

(No Model.)

5 Sheets—Sheet 1.

O. W. BERGMAN.
BREECH LOADING FIRE ARM.

No. 468,127.

Patented Feb. 2, 1892.

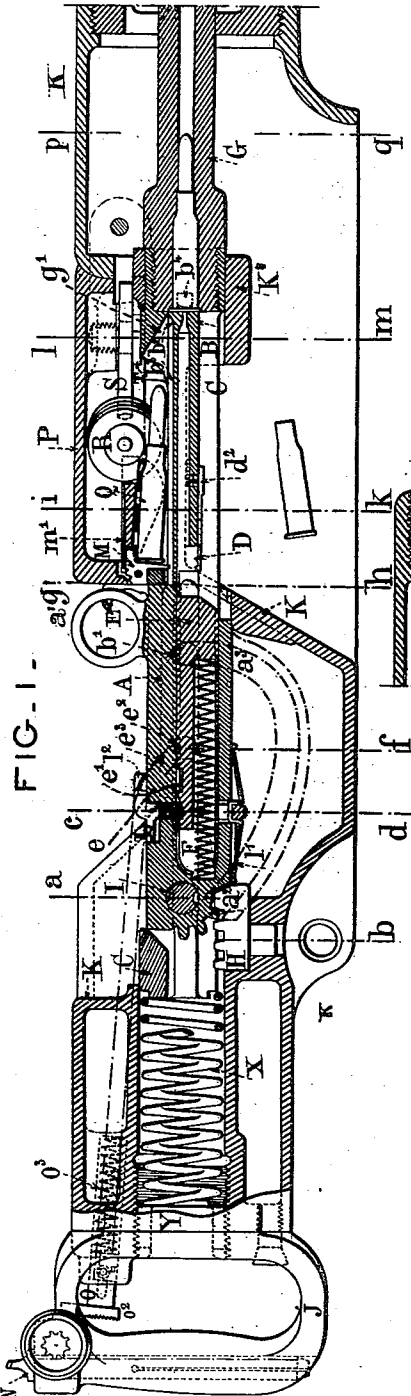


FIG. 1 -

Witnesses.
H. C. Mitchell.
Harry W. Smith

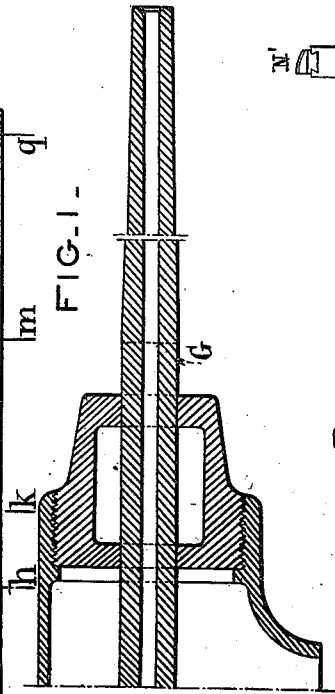


FIG. 1 -

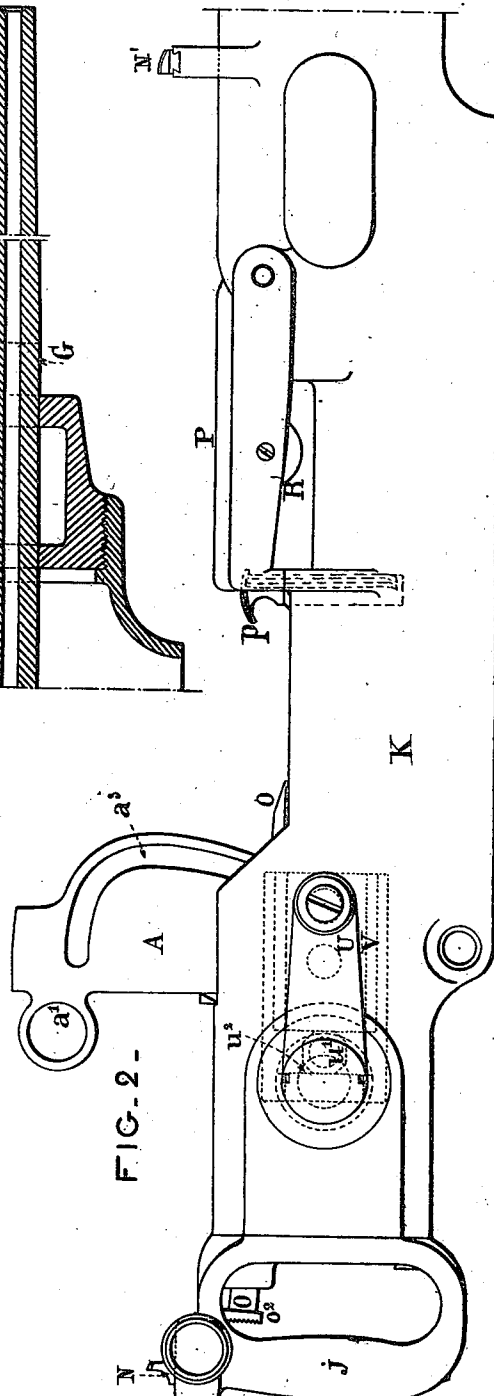


FIG. 2 -

Inventor.
Oscar W. Bergman
