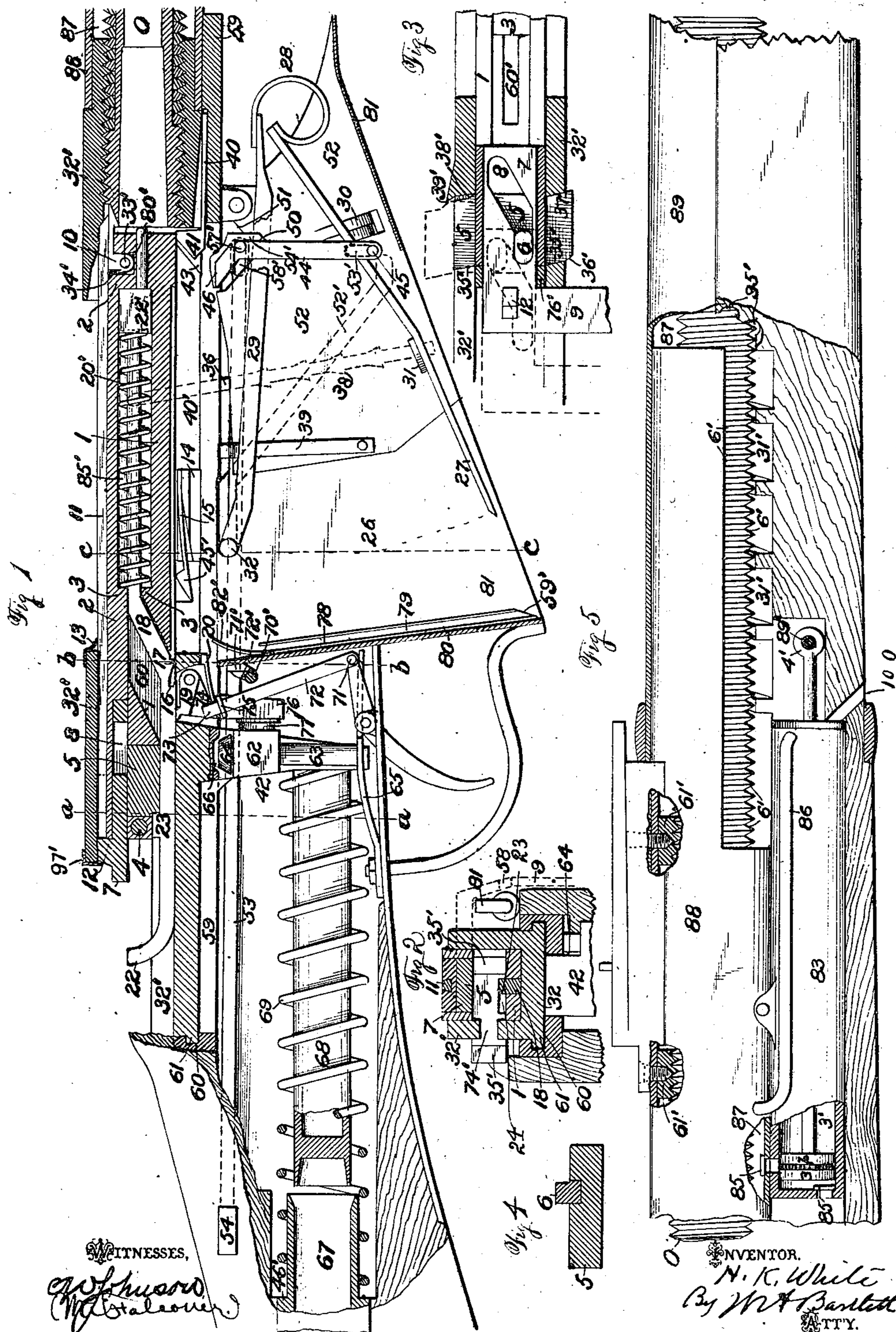


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No. 488,409.

Patented Dec. 20, 1892.



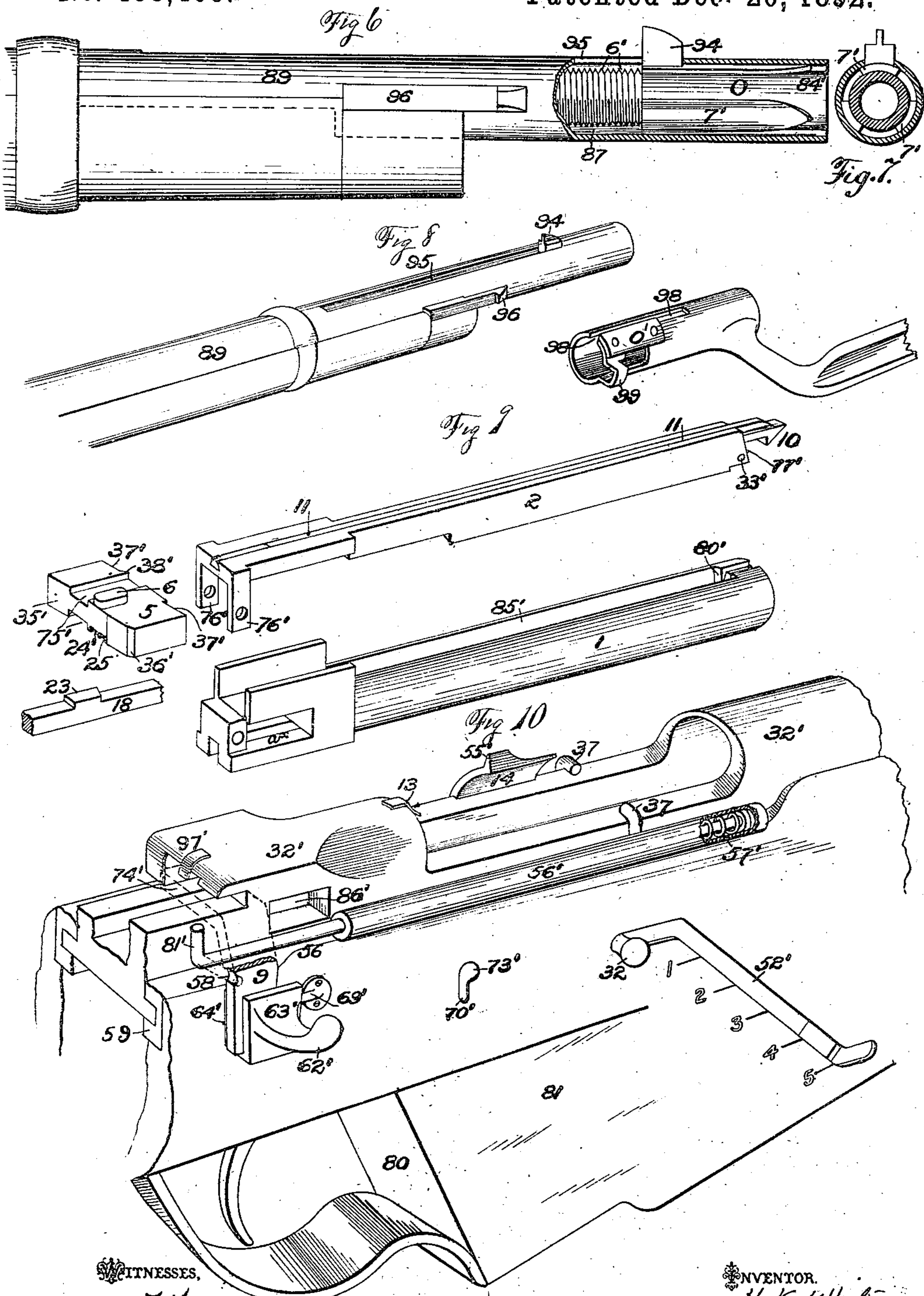
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H. K. WHITE.  
RECOIL OPERATED MAGAZINE FIREARM.

No. 488,409.

Patented Dec. 20, 1892.



WITNESSES.

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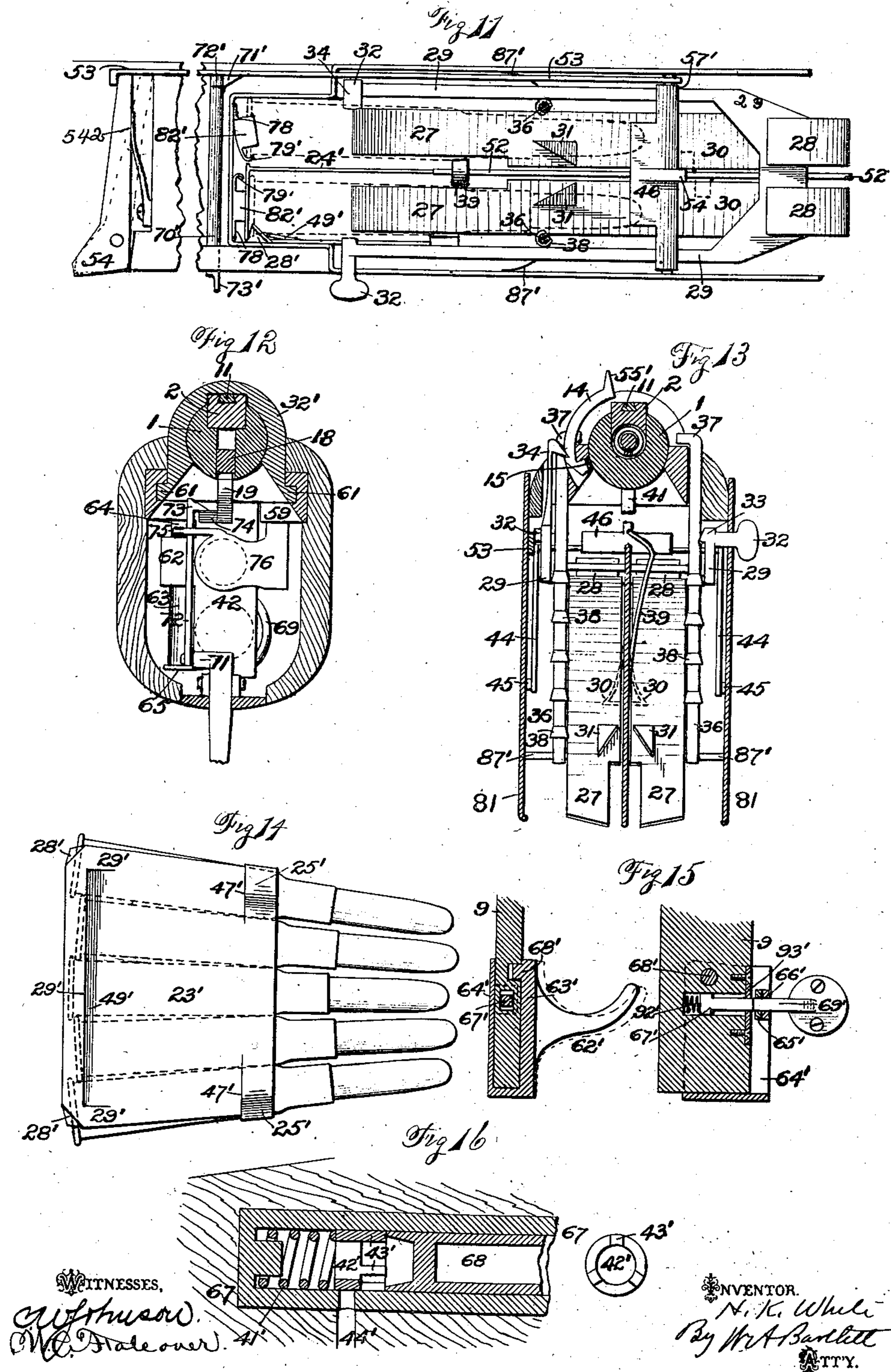
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No. 488,409.

