech-bolt is locked. The teeth of the locking wheel are slightly beveled on the rear face as shown in Fig. 2. When this final locking movement is in progress, the firing-pin spring

b^3 is being put under tension by the firing-pin II (whose head is in engagement with the sear d' which is pivoted to the breech-bolt nut a^6) being drawn through the arm b' of the firing-pin carriage, thereby compressing the spring b^3 between the rear end of the collar or nut b^4 , and the forward end of the arm b' , as shown in Fig. 13. As the movement ceases, the forward end of the rear trigger O, (which has been drawn under the breech-bolt and firing-pin carriages,) reaches the notch j^4 cut in the left hand wall of the breech-bolt carriage I for the accommodation of the lug j^2 and permits the trigger O to be raised by its spring f^{10} into engagement with the rear end of the firing-pin carriage, thus preventing any movement of the main body of the gun with relation to the butt or heel plate, and therefore of the mechanism, should the pressure of the gun against the shoulder be relaxed. This completes the act of loading, and the forward trigger I may be pulled and the gun discharged.

In unloading, the rear trigger O is pulled, and, as its forward end is disengaged from the rear of the firing-pin-carriage, the spring E^4 is permitted to move the gun forward, while the firing-pin-carriage I is held stationary by the rod E^3 which connects it with the heel-plate, which is resting against the shoulder. The pin a^{10} of the locking wheel a^8 being pressed forward against the forward or right hand wall of the spiral slot b^5 , Fig. 18, cut in the firing-pin-carriage, the wheel is turned to the right until its teeth a^9 come opposite the corresponding spaces or slots e^3 , Fig. 22, in the tube K, and at the same time the pin c' has passed along the slots c^2 , Fig. 2, in the side walls of the breech-bolt carriage, and its rear ends rest against their rear ends, thus holding the breech-bolt carriage also stationary. The main body of the gun still continuing its advance, and the empty shell being held stationary by the extractor, the barrel of the gun is drawn off it, and the receiver drawn over it. Then, as the rear end of the receiver approaches the head of the breech-bolt, the forward end of one of the ribs e^4 of the extractor lever c^5 , with which it has a sliding connection, raises the head of the extractor until it is clear of the flange of the empty shell. The empty shell is thus left in the receiver, but as that takes place the left wall of the inclined portion h^2 of the receiver strikes against the pin c^3 projecting from the breech-bolt G, and the receiver N is revolved to the left until the opening in it comes opposite a vacant compartment in the magazine in line with the discharge opening of the casing C, and the empty shell rolls down the inclined plane thus formed, and out of the discharge port h^5 , and the act of unloading is complete. If the gun is to be again used as a single shot weapon another cartridge is at once dropped into the feed opening h^3 , the gun drawn against the

shoulder, and the operations described repeated.

To fill the magazine,—the mechanism being in the position of Fig. 3, and the feed aperture open,—the gun is grasped with the left hand forward of the trigger guard, and the butt rested against the right thigh. The sliding cover S Fig. 23, of the opening R on the right hand side of the magazine is then drawn down with the fore finger of the left hand. The cartridges (six of which can be conveniently held at a time between the fingers and thumb of the right hand) are dropped one at a time into the feed opening in the top of the frame, and as each one is dropped in, the bar f^2 of the magazine M which is exposed through the opening R, is drawn down with the forefinger of the left hand as far as the opening in the casing will admit, and an empty compartment is thus presented below the feed opening for the reception of the next cartridge. When the magazine has in this way been turned five spaces or compartments, and received five cartridges, its movement is stopped by the pin f^5 , Fig. 6, projecting from the block or casing f^6 ; and if a sixth cartridge be dropped in the feed opening, then when the gun is raised to the shoulder, and pressed against it, that cartridge will descend into the receiver, and be transferred by the breech-bolt to the barrel; so that at each filling five cartridges may be placed in the magazine, and one in the barrel.

To remove the cartridges from the magazine when not required for use, the mechanism is placed in the position of Fig. 3, and the gun turned so that the feed opening is downward, while the magazine is revolved in the opposite direction from it was when being filled, and each cartridge drops out as it comes opposite the feed opening.

When the gun is used as a repeater the cover g^5 of the feed opening is pushed forward so as to close the opening, and throw the magazine into action by pushing the "cut-off" g^2 clear of the receiver N, thus permitting the spring pawl g' to emerge and engage the tooth f^8 of the magazine ring f' which is presented to it, and shift the magazine one space as the receiver oscillates to the left in the act of unloading, thus bringing the first cartridge to the right of the feed opening directly under that opening. When, in the process of loading, the receiver oscillates to the right its pawl g' travels backward over the back of the next ratchet tooth f^8 of the magazine (which is being held stationary by the V-shaped click f^9) and drops in front of the tooth f^8 ready for the next oscillation of the receiver to the left, and the cartridge in the compartment under the feed opening drops into the receiver in front of the breech-bolt and is transferred by it to the barrel. This process is repeated with each reciprocation of the gun until the magazine has been

shifted five times, when it ceases to revolve,—the pawl g' of the receiver having reached the blank space in the magazine ring f' where there are no ratchet teeth (see Fig. 7) and the magazine being empty.