By Briscoe & Knauth
his Attorney

(No Model.)

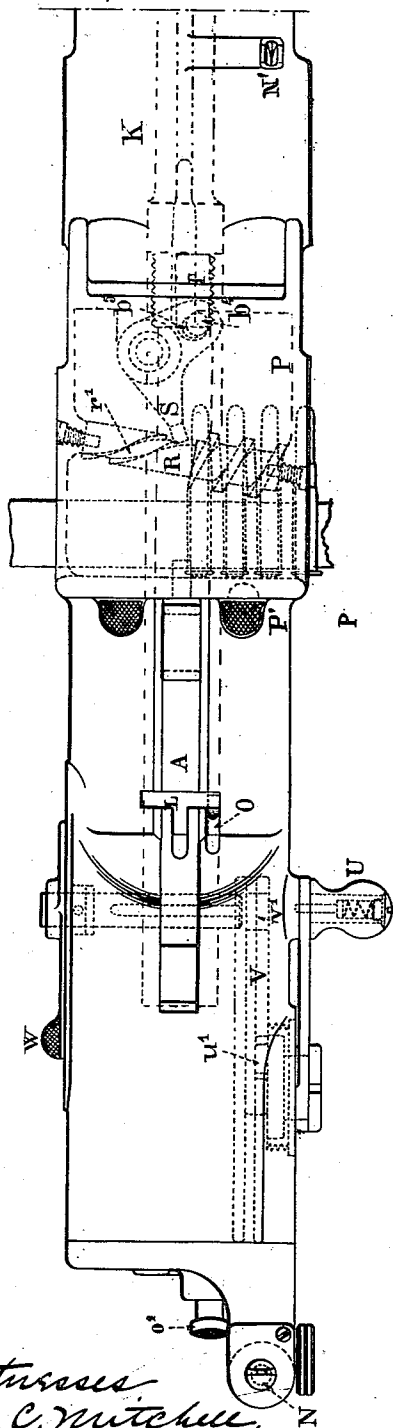
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FIG-3 -



Witnesses
R. C. Mitchell.
Hans M. Rung

FIG-6 -

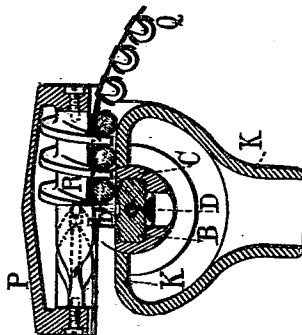


FIG-5 -

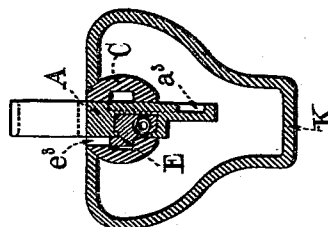
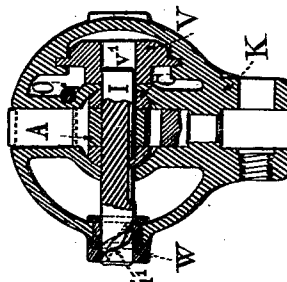