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Patented Dec. 20, 1892.

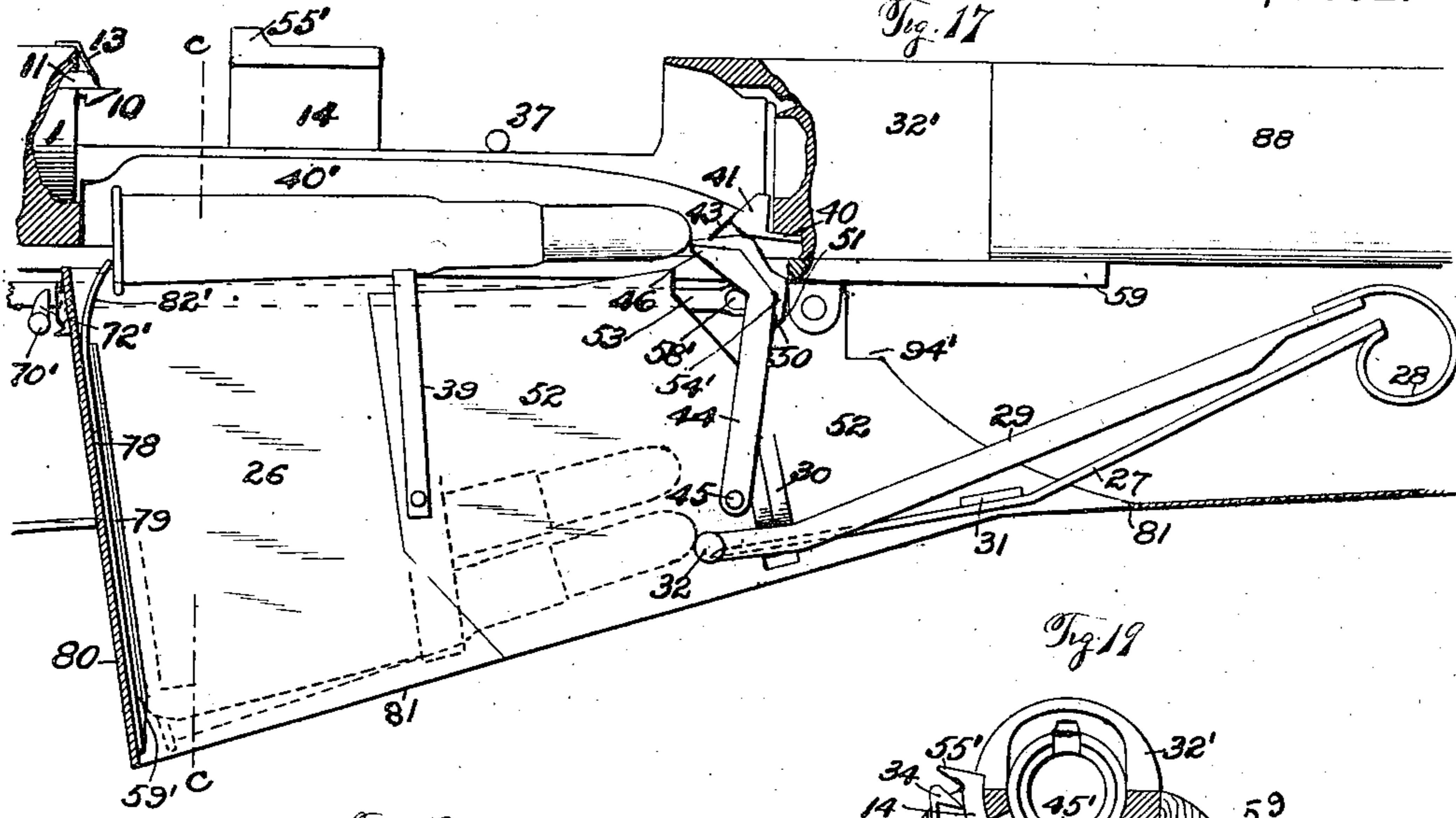


Fig. 18

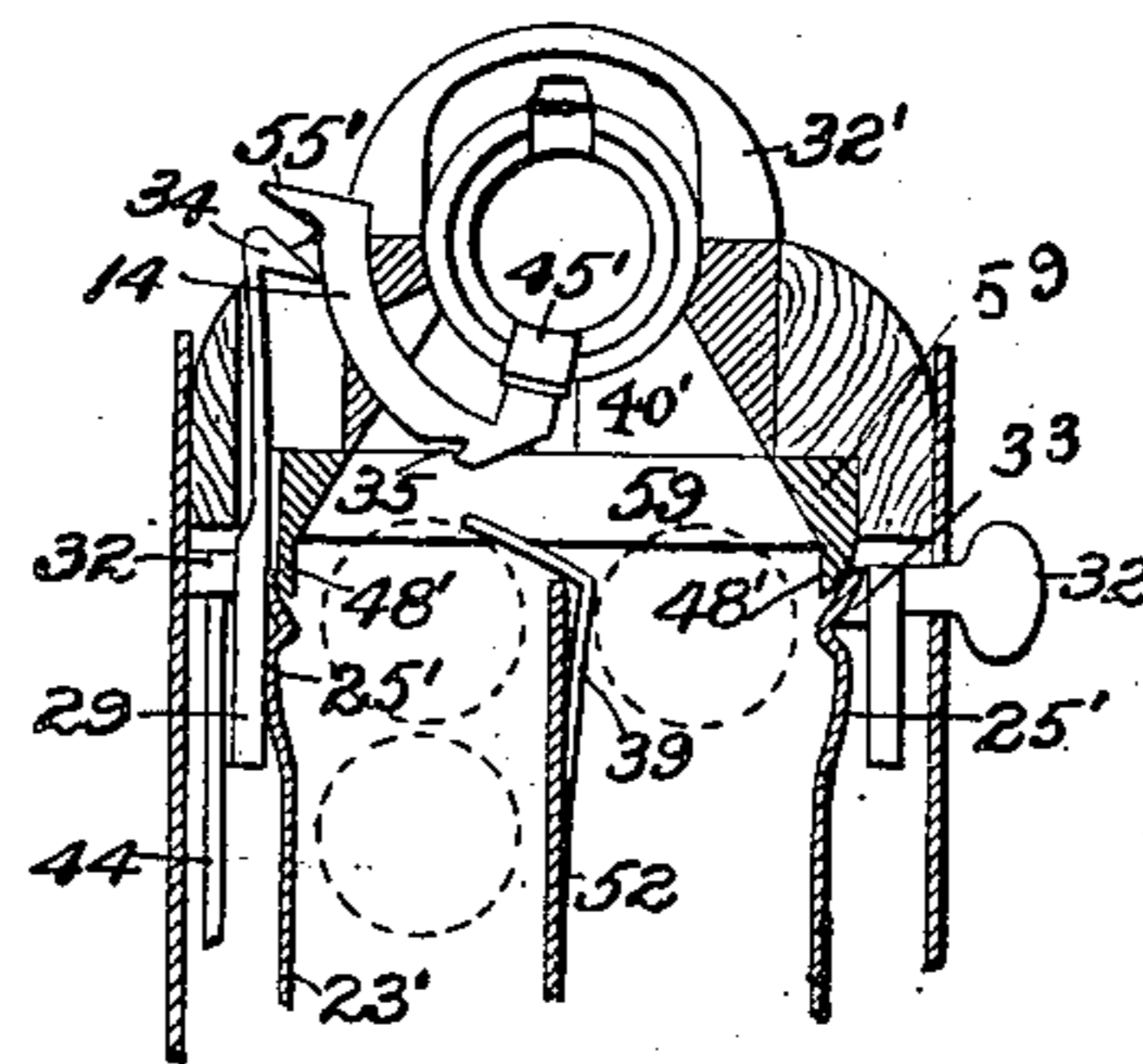
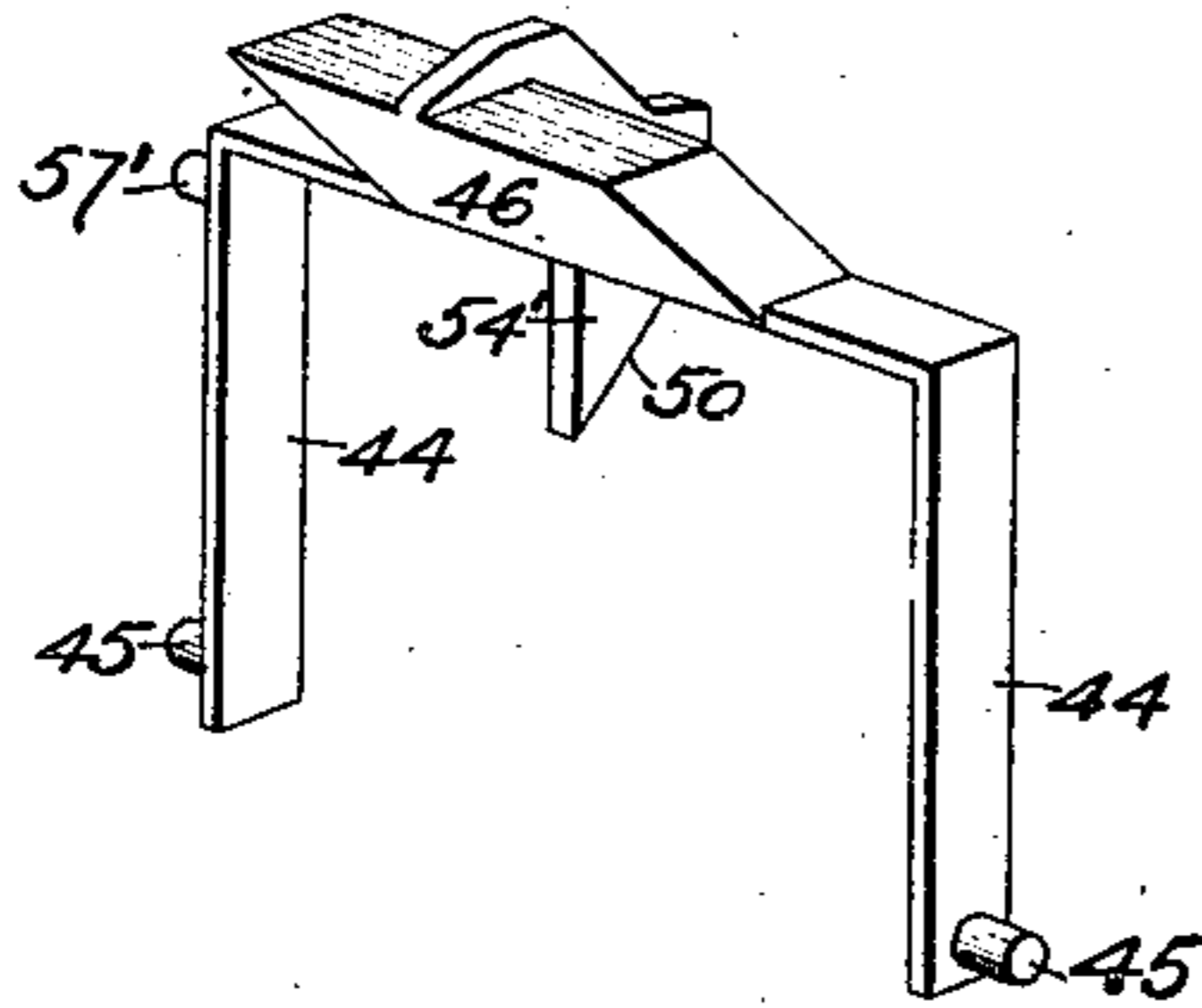