The operation of the rest of the mechanism is the same when the gun is used as a repeater as when it is used as a single shot weapon, and has already been described; but when used as a repeater, the gun need not be taken from the shoulder or the grasp of either hand on it shifted, until the contents of the magazine have been exhausted.

To use the gun with the greatest possible speed as a repeater, the rear trigger may be kept continuously drawn back by the second finger of the right hand, and the gun worked backward and forward as fast as the forward trigger can be manipulated by the fore-finger of the same hand.

Having thus described my invention, what I claim is—

1. In a magazine gun, a rotatable magazine mounted concentric with the barrel of the gun and provided with peripheral openings.

2. In a magazine gun, a rotatable magazine having figures or markings thereon to indicate the number of cartridges in the magazine.

3. In a magazine gun, a rotatable magazine comprising the end rings f f' and the separated bars f^2 connecting the rings, and forming the division walls of the cartridge compartments.

4. In a magazine gun, a rotatable magazine comprising the separated bars f^2 and the end rings f f' to which the bars are connected, and a stationary casing encircling the rotatable magazine and forming the outside wall of its compartments.

5. In a magazine gun, a rotatable magazine provided with openings in its periphery, in combination with a receiver mounted centrally within the magazine and forming the inside wall of its compartments.

6. In combination with the rotatable magazine, the receiver within the same, and the cup-shaped block encircling the magazine.

7. In combination with the gun frame provided with the feed opening h^3 and discharge opening h^5 , the rotatable magazine, the oscillating receiver mounted within the magazine, and a pawl g' adapted to connect the magazine with the receiver.

8. In a magazine gun, the combination with a frame, of a magazine, a cut-off mechanism therefor, a feed opening in the frame, and a cover for the feed-opening which operates the cut-off mechanism.

9. In combination with the gun frame having the openings h^3 and h^5 , the cover g^5 for the opening h^3 , the rotatable magazine, the receiver, the pawl g' connecting the receiver and the magazine, the cut-off plate g^2 for throwing the pawl out of action, and the spring g^6 for actuating the plate; said plate being con-

trolled by the cover in such manner that when the opening h^3 is uncovered, the cut-off plate is permitted to rise and sever the connection between the receiver and the magazine, and when the opening h^3 is covered, the cut-off plate is depressed so as to allow the receiver to resume its connection with the magazine.

10. In combination with a gun frame or casing provided with a feed-opening, a rotatable magazine, means for rotating the latter, and a cover for the feed opening controlling the said means, and preventing the rotation of the magazine when the cover is off the opening.

11. In a magazine gun, the combination with a rotatable magazine, of means for rotating the magazine, and the gun frame or casing provided with an opening R in its side wall through which the magazine may be operated by hand.

12. In combination with the frame or casing, the rotatable magazine having all the bars f^2 except one, notched as at f^4 , and means for rotating the magazine the screw f^5 projecting from the frame into the notches, as and for the purpose set forth.

13. In combination with the frame or casing, the rotatable magazine provided with rings f and f' and the bars f^2 , the said ring f' being provided with teeth or shoulders f^8 , the receiver N provided with a pawl g' to engage the shoulders f^8 , and means for oscillating the receiver.

14. In combination with the frame or casing provided with the feed opening h^3 , the rotatable magazine having the toothed ring f' , the receiver N mounted within the magazine and provided with a spring pawl or dog g' to engage the teeth of the ring, a cut-off plate encircling the receiver and its pawl or dog and provided with a pin or stud g^3 , a cover g^5 for the opening h^3 , provided with an inclined groove g^4 to receive the pin g^3 , and a spring g^6 for urging the plate into contact with the pawl of the receiver.

15. In combination with a rotatable magazine concentric with the barrel, a receiver mounted within the magazine, and a breech-bolt adapted to oscillate the receiver as the receiver passes over it.

16. In combination with a rotatable magazine concentric with the barrel, an oscillating receiver mounted centrally therein and forming the inner wall of the cartridge compartments of the magazine, said receiver being slotted or cut away longitudinally as shown, whereby when the slot or opening in the receiver comes opposite the feed opening of the gun, the cartridge contained in the compartment of the magazine which is in line with the feed opening, may fall into the receiver, in line with the barrel.