FIG-4 -



Inventor.
Oscar W. Bergman.
by Bonica & Knauth
his Attorneys

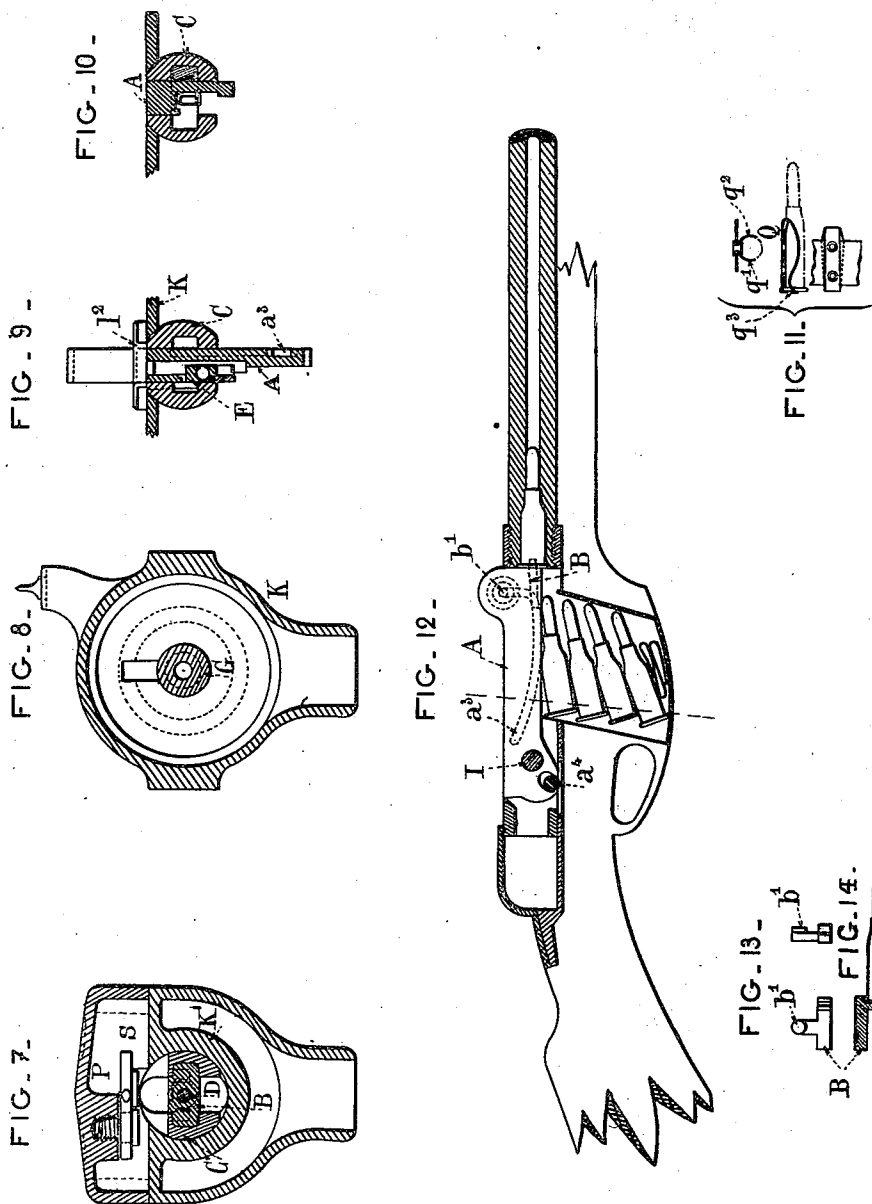
(No Model.)

5 Sheets—Sheet 3.

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BREECH LOADING FIRE ARM.

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Patented Feb. 2, 1892.



Witnesses.
R. C. Mitchell.
Harry M. Clark

Inventor.
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(No Model.)