Fig. 20

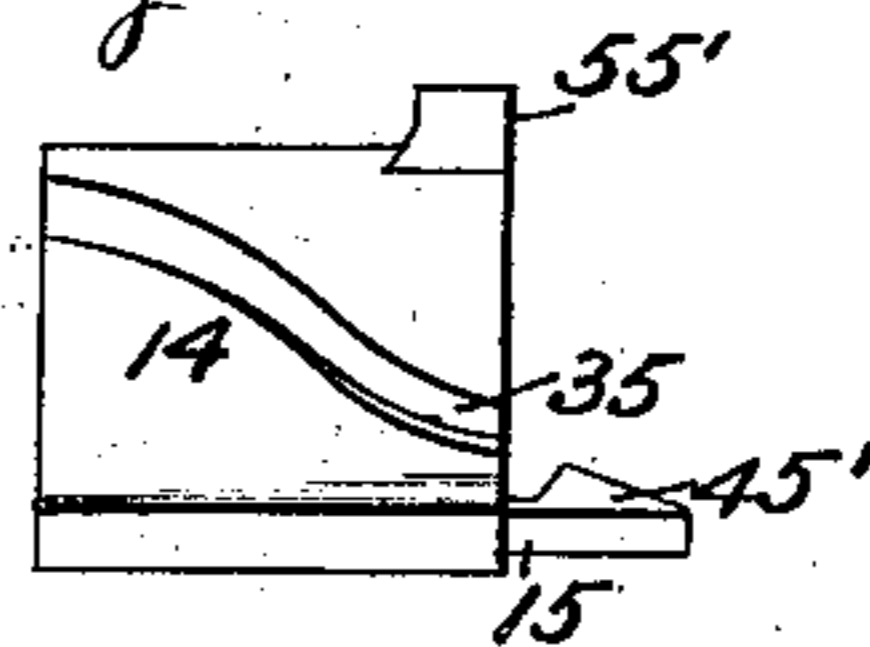


Fig. 21

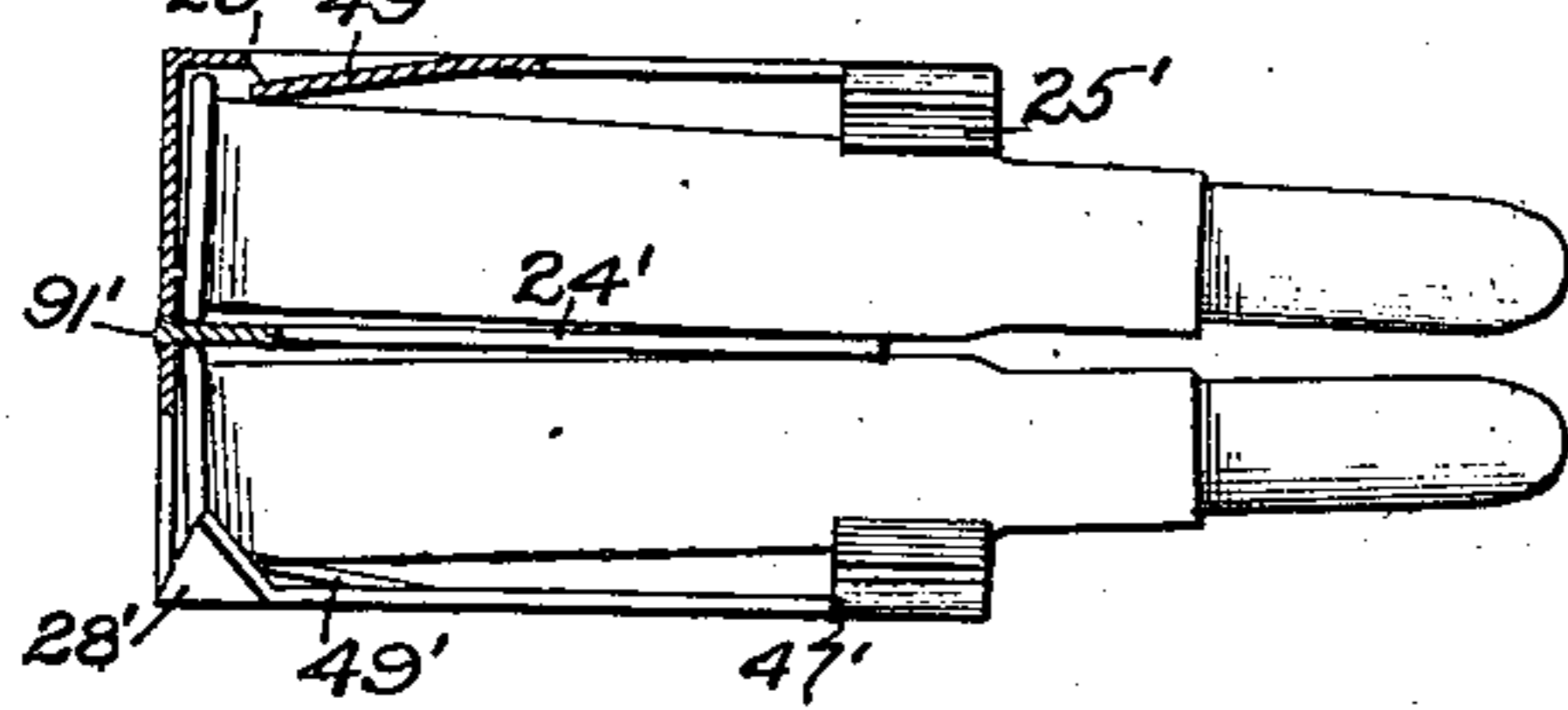
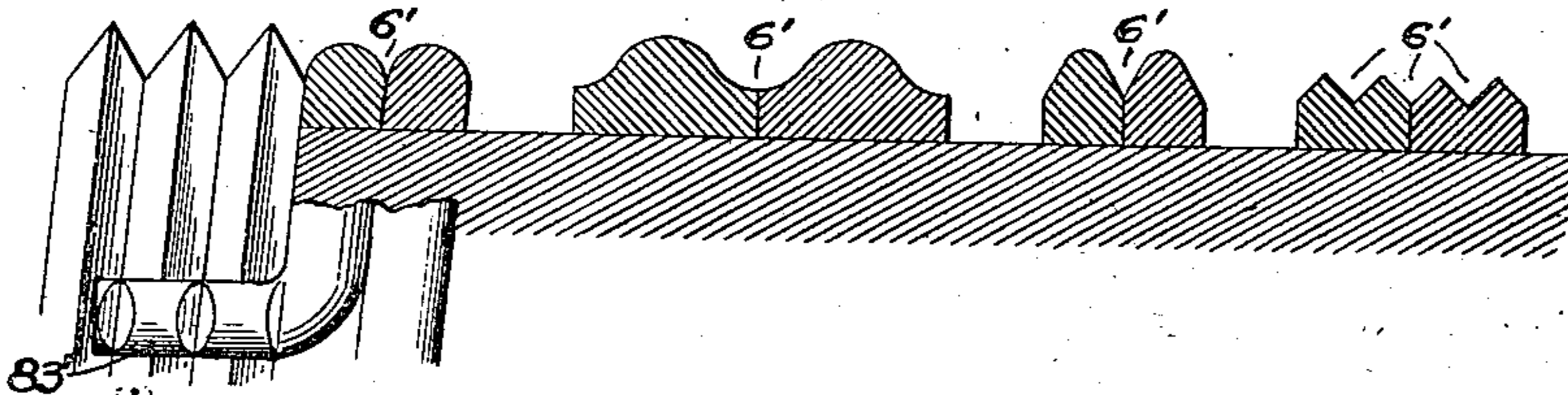