17. In combination with a rotatable magazine, an oscillating receiver, and intermediate devices operatively connecting the magazine and receiver to turn the magazine when the

receiver turns in one direction and to leave the magazine at rest when the receiver turns in the opposite direction.

18. In combination with a frame or casing having the feed opening h^3 and the discharge opening h^5 , a rotatable magazine mounted concentric with the barrel, and an oscillating receiver within the magazine, having its mouth brought alternately opposite the openings h^3 and h^5 .

19. In combination with the breech-bolt the firing-pin mounted therein, the sear d' to engage the firing-pin, the lever d^4 bearing upon the sear at one end, and the trigger L provided with the upright arm d^5 to engage the lever d^4 .

20. In combination with a breech-bolt and its carriage, a firing-pin mounted within the breech-bolt, and provided with a carriage mounted within the breech-bolt carriage, and means for moving one of said carriages in relation to the other.

21. In combination with the breech-bolt and its carriage the firing-pin and its carriage, a rocking dog or lever J adapted to connect the carriages, and a pin or "knock-off" i adapted to tip or rock the lever J out of engagement with the breech-bolt carriage as the said pin i moving relatively to the carriages comes in contact with the upper end of the lever J.

22. In combination with the breech-bolt carriage I having slots c^2 , the firing-pin carriage F provided with a pin c' to enter the said slots for the purpose of limiting the movement of the carriages with reference to each other, a dog or lever J adapted to connect the carriages so that they shall move forward together, and a stop i to tip or rock the dog J out of engagement with the breech-bolt carriage.

23. In combination with the breech-bolt carriage, an armed wheel a^8 mounted on the breech-bolt and provided with a pin a^{10} ; the firing-pin-carriage provided with a slot b^6 to receive the pin a^{10} ; a tube or shell K through which the wheel moves, provided with one or more grooves e^3 and abutments e^4 corresponding to the arms or teeth of the wheel a^8 , and means for moving one of the carriages in relation to the other so as to turn the wheel and bring its arms into or out of alignment with the grooves in the tube for the purpose of unlocking or locking the breech-bolt.

24. In combination with the carriage I provided with the rings a^4 and a^5 , the shouldered and threaded breech bolt passing through the rings, the wheel a^8 mounted upon the bolt between the rings, the retaining nut a^6 , the firing-pin-carriage movable relatively to the carriage I, and provided with a cam slot to receive a pin on the wheel, and the grooved shell K through which the bolt and attendant parts move.

25. In combination with the hollow breech-bolt slotted at its rear end, the firing-pin carriage provided with the arms b and b' , the

firing-pin passing through the arm b' and provided with a nut or shoulder b^4 at its forward end, and the spring b^3 bearing at its ends against the shoulder b^4 and arm b' .

26. In combination with the shell or casing K provided with a rib e^4 , an extractor consisting of a lever c^5 pivoted to the breech-bolt, and urged upward at its rear end by a spring c^6 which has a sliding connection with the lever and which is adapted to be depressed by the rib e^4 , as it passes over it in the act of unloading, so as to raise the forward end of the extractor sufficiently to release the flange of the cartridge from the hook.

27. In a breech-loading gun, the combination with the frame and stock-portion B, of the butt or heel-portion A, the interposed spring E^4 , the reciprocating breech-bolt and firing-pin carriages, a rod connecting the firing-pin carriage with the heel-plate, and a trigger O adapted to engage the said firing-pin carriage to prevent the unlocking of the breech-bolt and consequent movement of the breech-loading mechanism.

28. In combination with the locking trigger O and the firing-pin-trigger L, the sliding safety plate F moving over the top of the triggers to prevent the actuation thereof.

29. In a gun, a "safety" consisting of a plate adapted to slide over the rear ends of the triggers, a friction spring to hold it stationary and a handle capable of moving within the rear end of the trigger guard.

30. In a breech-loading gun, the combination with the main frame or casing in which the lock and attendant parts are mounted, of a sleeve or butt portion A mounted upon the stock portion B to which the main frame is secured, a coiled spring urging the said portions A and B in opposite directions; and a rod secured at one end to the butt portion and at the other end to the operative mechanism of the gun, whereby the reciprocation of the gun relatively to the sleeve or butt portion which surrounds the stock shall effect the operations of loading and unloading.

31. In combination with the breech-bolt, a rotatable magazine, an oscillating receiver actuated by the breech-bolt, a sleeve or butt portion A encircling the main body of the gun stock B, the interposed spring E^4 and a positive connection within the gun between the breech-bolt and the said sleeve or butt portion A.

32. In a breech loading gun, a rotary magazine, and an oscillating receiver mounted within the magazine to receive and discharge by gravity through the chamber of the magazine.

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

DUNCAN EDMUND GRANT.

Witnesses:

SAML. CLARKE,
BENJ. MARTIN.