5 Sheets—Sheet 4.

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FIG-17

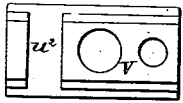


FIG-18-

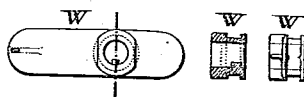


FIG-19-

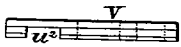
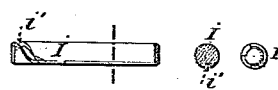


FIG 14A

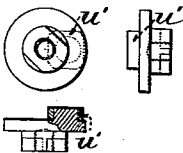


FIG 15-

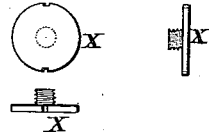


FIG 16-

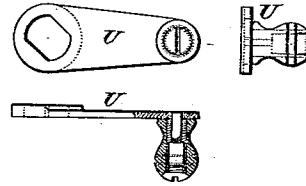


FIG-20-

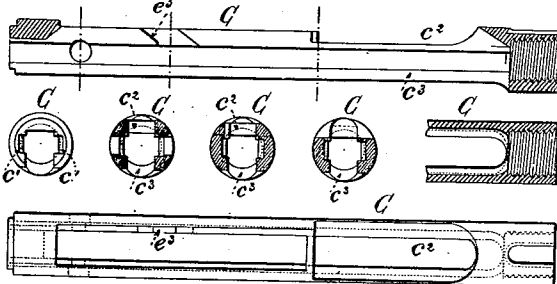


FIG-21-

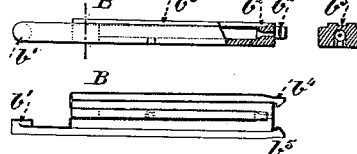


FIG-22-

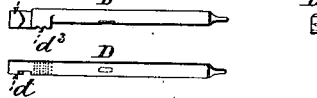


FIG-24-

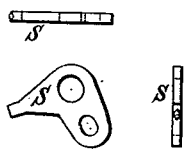


FIG-25-

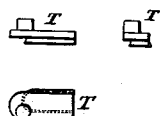


FIG-26-

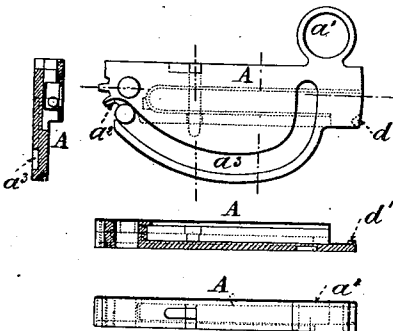


FIG-27-

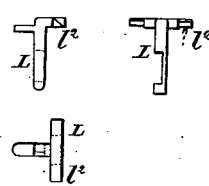
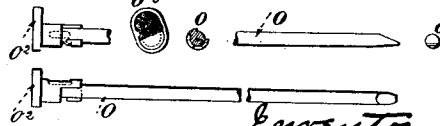


FIG-28-



Witnesses:
P. C. Mitchell.
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(No Model.)