Fig. 22



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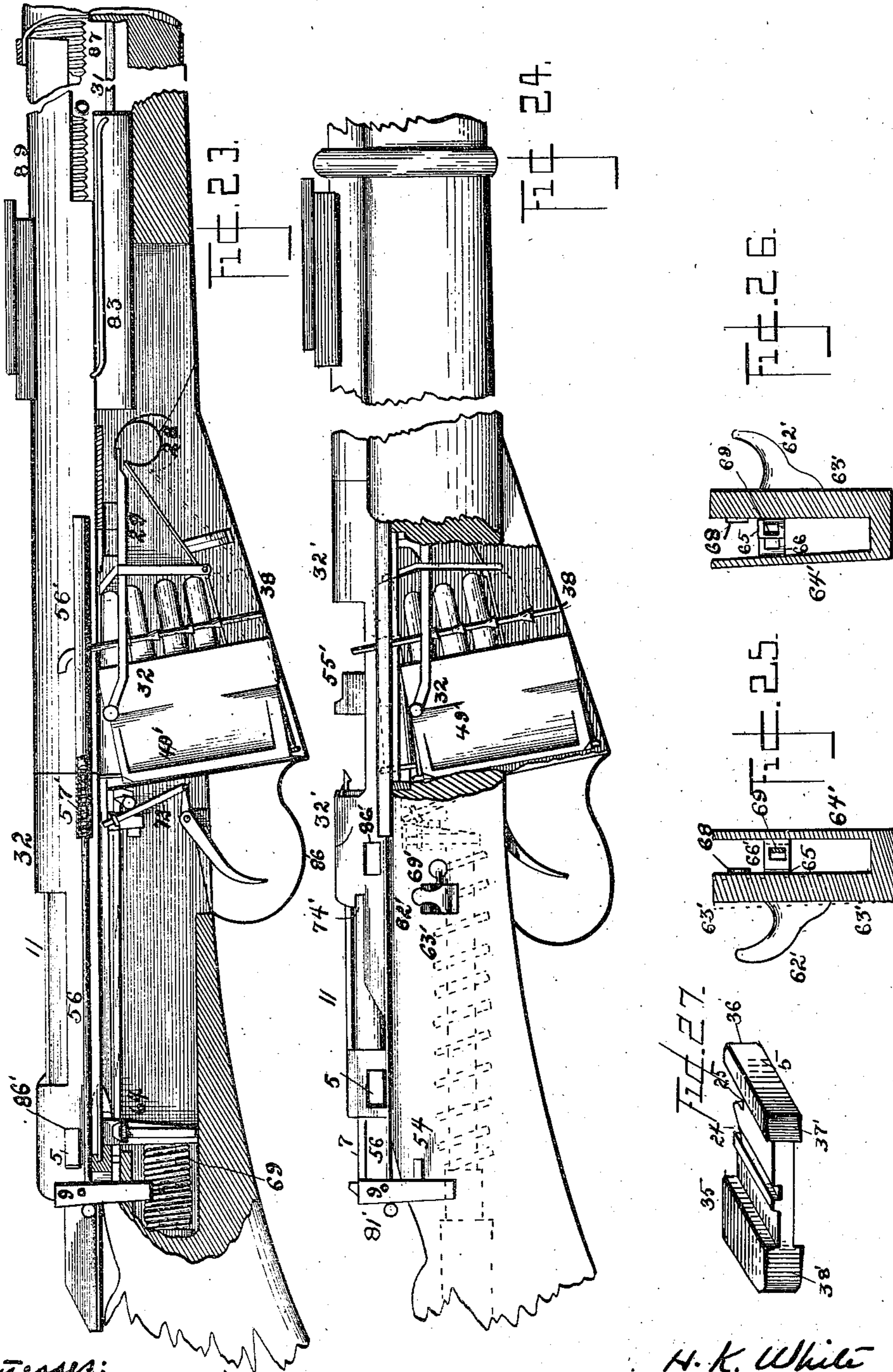
(No Model.)

5 Sheets—Sheet 5.

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RECOIL OPERATED MAGAZINE FIREARM.

No. 488,409.

Patented Dec. 20, 1892.



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# UNITED STATES PATENT OFFICE.

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MAGAZINE RIFLE COMPANY, OF ALEXANDRIA, VIRGINIA.

## RECOIL-OPERATED MAGAZINE-FIREARM.

SPECIFICATION forming part of Letters Patent No. 488,409, dated December 20, 1892.

Application filed March 27, 1891. Serial No. 386,679. (No model.)

*To all whom it may concern:*

Be it known that I, HARRY K. WHITE, of the United States Marine Corps, stationed at Annapolis, in the county of Anne Arundel and State of Maryland, have invented certain new and useful Improvements in Firearms, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to firearms.

The object of the invention is to provide an arm which in the hands of the troops will prove light and strong, of easy recoil and be capable of being fired as a single loader or  
15 as a magazine gun either slowly or rapidly, and will cool off rapidly during firing; also to produce a magazine which will be readily changed or charged, and to improve the magazine and feed mechanism; also to improve the  
20 breech opening and closing mechanism, and the cartridge extractor and ejector, and generally to improve a fire arm of the class described.

In the drawings Figure 1 is a longitudinal  
25 vertical section of the breech bolt and receiver, showing in elevation parts of the bolt, the trigger having been pulled, the recoil mechanism and the cartridge feeding mechanism. Fig. 2 is a vertical cross section of the bolt  
30 and receiver on the line *a— a* Fig. 1 showing an outline of the operating arm in dotted lines, and the end of the bolt closing spring rod. Fig. 3 is a top plan showing the transverse locking bar and its operating plate with  
35 a horizontal section of the rear part of the bolt and receiver on a plane through the top surface of the operating plate, and part of the forward part of the bolt with the cover removed. Fig. 4 is a vertical cross section of  
40 the transverse locking bar. Fig. 5 is a side elevation and partial section of the rear portion of the barrel and fore stock, showing an air space about the barrel, a sliding and a fixed cover and groove in the stock, the apparatus  
45 for pumping air into the air space and the supports for the sight. Fig. 6 shows the construction for guiding the muzzle of the barrel on recoil, and the means by which the heated air is drawn out of the air space about the  
50 barrel. Fig. 7 shows the same, being a vertical cross section of the muzzle in rear of the

sight. Fig. 8 shows in perspective the means by which the arm having a barrel movable on recoil may be used with bayonet fixed. Fig. 9 shows in perspective the bolt, the bolt cover, 55 the transverse bolt locking bar, part of the firing pin and the extractor with the extractor-locking bar. Fig. 10 is a perspective of the breech with the bolt removed showing the feed stop, feeding shafts, a part of the operating arm and handle, together with the spring and rod to force the operating arm forward after drawing it to the rear in opening the breech, and the parts of the feeding apparatus projecting, to be operated by the right 65 hand. Fig. 11 is a top plan view of the cartridge feeding mechanism with the automatic arrangement for releasing the operating arm. The right side of the magazine receiver shows part of a magazine in place, 70 the left side showing the method of holding the cartridges when no magazine is used. Fig. 12 shows a front elevation of the recoil mechanism in rear of the magazine receiver with a cross section of the bolt on the line *b— b* 75 Fig. 1. Fig. 13 shows a rear elevation of the feeding mechanism and the magazine feed stop, with a cross section of the bolt on the line *c— c*, Fig. 1. The side plates of the magazine receiver are moved out to give a clear 80 view of the interior. Fig. 14 is a side elevation of the magazine. Fig. 15 gives vertical cross and longitudinal sections of the operating arms to show the handle attachments. Fig. 16 shows the base of the recoil cylinder 85 in the butt, and its valve. Fig. 17 is an elevation of the breech portion with the side broken away to show the working of the automatic rocking frame by a cartridge; the position of the tray frame when forward to allow the entrance of a magazine, the tray being in position to move under and catch the cartridges when drawn to the rear; and the extractor locking bar caught by its spring to be held back when the bolt is moved forward. 95 Fig. 18 is an isometric view of the rocking frame. Fig. 19 is a cross section on the line *c— c*, Fig. 17, with the feed stop down, showing how the cartridges in the left compartment of the magazine are held and prevented 100 from rising while there are any cartridges in the right compartment. The side plates of

the magazine receiver are moved out to show the spreaders for the magazine. Fig. 20 is a side elevation of the feed stop showing the ejector. Fig. 21 is a top plan view of the magazine, one corner being broken away to show the leaf holding the cartridges and to show the method of uniting the central plate to the rear plate. Fig. 22 shows cross sections of wires that may be used to form external grooves on the barrel by wrapping, and a method of securing the ends of the wire. Fig. 23 is a partial side elevation and partial section of the breech and magazine, and other operative parts of the gun, the barrel and receiver in recoiled position. Fig. 24 is a partial elevation and partial section, with the mechanism in different relative position, the receiver being forward and bolt held back. Figs. 25, and 26, are details of the handle or thumb piece. Fig. 27 is an inverted view of block 5.

The barrel O is screwed into the head of the receiver 32' at its breech. The barrel is formed with longitudinal or circumferential grooves on its exterior for the purpose of increasing the radiating surface in order that the barrel may cool rapidly during firing. I prefer to form these grooves circumferentially, as shown at 6' Figs. 1, 5, and 6, so as to preserve the transverse strength. These grooves may be cut in the metal of a solid barrel but I prefer to form them by wrapping a steel tube with wire under tension, this wire being of such section as to form spiral grooves (Figs. 1, 5, 6, and 22) on the external surface of the tube. To accomplish this I may use wire of section similar to the forms shown in Fig. 22. To secure the ends of the wire I turn the end into the groove 83' cut in the enlarged part of the barrel at an angle to the wire, and on the breech portion continue the thread cut on the breech over this end of the wire so that it is locked or held by the thread of the receiver when screwed over the breech of the barrel. In order that the heat may more readily pass from the interior to the external surface, a solid metallic mass is formed by soldering or sweating the wires together and to the tube.

A space 87 is formed for the circulation of air about the barrel by the cylindrical cover 88 (Figs. 1 and 5) secured to the receiver, the cover 89 (Figs. 5 and 6) over the forward part of the barrel secured to the stock, a set of circular or spiral grooves 31' and longitudinal grooves 95' Fig. 5 cut in the stock in the seat of the barrel, and by the grooves in the outer surface of the barrel hereinbefore referred to. The muzzle is centered in the forward cylindrical part of the cover 89 by the ribs 7' Fig. 6 the spaces between the ribs allowing the egress of the air from the air space between the barrel and the cover. The forward ends of the ribs 7' are tapered down and there is formed about the muzzle between the barrel and the cover 89 an annular opening or orifice 84'. On firing, the rapid passage of the

gases past the annular opening causes a partial vacuum in the spaces between the ribs 7'. The heated air in the air space 87 is drawn out through the spaces between the ribs and through the annular opening about the muzzle, causing fresh air to enter the air space about the barrel through the breech openings 100, Fig. 5 of the stock to cool the barrel.

The barrel and receiver move to the rear on recoil, being checked by compression of the air in the cylinder 67 Figs. 1 and 16 as hereinafter described, and return through the action of the spring 69 Fig. 1. During this motion the receiver slides in the bed 59 and the muzzle is guided by the ribs 7' sliding in the cover 89, the front sight moving in the slot 95 in the cover shown in Fig. 8. As the front sight cannot be used to hold the bayonet, I provide the spring catch 96 on the stock which enters the ear 99 on the bayonet, in fixing bayonet, the head of the catch springing out to catch ear 99 and hold the bayonet on the muzzle. To allow the sight 94 to move to the rear in the bayonet slot, 98, Fig. 8, I continue this slot through the base of the bayonet socket and rivet on the strengthening piece O' at the side of the slot. In unfixing bayonet the spring 96 is pushed back by the thumb out of engagement with the ear 99 and the bayonet is withdrawn from the muzzle.