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FIG. 31 -

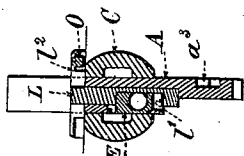


FIG. 30 -

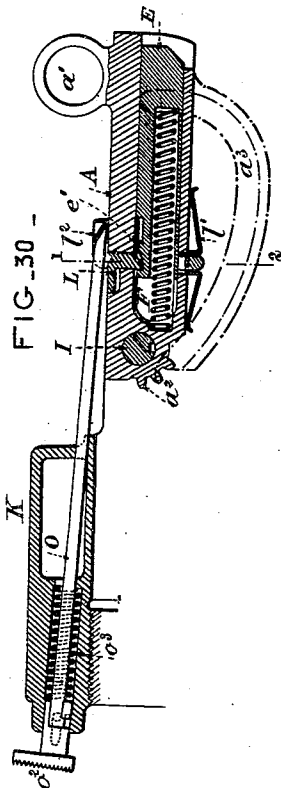


FIG. 29 -

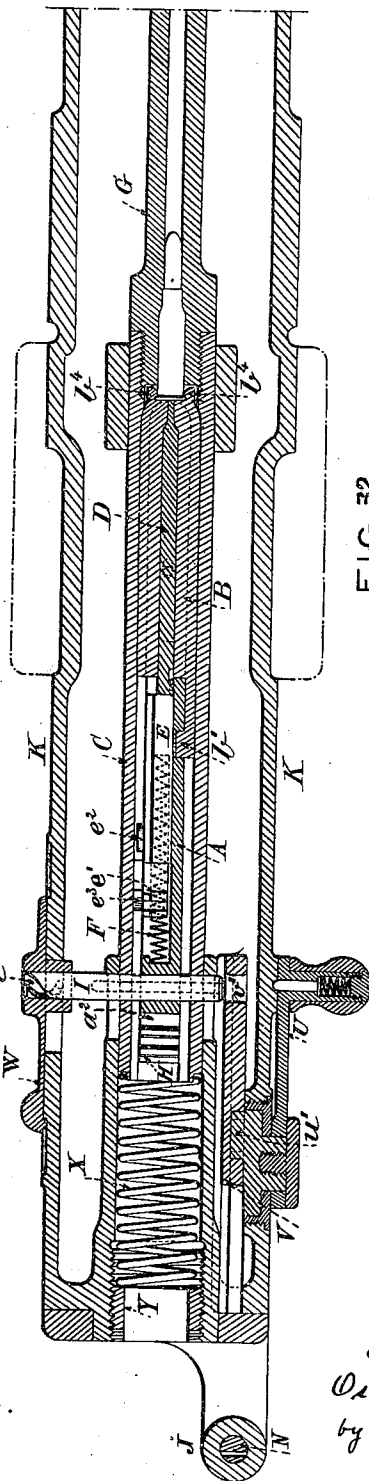
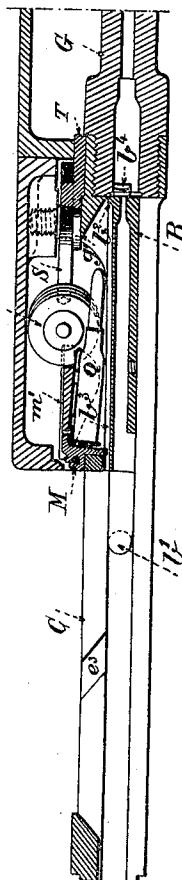


FIG. 32 -



Witnesses
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L. M. Hachschlager.

Inventor
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his Attorneys.

UNITED STATES PATENT OFFICE.

OSCAR WILLIAM BERGMAN, OF GOTHENBURG, SWEDEN.

BREECH-LOADING FIRE-ARM.

SPECIFICATION forming part of Letters Patent No. 468,127, dated February 2, 1892.

Application filed December 9, 1890. Serial No. 374,123. (No model.)

To all whom it may concern:

Be it known that I, OSCAR WILLIAM BERGMAN, residing at Gothenburg, in the Kingdom of Sweden, have invented new and useful Improvements in Breech-Loading Fire-Arms, of which the following is a specification.

My invention relates to military or sporting rifles or small-arms with or without magazines and to machine-guns operated either by hand or automatically by the force of the recoil, and comprises the improvements hereinafter described.

In the accompanying drawings, Figure 1 represents a longitudinal sectional elevation of a machine-gun constructed according to my invention and adapted to be operated either by hand or by the recoil, the breech being shown closed and the mechanism in the position it occupies immediately after the gun has been fired. Fig. 2 represents a side elevation of the gun with the breech open. Fig. 3 is a plan view of the gun. Figs. 4, 5, 6, 7, 8, 9, and 10 are transverse sections taken, respectively, on the lines *a b*, *e f*, *i k*, *l m*, *p q*, *c d*, and *g h* of Fig. 1. Fig. 11 represents various views of a cartridge-feeding belt and one of its clips. Figs. 12, 13, and 14 are views of modifications hereinafter described. Fig. 14^a shows in detail the eccentric operated by the handle. Fig. 15 represents the spring bearing against the breech-piece with its flange. Fig. 16 shows the working handle. Fig. 17 is a view of the slide. Fig. 18 shows views of the lever operating the cam-spindle. Fig. 19 shows the cam-spindle with its spiral groove. Fig. 20 shows detail views of the breech-piece. Fig. 21 represents the extractor-carrier. Fig. 22 represents the firing-pin. Fig. 23 represents the hammer. Fig. 24 is the lever operating the cartridge mechanism. Fig. 25 is the rod operating said lever. Fig. 26 shows in detail the cam-block. Fig. 27 shows the trigger. Fig. 28 is a detail view of the pusher. Fig. 29 is a plan view of the gun with the top parts removed. Fig. 30 is an enlarged detail view of the upper left-hand portion of Fig. 1. Fig. 31 is a cross-section on the line 1 2, Fig. 30. Fig. 32 is an enlarged detail view of the upper central portion of Fig. 1.