To support the rear sight and the cover 88 under it, blocks 61', Fig. 5, fitting over the barrel are placed between the barrel and the cover and the sight screws are screwed into these blocks.

The bolt slides back and forth in the receiver which has the usual openings above and below for the passage of cartridges. It consists as shown in Fig. 9 of the main piece 1, the cover 2, the pin 4 (Fig. 1) to secure these parts together, the transverse locking bar 5 and the longitudinally reciprocating plate 7 Fig. 3 to operate the bar 5, said plate 7 being provided with the operating arm 9. Figs. 10, 2, and 3

In the bolt is the firing pin 18 Fig. 1, having the spring 20' the rear end of which rests on the abutment formed by the shoulders 3 on bolt 1 and cover 2. The forward end of spring 20' engages the enlargement on the forward end of the firing pin. For this engagement there is a helical groove 22', shown in dotted lines in Fig. 1, cut in the rear face of the enlargement. The end of the groove, and therefore its foremost portion is in rear of the firing pin point which is placed eccentrically. The spring being constantly under tension, the tendency of its forward end is to seek the foremost position possible, that is the end of the groove and remain there, and this end of the spring will therefore always be in rear of the firing pin point. The object of this is that the spring may act in the axis of the firing point and decrease the liability of breaking the point on striking the cartridge, and also act near the axis of the center of

gravity of the pin of the form shown in Fig. 1 to avoid vibration and unnecessary friction. The part of the pin within the spring is round to form a spindle for the spring and the rear part is of rectangular section being bent up to form the thumb piece 22 and having safety and full cock notches 16 and 17. The sear 19 in the receiver engages these notches as usual. The bolt has the inclined recess 60' Fig. 1 through the rear part, through which the rear end of the firing pin is dipped in assembling, and the bolt has recess 85' open above into which the forward end of the pin is next introduced, the firing pin point being then allowed to spring forward into the hole in the forward end of the bolt. In the rear part of the bolt is a rectangular recess in which reciprocates the transverse locking bar 5. Over this is placed the longitudinally reciprocating plate 7 Fig. 13 having the slot 8, the rear part of which is straight, and parallel with the length of the bolt. The slot in front of this straight part extends obliquely and nearly across plate 7. The slot 8 receives the lug or pin 6 on the locking bar 5. The plate 7 slides between the side plates or ears on the rear part of the bolt or cover, plainly shown in Fig. 9, and is held from coming out of the bolt in moving to the rear by the forward end of the slot 8 bringing up against the pin 6. The cover 2 is placed over the plate 7, its forward part fitting in and closing the opening of the recess 85' above the firing pin. The forward end 77' of the cover 2 fits into and is held by the undercut recess 80' in the bolt, and the pin 4 is passed through the holes in the ears 76' on the rear part of the cover and the corresponding hole in the rear part of the bolt. The parts of the bolt are thereby secured and held together.

The bolt is locked when forward against the breech by the transverse reciprocating bar 5, the ends of the bar engaging corresponding recesses 86' Fig. 10 in the receiver to hold the bolt securely in firing. On moving the plate 7 to the rear as shown by the dotted lines Fig. 3 the cam slot 8 operating on the pin 6 moves the bar 5 to the left, disengaging it from the recesses in the receiver. Part of the metal in the rear of the left recess in the receiver is cut away forming a longitudinal slot in the frame at the left hand side (74' Figs. 2 and 10) to allow the locking bar 5 to move to the rear with the bolt after being moved to the left in unlocking, corresponding slots 75' being cut in the bar 5 to pass over the parts of the receiver remaining about 74', as shown in Figs. 2 and 9, that is, the thin part only of the bar 5 will move in slot 74.

In a recess in the forward end of the cover 2 is pivoted an extractor of the form shown in Figs. 1, 9 and 17 secured to the cover 2 by the pin or pivot 33'. The extractor has a spring 34' Fig. 1 bearing on the back of the recess in the cover to throw down the hook end of the extractor. In a groove in the upper side of the cover 2 slides the extractor locking bar 11.

When the bolt is locked and ready for firing, the forward end of the bar 11 extends over the extractor, as shown in Figs. 1 and 9, and locks it down. On drawing back the operating arm 9 the bar 5 is moved to the left through the action of the plate 7 as described. The bar 11 moves back with the bolt, its forward end remaining over the extractor until the bolt moves a little way forward, as hereinafter described. The faces 37' Fig. 9 on the bar 5 are slightly inclined and by engaging similar faces in the receiver recesses 86' the bolt is started back. The extracting face 38' on the bar next engaging the corresponding face on the lug 39' (Fig. 3) on the receiver, the bolt is drawn still farther back, until finally the bar 5 is disengaged as shown in Fig. 2 and in dotted lines in Fig. 3. Continuing the pressure on the operating arm, the pin 6 being at the forward end of the slot 8 the bolt is carried to the rear by the continued rearward movement of plate 7 and the cartridge shell is withdrawn from the chamber and ejected, the end of the bar 11 remaining over the extractor and holding it down over the rim of the cartridge.

The firing pin is provided with a projection 23 (Figs. 1 2 and 9) engaging a corresponding cam face 24 in a recess in the bar 5, the bar 5 having another recess 25 to the right of the cam 24 and adjoining it. While the bar 5 is moving to the left the withdrawing face or cam 24 engaging the projection 23 on the firing pin, forces the firing pin back until the recess 25 in the bar 5 passes in front of the projection 23. The firing pin then springs forward, the projection 23 entering the recess 25 to hold the bar 5 and prevent it from returning to the right until, when the bolt is nearly home again when being moved forward, the sear in cocking the firing pin withdraws the projection 23 from the recess 25. While the firing pin has been in the above described position holding the bar 5 it has been held back enough to withdraw the point from the front bolt face, thus being prevented from accidentally firing the cartridge.

On forcing the operating arm and plate 7 connected thereto forward to close the breech the bar 5 being held by the projection 23 on the firing pin and prevented from moving to the right in the bolt, the bolt is pushed forward by the forward movement of bar 5. The spring 13 on the receiver catches over the forward end of the bar 11 (Fig. 17) and pressing it back holds it while the bolt moves forward. By this means the extractor is uncovered and is free to spring over and catch the rim of the cartridge when the bolt is closed against the barrel breech. When the ends of the bar 5 are opposite their recesses 86' in the receiver, the action of the slot 8 in the plate 7 upon the pin 6 forces said bar to the right, locking the bolt, the entering face 36' on the bar 5 causing its easy entrance into the recesses and the inclined locking faces 35,

engaging the corresponding faces in the recesses and causing the cartridge to be forced into place. The extractor is then over and engaging the cartridge rim. Continuing the forward motion of the operating arm the straight part of the slot 8 in the plate 7 passes about the pin 6, locking the transverse bar 5 and at the same time the lug 12 on the plate 7 (Figs. 1 and 3) engaging the rear end of the bar 11 forces said bar forward, the forward end passing over the extractor, to remain there and lock the extractor during the next opening of the breech. As there may be some wear of the bolt locking mechanism after long use, the part of the pin 6 above the transverse bar 5 is made with its axis slightly to one side of the axis of the lower part in the cross bar as shown in Fig. 4. When the parts are worn, by reversing the pin 6, placing the present left side on the right, the wear will be taken up and the breech tightly closed when locked.

The sear is pivoted in a recess in the receiver and pressed up by the spring 20 secured to the receiver. It is depressed on pulling the trigger by means of the bar 72 having the head 73, (shown clearly in Fig. 12,) which catches over the lug 74 on the sear when the barrel and receiver are forward in the firing position (Fig. 1). The bar 72 moves in the guide 75 on the arm 76 attached to the bed 59, its lower end being attached to the trigger arm 71. The rear part of the receiver 32' has a flat under surface with projecting ribs 61 at the sides (see Figs. 1, 12.) This part of the receiver rests in a corresponding guide plate on the bed 59. The sides of the bed rising on each side of the receiver have grooves 60 in which the ribs 61 on the receiver slide. In this way the bed forms a holder and guide for the receiver. The bed 59 is secured to the stock, and has an opening corresponding with the opening 40' Fig. 1 in the receiver for the passage of cartridges from the magazine. This opening in the bed is continued to the rear, to allow the movement of the arm 42 projecting down from the receiver (Figs. 1 and 12).

The downward projecting arm 42 on the receiver 32' serves to carry the recoil piston 68 and the spring 69 and to engage the buffer 77 on the return from the recoil, to ease the stoppage of the receiver and barrel. The buffer 77 of rubber is carried on the arm 76 secured to the bed 59. On the side of the arm 42 is the lug 62 serving as a guide or holder for the rod or bar 63. The bar 63 has the head 64 which fits into the corresponding recess 66 under the bed plate, shown in Fig. 1, and holds the receiver and barrel to the bed plate 59 when they are in the forward position. The bar 63 is held up with its head in the recess 66, when in the forward position, by the spring 65 on the guard plate, the spring then passing under and pressing up the lower end of the rod.

The forward end of the spring 65 passes

under the trigger arm 71 and by this means holds the bar 72 up in place that its head may be above the sear lug 74 when the barrel is forward and engage said lug on depression. In case the head should be below the sear lug 74 on return of the barrel, the head is so formed with an incline at its upper end (as shown in Fig. 12,) as to cause the bar 72 to spring out in the guide 75 while rising, and allow the head to pass above the lug 74 into place to engage said lug.

When ready to fire, on pulling the trigger the spring 65 is first depressed by the trigger arm 71, and the head 64 of the bar is allowed to drop out of the recess 66 in the bed 59, as shown in Fig. 1. On further pulling back the trigger, the sear is disengaged from the firing pin and the piece is fired, the barrel being now free to recoil against the air in the recoil cylinder 67 and the springs 69 and 57, Fig. 10. Of course the barrel in its recoil carries the receiver and connected parts with it. The forward and rear sides of the head 64 are inclined in order to more easily enter the recess 66 in the bed, and also to allow of its being forced out in case the piece is discharged before it is clear of the recess.

The cylinder 67 receives the piston 68, attached to the arm 42 of the receiver, on recoil, the air within the cylinder being thereby compressed and most of the shock of the recoil taken up. When the rear limit of the recoil is reached, the piston 68 strikes the projections 43' on the ring shaped valve 42', (Fig. 16) over the passage 44' and pushes the valve back against the pressure of the spring 41', thus opening the passage 44'. The compressed air in the cylinder 67 is then free to escape through said passage. On the return of the piston 68, the valve 42' is forced forward over the passage 44' by the spring 41'. A partial vacuum is thereafter formed in the cylinder 67, during the return of the piston 68, until the piston passes out of the cylinder at the end of the return, as shown in Fig. 1, and the motion of the barrel is thereby still further checked or retarded. After the piston passes out the normal pressure is re-established in the cylinder 67.

The spring 69 and the spring 57' serve to take up part of the recoil, but the object of the spring 69 is to return the barrel to place after recoil, and the object of the spring 57' is to force the operating arm 9 forward and thereby close and lock the bolt. The base of the cylinder 67 rests on the bottom of the hole bored in the stock, as shown in Fig. 16. By this means most of the strain of the recoil is brought upon the larger part of the butt, and the small of the stock is thereby relieved.

The cylinder 67 has the shoulder 46' Fig. 1, which serves as an abutment for the spring 69, the other end of the spring 69 engaging the arm 42 depending from the receiver. The forward end of the cylinder and the piston 68 form a spindle for the spring, as shown in Fig. 1. The action of spring 69 is to force the

arm 42 forward after recoil, thereby returning receiver and barrel to place, said spring having been compressed by the action of the arm 42 during recoil, and having checked the recoil at its end by extreme compression. All the rearward pressure of the spring 69 is exerted on the shoulder 46' of the cylinder 67, and by this means the part of the strain of the recoil acting through said springs is brought upon the butt as above described.

The cover 88 (Fig. 5) is secured to the receiver and moves with it. It is cylindrical, and the forward part slides in the cover 89 on recoil. The cylinder 83, Fig. 5 is secured to the cover 88, and has a piston 3<sup>p</sup> provided with the rod 3' which is held by a pin 89' passed through a hole in the stock and through the head 4' of said piston rod. On recoil and return the cylinder 83 moves with barrel and receiver, and the air within it is forced out by the piston into the air space 87, to cool the barrel. The valves 85 are provided to secure this circulation and prevent the return of the air to the pump, the pipe 86 taking the air from the forward end of the pump to the air space. The air on entering the space 87 is given a circular direction about the barrel, (the valves in the cylinder 88 opening toward one side,) and passes spirally along the barrel through the grooves 6' and 31' in barrel and stock respectively, and out at the muzzle. I may take the air from the passage 44' in the recoil cylinder 67 to the air-space 87 by a pipe similar to the pipe 86.

Secured to the bed plate 59 is the cylinder 56' (Figs. 10 and 2) having a rod 56 with a spiral spring 57' about it, which spring may be compressed between the forward end of the rod 56 and the rear end of the cylinder 56' by moving the rod to the rear. The rear end of the rod 56 is bent at a right angle, to form an arm 81' so that when the arm 81' is turned down to the right, it will engage the notch 58 in the operating arm 9. It may be turned up as shown in Fig. 2 to disengage the operating arm and allow the removal of the bolt. The catch 54 is a transverse lever pivoted in the frame. The nose 54' of said lever is thrown out a little at one side, by the spring 542, which rocks the lever on its pivot. When the catch 54 is rocked against the force of said spring, (dotted lines, Fig. 11) its nose rocks inward, to release the operating arm 9.

In recoil the spring 57' is compressed, and at the end of the recoil the operating arm 9 is caught and held by the catch 54 (Figs. 1 and 11) while the barrel returns forward. This action draws the locking plate 7 to the rear in the bolt, and by this means the transverse locking bar 5 is drawn to the left, unlocking the bolt and holding the bolt during the return of the barrel. When the cartridge is in place in the receiver ready to be pushed into the chamber, the catch 54 is released automatically as hereinafter described, and the

spring 57, acting through the rod 56 on the operating arm 9 of the plate 7, moves said plate 7 forward. This plate 7 forces the bolt forward and finally locks it as before described.

The magazine is made of thin sheet metal and has a plate 24' (Figs. 11 and 21) in the middle, forming two compartments for cartridges. It is open above and below, and may be inserted in the stock and used either side up. The cartridges are ordinarily held and kept from coming out of said openings by ears 25' formed by slitting the sides at 47' and springing in the ear. The ends of the ears 25' are bent out to catch under the spreaders 48' (Fig. 19) on the bed 59 and open the upper side when inserted in the stock. The cartridge heads are held by means of the leaves 49' formed by cutting the plate along the line 29' 29', Fig. 14, and springing in the leaf so made to a permanent set, as shown in Fig. 21. The object of this construction is that a number of cartridges may be inserted in the magazine at one time from its front, which is open as shown, and when so inserted the cartridges will be held by the leaves 49', which spring in after the passage of the cartridge heads by them and catch the rims of the cartridges. Said leaves 49' are given enough resilience to press the cartridges in toward the central plate. The charging of the magazine by the means described is thereby accomplished in one operation, or in one operation for each cartridge compartment. The rear corners of the side plates of the magazine are bent in and forward, as shown in Fig. 14, and in Fig. 21 (lower side). The object of this construction is to form guides for the cartridge heads which guides will direct the cartridges over the central plate in rising into place in the passage 40' into the receiver. This magazine is constructed of a single sheet of metal bent to form the back plate and two side plates as shown in Fig. 21, with a central plate 24' united to the said back plate by means of lugs 91' on the central plate, inserted in corresponding holes in the back plate and upset to rivet and hold them in.

The magazine receiver 26 has the back plate 80 formed in one piece with or united to the two side plates 81. These side plates 81 are bent under and riveted together forward of the opening left for entering the magazine, one of the plates being further bent up to form the center plate 52 of the magazine. The lower rear corner of the center plate 52 is chamfered off to allow the magazine to be easily entered. There are two trays or followers 27 for raising the cartridges, each having a spring 28 secured to a U shaped frame as shown in Figs. 1 and 11, 13, and 17. This frame is made by cutting out a plate to the required shape, the legs 29 being bent into planes at right angles to the plane of the plate to give them stiffness in the vertical direction, and the tray springs 28 are secured to the connecting part of the U. On the ends

of the legs 29 are pins 32, to support the legs on the side plates 81. The left pin 32 works in the groove 52' in the left plate 81, (indicated by the dotted lines and partially full lines in Fig. 1.) The right pin is extended through and works in the slot in the right plate 81 corresponding with the groove 52', (as shown in Fig. 10,) and the pin extends out far enough to form the handle by which the feeding frame is manipulated. On moving said handle forward, the pins 32 move down the guide slots 52', and the frame with the springs and trays is moved forward into the space left in the stock for it, the rear ends of the legs 29 moving down with the pins 32 and carrying the trays 27 down with them. The trays 27 being carried forward with the frame as described, are out of the way and clear of the opening in the magazine receiver, and a magazine charged with cartridges may then be inserted. The magazine having been inserted, the handle 32 is moved back up the slot 52', the frame with the springs 28 and trays 27 is carried to the rear, the ends of the legs 29 moving up with the pins 32. The trays are caught and prevented from rising by the spring catches 30 on the center plate. These catches are formed by cutting the center plate 52 to form strips which are attached at their upper ends to said center plate 52 as shown in Fig. 1. These strips are sprung out and the lower ends are bent in to form good engaging ends for the trays 27, the shape being shown in Fig. 13 by dotted lines. After the ends of the trays have passed under the cartridges, the spring catches 30 are pushed off the trays 27, as said trays continue moving to the rear, by the cam action of the projections 31 on the trays. The inclined edges of said projections 31 flatten the spring catches 30 back so that they do not project from the plate 52, and thus the trays are free to rise. The trays are then free to rise through the action of their springs 28, and to press underneath the cartridges. After the pins 32 are to the rear in place they are held up in the upper horizontal part of the grooves or guides 52' in the side plates 81, and the forward part of the tray-frame rests on the step 94' (Fig. 17,) on the center plate 52. The action of the frame and trays is then simply to press up the cartridges, the spring 28, having been put under strain by the upward movement of pins 32 and connected parts just above described. The right hand pin 32, to which the operating knob is attached, has an inwardly projecting hook, 33, which hook 33 forms an ejector (Figs. 13 and 19) for the empty magazine, by which said magazine is forced down on moving the handle 32 down the slot 52'.

In order that the right side of the magazine may be first emptied, the spring 39 is secured to the center plate 52 (Figs. 1, 11, 13, and 19). While there are any cartridges in the right compartment, the spring 39 is pressed to the left by said cartridges, and its end passes over the cartridges in the left compartment to pre-

vent them from rising. When all cartridges are out of the right compartment, the spring 39 returns to the position shown in Fig. 13 and allows the cartridges in the left compartment to rise. Each cartridge as it rises into position in the passage 40' to be entered into the chamber moves sidewise under the center of the receiver. As the cartridge rises and moves to the center the bullet engages under the inclined plate 46 on the rocking frame 44 shown clearly in Figs. 17 and 18, and as the cartridge rises, under the influence of the follower, the point of the bullet acts as a cam, and rocks the frame 44 into the position shown in Fig. 17. The rocking frame 44 has two arms, as shown in Fig. 18, which arms are connected at the top by the plate 46. The arms 44 have pins 45 at the lower ends as pivots, said pins working in slots 53' in the side plates 81, shown in dotted lines in Fig. 1. The plate 46 has the forward projection or vertical plate 54' which engages the central plate 52 and prevents the rocking frame from moving forward until the cartridge, in rising with its bullet under the plate 46 lifts the rocking frame sufficiently for the inclined edge 50 on the projection 54' to engage the incline 51 on the central plate 52, the pins 45 moving up in the slots 53' while the rocking frame is rising. Then, in moving forward, through the oblique action of the cartridge head, the plate 46 allows the cartridge to move up past said plate 46 into position to be pushed into the chamber by the bolt. At the same time, by means of the pin 57' on the rocking frame acting on the forward end of the slot 58' in the bar 53, said bar is drawn forward. The bar 53 acting on the arm of the catch 54 (Figs. 1, and 11) draws forward the long arm of said catch 54, compressing spring 542, and drawing in the nose of the catch. Thus the operating arm 9 is released and allowed to move forward through the action of the rod 56 and spring 57 as before described.

In order that the above described action of the rocking frame may not take place in the case that a shell is not extracted from the chamber, I provide a safety arrangement which prevents the plate 46 and the rocking frame from moving forward. It consists of the spring 40 (Figs. 1 and 17) secured to the receiver and provided with the projection or horn 41. The horn 41 works in a slot 43 cut in the receiver, and in case a shell remains in the chamber it is prevented by the shell from rising in the slot. In this case the space between the lower edge of the horn 41 and the incline 51 on the central plate 52 is not enough to allow the projection 54' on the rocking frame to enter, and the rocking frame is not permitted to move forward and hence does not release the catch 54. In case the shell is extracted, the horn 51 is permitted to rise into the chamber, and allow sufficient space for the projection 54' to enter between said horn and the incline 51, whereby the op-

eration of the rocking frame by the cartridge in rising is permitted. After the cartridge has risen the rocking frame falls into position to engage the next cartridge. The upper edge of the projection 54' is inclined in order that it may be pushed down by the receiver on recoil, in case it has not fallen enough to clear the receiver. The rear edge of the horn 41 is inclined, in order that it may be pushed down by the bolt when the bolt is being closed against the barrel breech. When all the cartridges in the magazine are used there is no action of the rocking frame, and the bolt remains open until another magazine is introduced.

A means of releasing the catch 54 at will, and of holding it in, is provided in the shaft 70' (Figs. 1, 10, 11, and 17). The shaft 70' has an arm 72' which engages the lug 71' on the bar 53, and a thumb piece 73' by which it is operated. On pushing forward the thumb piece 73', the lug 71' is pressed forward, and bar 53 is moved with it. When the bar 53 is thus moved forward by the arm 72', the catch 54 is released, the slot 58' in the bar 53 permitting the bar to move forward over the pin 57' on the rocking frame. By turning the thumb piece 73' through ninety degrees, the arm 72' will be brought at a right angle with the lug 71' and hold it forward against the tension of the catch spring 54, the end of the arm 72' entering a shallow groove in the lug 71' shown in Fig. 1 to prevent the shaft 70' from turning back through the jarring of the piece. By this means the catch 54 is held in order that it may not catch the operating arm 9.

In order that the cartridges may be fed one by one, there is provided a vertical shaft 36 on each side of the receiver, each of said shafts having conical projecting stops 38, to catch and hold down the trays 27. These stops have a portion cut away as shown in Fig. 11. The upper end of each shaft 36 is bent to form an arm 37. On recoil the receiver head strikes the arm 37, turning it to the rear and bringing the cut away portion of the stops 38 on the inside. The tray is then free to rise slightly until the cartridge comes under and against the receiver. On return of the receiver from recoil the arm 37 turns in again through the action of a spring 87' (Fig. 13) on the lower end of the shaft 36, engaging the side plates 81. When barrel and receiver are forward in place, the cartridge is free to continue moving up into place in the opening 40' until the tray comes under and is caught by the next stop 38. There is no stop 38 corresponding with the lowest position of the right tray 27'. The object of this is that the right tray may feed one cartridge as soon as, in moving back after the magazine is entered, the tray is released from the catch 30 on the center plate 52 by the cam 31. To the end also that the right tray 27 may be released before the left tray, and start the cartridges in the

right compartment, the catch 30 for the right tray 27 is forward of the catch 30 for the left tray 27.

In order that the gun may be used as a single loader, a feed stop 14 is provided, in the shape of a section of a cylindrical arm which slides rotatively about the receiver, in a recess or groove cut in the outside of the receiver. It is shown in Figs. 1, 10, 17, 19, 20. It has the lug 55' by which it may be moved up or down. When using the magazine this stop is up in full sight of the officer commanding the troops, so that he can easily perceive whether magazines are being used contrary to orders.

When using the arm as a single loader, the natural action in introducing a cartridge into the receiver is to push the stop down out of the way, in case it is up. When down, the lower end of the stop obstructs the passage 40' from the magazine, as shown in Fig. 19, and prevents the cartridges in the magazine from rising into the receiver. Every time the tray frame is moved forward, in order that a magazine may be introduced, the stop 14 is moved down (in case it is up) and the arm becomes a single loader. This is accomplished by means of a vertical arm 34 (Figs. 13 and 19) on the left bar 29. The arm 34 has a ratchet like head to engage a groove 35 cut spirally on the stop 14, (Figs. 20, 13, and 19.) Whenever the handle 32 is moved forward the head of the arm 34, engaging and moving forward in the groove 35, turns the stop 14 down. The groove 35 is of triangular section, in order that the head of the arm 34 may catch on the lower edge only of the groove, and operate only to move the stop 14 down. On the stop 14 is the spring 15, provided with the head 45', of the shape shown in Fig. 1. The head 45' springs up after the passage of the bolt, and acts as an ejector, to strike under and throw out the shell. The rear end of the head 45' is sloped down so that it may pass under the bolt when the bolt is moved forward.

I form the magazine receiver so that it may be charged with cartridges without the use of the magazine proper, if necessary, by employing a spring 78 (Figs. 1, 11, and 17) on each side to take the cartridge heads. Each spring 78 has the outer edge riveted to the rear plate 80 of the magazine receiver. The inner edge of each spring 78 springs forward or out from the rear plate 80. The inner edge of each spring 78 is turned over to form a guide or holder 79 for the cartridge heads, engaging said heads in the manner shown in the left side or compartment of the magazine receiver in Fig. 11. The strip 78 springs forward at the upper end 82', to guide the upper cartridge forward in feeding. The lower part of the strip 78 is cut away as shown at 59' Figs. 1 and 17 to allow, the magazine to enter easily and push the spring back when said magazine is inserted.

Whether manipulating the breech block by

hand or by the action of recoil, the thumb of the right hand will naturally rest on the handle or thumb piece 62' while the finger is pulling the trigger. In order that this handle 62' may not be forced to the rear on recoil, it is made detachable. To this end it has an outer leaf 63', provided with an ear or hasp 65' and an inner spring leaf 64' joined to said outer leaf and provided with an ear or hasp 66'. In these ears are square holes which register with each other. The ear or hasp from the inner leaf extends outward, and the ear or hasp of the outer leaf extends inward, each nearly to the opposite leaf, so that the ears or hasps overlap each other, and the holes are normally in line with each other, and into these holes a square pin 67' in the operating arm 9 is forced by means of a spring 92' shown in Fig. 15, ordinarily locking the two leaves together. When the leaves are on the operating arm 9 and locked together, the pin or stud 68' on the leaf 63' enters a corresponding hole in the operating arm 9, and secures the handle to the operating arm. The operating arm 9 may then be moved back and forward by moving the handle 62' back and forward. When the arm 9 is in the forward position and the gun is ready to be fired the pin 69' on the stock enters the holes in the ears 65' and 66', forcing the locking-pin 67' back out of the ears. The pin 69' is of narrower dimension at the end than the square holes in the ears 65' and 66', so that upon downward pressure of the thumb on the handle 62' while pulling the trigger, the leaf 63' is free to turn outward as shown by dotted lines Fig. 15 against the tension of the spring leaf 64', thereby disengaging the stud 68' from the arm 9. The handle 62' is then free to remain on the pin 69' being simply hung up on the bent pin 69'. A downward pressure by the thumb on the horn 73' of the leaf 63' disengages the pin 68' from the hole in the arm 9, so that the handle is in no wise connected to the arm 9, while the operating arm 9 moves to rear on recoil and returns. If the handle 62 is again moved to the rear after return of the operating arm the pin 67' in the operating arm again enters the ears 65' and 66' securing the leaves 63' 64' together and securing the handle 62 to the operating arm. The pin 67' has shoulders to engage the plate 93' secured to the arm 9, to hold the pin 67' in the operating arm.

On the outside of the magazine receiver, at the side of the slot 52', are marks, and figures corresponding (Fig. 10) to indicate the number of cartridges remaining on the tray when the tray is at a height corresponding with any of these marks, the tray being visible through the slot.

It will be seen in Fig. 10 that the parts 62' 73' and 32 are placed in natural and convenient positions for manipulating. The thumb piece 73' is within easy reach of the thumb while resting on the handle 62', so

that it may be pressed by the thumb to release the operating arm without moving the hand. The handle 32 is in the natural position to which the right hand is carried, both in moving from the handle 62' forward to push the handle 32 down and get a fresh magazine, and also after inserting a magazine with the palm of the hand, in moving back to grasp the handle 62' and the trigger; the thumb and fore finger naturally grasping the handle 32, being close beside said handle while inserting the magazine and ready to grasp it.

The friction spring 97' on the top of the receiver, bears on the bolt locking plate, and serves to prevent its accidental shifting.

I have described the firearm in the best form with which I am acquainted. It is not necessary that all the parts should be used to make an operative gun. For instance the automatic loading apparatus might be omitted and the gun worked by hand. I can also substitute other and equivalent parts in many of the combinations named, without departing from the spirit of my invention. I do not, therefore, limit to the precise construction shown in the drawings, save where such constructions have important advantages.

What I claim is:—

1. The combination with an inclosing stock or casing, of a gun barrel having external grooves to permit a circulation of air between the barrel and casing, and offer increased heat radiating surface, substantially as described.

2. The combination with the inclosing casing having internal grooves, of the gun barrel having external grooves, thus forming an air space between the barrel and casing, substantially as described.

3. The combination with the gun barrel, of an inclosing casing having internal grooves and ridges, forming air spaces between the casing and barrel, substantially as described.

4. The combination with the barrel having external ribs and grooves extending circumferentially, of the inclosing casing having internal longitudinal ribs and grooves forming air passages, substantially as described.

5. The combination with a gun barrel, of an inclosing casing about the muzzle thereof, there being passages between the barrel and casing, near the muzzle, and an air inlet at the rear thereof, so that the blast of discharge will draw a current of air between the barrel and casing, substantially as described.

6. The combination of a gun barrel and an inclosing casing therefor, and longitudinal ribs between the barrel and casing, and air passages between said ribs, substantially as described.

7. The combination with the gun barrel, of a casing inclosing the barrel, leaving an air space between, and an air compressor communicating to said air space, substantially as described.

8. The combination with the gun casing, of a barrel having a longitudinal movement therein, and a space between the same, and an air compressor having a moving part connected to the barrel, so that the movement of the barrel actuates the compressor to force air into the space between the barrel and casing, substantially as described.
9. The combination with the casing and the gun barrel longitudinally movable therein and having a space between the same, of an air compressing cylinder connected to the barrel, a piston in said cylinder connected to the casing, and connections whereby an air jet is guided from the compressor to the space between the barrel and casing, substantially as described.
10. The barrel supported in the stock to have longitudinal movement therein, a piston plunger connected to the barrel, and an open ended cylinder in the stock into which cylinder the piston closes on the recoil of the barrel (forming a buffer), the parts in combination substantially as described.
11. The barrel supported in the stock to have longitudinal movement therein, the piston plunger connected to said barrel, a cylinder in the stock into which the piston closes on recoil, and a coil spring surrounding the cylinder and piston and acting to return the barrel after recoil, substantially as described.
12. The barrel supported in the stock to have recoil therein, the plunger connected to said barrel, the cylinder into which said plunger fits closely and having a valve therein in position to be opened by the plunger near the end of its rearward movement to relieve air pressure, and a spring to close the valve as the plunger moves forward, substantially as described.
13. In a breech loading gun, the combination with the barrel, of the longitudinally sliding bolt, having a transverse passage through the bolt the movable bolt locking bar extending transversely of said passage and moving with said bolt, and locking shoulders in the frame with which said locking bar engages substantially as described.
14. In a breech loading gun, the combination with the longitudinally sliding bolt, of the locking bar extending transversely of the bolt and having a groove in one face, and a locking shoulder on the frame, with which the locking bar engages said shoulder constructed to enter the groove in the locking bar and permit the backward movement of the locking bar and bolt when the locking bar is properly shifted, substantially as described.
15. In a breech loading gun, the combination with the bolt, having two pieces with independent longitudinal movement, of the transverse locking bar and shoulders on the frame with which said bar engages, and inclines on one of the bolt pieces engaging a projection on the locking bar to shift said bar laterally, substantially as described.
16. The combination with the barrel or chamber having a recess for the extractor, of the sliding bolt having an extractor which enters said recess and engages the cartridge when the breech is closed, and a movable piece on the bolt in position to enter said recess and firmly hold the extractor in its engagement with the cartridge, substantially as described.
17. The combination with the bolt having cylindrical headed firing pin with its striking point in eccentric relation to the pin head, of the spring having its rear bearing against the bolt, and its front end in line with the firing pin point and bearing against the pin head, substantially as described.
18. The combination, with the bolt of the firing pin having a projection thereon, and the transverse locking bar having an incline which engages the projection on the pin to start the firing pin back, substantially as described.
19. The combination with the bolt and its firing pin having a projection, of the transverse locking bar having a recess which is in the line of movement of said projection when the bar is in locking position, substantially as described.
20. The combination with the bolt and firing pin, of the transverse locking bar having an abutment in position to engage the firing pin, in one position of said pin, whereby the shifting of said transverse bar is prevented, substantially as described.
21. The barrel and connections supported in the stock and having a longitudinal movement therein under the impulse of recoil, a locking bar engaging therewith, and the trigger connected to the locking bar so as to unlock the barrel when the trigger is pulled, in combination substantially as described.
22. The combination of the sear and a link connected thereto, the trigger connected to said link, the stock and barrel having a longitudinal movement in the stock, and a barrel locking bar connected to the trigger in such manner as to be released when the sear is released, substantially as described.
23. The combination of the stock barrel and connections having a longitudinal movement in the stock under impulse of recoil, a locking bar engaging the barrel mechanism, a spring acting to hold said bar in locking engagement, and the trigger having a surface in position to compress the spring and unlock the bar when the trigger is pulled, substantially as described.
24. The combination with the corrugated or fluted barrel and its inclosing casing, of a cylindrical barrel cover for the breech portion of the barrel, extending within the casing proper and attached to the barrel, substantially as described.
25. The combination with the barrel having

luted surface, of a cover over the same and supporting pieces connected to said barrel cover, and resting on the barrel substantially as described.

26. The barrel having fluted or corrugated surface, the filling pieces attached to the barrel, a cover for the rear portion of the barrel resting on said filling pieces, and the sight attached to the barrel by screws passing through the cover and into the filling pieces, in combination substantially as described.

27. The bolt and its locking connections, the transversely moving locking bar, the slide having inclines engaging said bar to shift the same, and a spring actuated draw rod having operative engagement with said slide, in combination substantially as described.

28. The bolt and its longitudinal slide operatively connected, the locking bar, the bolt closing spring, and a draw rod engaged by said spring said rod having a projection movable into or out of engagement with the bolt operating slide, in combination, substantially as described.

29. The frame, the bolt moving longitudinally therein, and having a detent, the magazine and a movable frame near the front of the bolt and in the path of movement of the cartridges, said frame operatively connected to the bolt detent, all combined substantially as described.

30. The magazine receiver having a central partition, and a spring catch extending along said partition and overhanging the opposite compartment, so that the cartridge bodies in the compartment having the spring will hold said spring to place as a detent to the other compartment, substantially as described.

31. The magazine open at both edges and having a central partition and having its side plates composed of thin metal, and corrugated near each edge so that the corrugations serve as clasps, in combination with the magazine receiver having projections with which either of said clasps on the magazine may engage, substantially as described.

32. The magazine receiver having a partition plate at the front of the magazine, in combination with the detachable magazine having a partition which aligns with and forms a continuation of the said receiver partition when the magazine is in place, substantially as described.

33. The magazine receiver having a recess at its forward end, and a movable spring follower in position to press upward on the cartridges in the magazine under the receiver proper, or to move forward into said recess away from the magazine, in combination with the detachable magazine having its mouth opening upwardly into the receiver proper, substantially as described.

34. The combination with the magazine-receiver having a recess at the front thereof, of a spring follower, and an incline in said re-

ceiver engaging a projection on said follower, whereby said follower may be put under tension by a longitudinal movement in said recess, substantially as described.

35. The partitioned open ended magazine and recessed magazine receiver, and a spring follower for each compartment of the magazine located in said receiver, all the followers being connected to a single frame and movable therewith, in combination, substantially as described. 70

36. The magazine-receiver provided with spring catches in position to hold down the cartridge follower when entering the magazine from the front, said receiver having a recess in front of the magazine, in combination with the follower having projections in position to disengage said catches by the longitudinal movement of said follower, all substantially as described. 80

37. The barrel, the frame, the bolt, and bolt closing mechanism substantially as described, a detent engaging the bolt to hold it open, and a thumb piece at the side of the frame connected to the bolt, and engaging the bolt detent as the bolt reaches its extreme rear position, all combined substantially as described. 85

38. The spring actuated bolt closing mechanism and a detent therefor, the magazine, and a swinging frame at the front of the magazine in the path of movement of the cartridges, the frame having an actuating rod connected to said detent, in combination substantially as described. 90

39. The magazine, the bolt and bolt detent, the swinging frame in proximity to the magazine and hung on movable pivots in the frame, and the actuating rod connecting the swinging frame and bolt detent, in combination substantially as described. 100

40. The receiver, the magazine, the bolt and bolt detent arranged substantially as described, the swinging frame connected to said detent, and the safety stop in the path of movement of the frame, to prevent the movement of said frame when a cartridge is in the gun chamber, all combined substantially as described. 110

41. The receiver, magazine, and the bolt closing mechanism constructed to operate substantially as described, the rocking frame connected to the bolt closing mechanism and having an inclined face, and the safety stop engaging said frame when held by a cartridge in the chamber, and provided also with an inclined operating face, all combined substantially as described. 115

42. The magazine and the movable magazine stop, and the movable cartridge follower in the magazine, said follower having a part or arm which engages the magazine stop to close the same, whenever the follower is moved from its feeding position, the parts combined substantially as described. 120 125 130

43. The receiver and the bolt having an actuating arm connected thereto, and the removable thumb piece connected to said arm by a spring actuated pin, in combination substantially as described.

44. The combination with the magazine having a spring actuated follower, of a rock shaft having projections at definite distances apart to act as detents to said follower, and an engaging surface on the movable part of the breech in position to engage and swing said rock shaft to release the follower during the bolt movement, substantially as described.

45. The combination with the double magazine having a spring follower in each compartment, of a rock shaft at each side of the magazine having spaced projections acting as detents to the followers, and projections from the moving part of the breech in position to engage and swing the rock shafts, and a detent for the cartridges in one apartment whereby the magazines may be made to feed successively, substantially as described.

46. The frame having an inclined slot in its side, and the magazine follower having a pin projecting through said slot, in combination substantially as described.

47. The combination with the receiver the magazine and breech bolt of a curved plate hung in the receiver to turn about the breech bolt and act as a magazine stop and loading floor, substantially as described.

48. The receiver and a bolt moving longitudinally therein, said bolt having an extractor, the magazine, and the magazine stop at the mouth of the magazine and in the path of movement of a cartridge which is retracted by the extractor, in combination substantially as described.

49. The combination with the magazine and the curved piece constituting the magazine stop, said piece having a spiral groove therein, of the movable magazine follower having a projection which enters said groove in the magazine stop, substantially as described.

50. A magazine gun having a magazine receiver provided with spreaders, and a magazine having spring sides and a contracted mouth, said magazine engaging said spreaders as the magazine is forced into the receiver, whereby the mouth of the magazine is opened to pass cartridges, all substantially as described.

51. A magazine gun having a magazine receiver, a movable magazine ejector in said receiver, and a magazine having elastic holding catches, which catches are detached by means of said magazine ejector, where it engages the magazine all substantially as described.

52. The gun having a magazine receiver, the spring actuated follower movable in said receiver out of the way of the magazine and contained cartridges, and the detachable magazine having its sides bent in to guide the

cartridge heads, and open at front so that the said follower may pass under the cartridges when the magazine is in its receiver, all substantially as described.

53. The combination with the magazine, of the tray or follower therein, and a curved spring secured to the front of said tray and to a frame independent of the magazine, and acting to lift said tray when in operation, substantially as described.

54. The combination with the bolt and its operating slide, of a handle or thumb piece having a spring leaf in contact with the operating slide, a retaining pin serving to retain said thumb piece in contact with the slide, and a pin on the frame in position to press back and disengage said retaining pin at the proper time to disconnect the slide and thumb piece, substantially as described.

55. The combination with the stock and recoil-actuated barrel moving longitudinally therein, the spring for returning the barrel, and the cylinder and piston working therein, said piston and cylinder constructed to act as a vacuum buffer to check the return of the barrel to its forward position, substantially as described.

56. The combination with the stock and barrel arranged to move longitudinally therein, a cylinder in the stock with its mouth open to the front, a piston attached to the barrel to close into the cylinder on the recoil, a spring valve at the rear end of said cylinder, in position to be opened by the piston in its extreme backward movement, and a spring acting on the barrel to press it forward, substantially as described.

57. The combination with the barrel, of a spirally coiled wire wound on the barrel and presenting ridges on the outer surface of said barrel to secure quick radiations of heat, substantially as described.

58. The combination with the barrel and inclosing casing having a space between, of the wire spirally wound on the barrel and presenting exterior ridges, the rear ends of the wire extending back in about a right line into the enlarged or screw threaded portion of the barrel.

59. The barrel having a recess for the extractor, the bolt having an extractor in position to enter said recess, a movable piece actuated by the bolt locking mechanism to enter said recess and lock the extractor to the cartridge, and a retaining catch acting on said movable piece to hold the same out of engagement with the extractor when the bolt starts to close, the parts in combination substantially as described.

60. The breech bolt consisting of a cylindrical body portion having transverse perforations and slotted longitudinally for the reception of the firing pin, and the cover extending lengthwise in the upper portion of the said bolt body, and having a transverse

perforation in line with the hole in the body, and securing devices, combined substantially as described.

61. The receiver having shoulders or abutments, the bolts, and the locking bar extending across the bolt in position to engage said abutments, and an operating means moving in line with the bolt for throwing the locking

bar into or out of locked position, all in combination substantially as described. 10

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

HARRY K. WHITE.

Witnesses:

W. A. BARTLETT,  
PHILIP F. LARNER.