Similar letters refer to similar parts.

K is a frame or box which incloses the whole of the mechanism of the gun. Said frame can be provided with trunnions for supporting the gun, the seating for the elevating-screw, the handle J, and the sights N N'.

My breech mechanism contains two principal parts—namely, what I term a “cam-block” A, Figs. 26, 30, and 31, and a bolt or needle and extractor carrier. (Indicated by the letter B, Figs. 21, 29, and 32.) Said bolt and carrier are located in a breech-piece or frame C, Figs. 20, 29, 31, and 32, which is secured to the barrel G. The block A is pivoted on a horizontal pin I, and has in its side a cam-groove *a*³. In this cam-groove *a*³ rests a stud *b*¹, said stud being fastened to B, Figs. 29 and 32.

*a*¹ is a handle on the outer end of the block A. As the cam-block A is oscillated on its axis I, the introduction and extraction of the cartridges are performed by the block or carrier B, contained in the breech-piece C, said block being supplied at its forward end with extractors *b*⁴ *b*⁵, Figs. 3 and 21. The carrier B contains the firing-pin D. The shock of the discharge is primarily received by the carrier B and transmitted to the block A, which by its axis I transmits the pressure to the breech-piece or frame C, in which the pin I has its bearings. That portion of the groove *a*³ with which the carrier is in engagement when the breech is closed is made concentric with the axis I, upon which the block A turns, so that the said carrier is allowed to remain stationary during the first part of the upward movement of the block A. The rest of the groove *a*³ is so shaped as to rapidly move the carrier B backward during the remaining part of the upward movement of A. On the block A and concentric with its axis or pivot I is formed a segment of cog-teeth *a*², which engages with the rack H, fixed to the frame K, so that during the longitudinal movement of the breech-piece C the block A is made to turn on its axis I to open and close the breech-piece, the pin I sliding in a bearing in the shell K, and a slot in the rear end of the cam-block A, as shown in Fig. 29.

E is the hammer, which is placed in a groove of the block A in such a position that when the block A is moved to open the breech

the said hammer will be cocked, as hereinafter described.

F is the mainspring for actuating the hammer E.

- 5 L is the trigger, which is held in its normal position in engagement with the hammer E by means of the spring V' , as shown in Fig. 30. One end of the top of the trigger is beveled or grooved on an angle, as shown in Fig. 27, and rests on the downwardly-inclined push-rod O, as shown in Fig. 1. By pushing the rod O forward the trigger L will be raised and released from contact with the hammer E.
- 15 M is a cranked lever resting on and above the feed-belt Q. This lever and the worm R are placed to the rear and above the entrance of the barrel on a part of the frame K, which is closed by a lid or cover P. The worm R is actuated by a cranked lever S, oscillated by the recoil of the barrel through the medium of the rod T, Fig. 3. The entire mechanism can be moved backward and forward by hand by rotating a crank-handle U, Figs. 16 and 29, which is connected with the pin I through a slide V, which converts the circular movement of the crank into a horizontal movement of the interior mechanism. A lateral lever or spring-catch, Figs. 18 and 29, acts upon the pin I, Figs. 19 and 29, by means of a threaded nut at the end of said lever working with a thread in the end of said pin in such a manner as to slide said pin in the direction of its length, either into or out of the hole prepared for its reception in the slide V, Figs. 17 and 29, thereby making the pin dependent on or independent from the handle U. (See Figs. 3, 4, and 29.)

- 30 X is a spring within the frame bearing between the rear end of the breech-piece C and the stationary abutment Y and tending to force the whole mechanism forward after the recoil.

- 45 Inasmuch as in certain cases a very rapid firing is called for, the mechanism of my machine-gun can be made to effect the feed, explosion, and discharge of every cartridge in a way to produce an almost uninterrupted firing by pressing only the trigger O.

- 50 In operation the cartridge feed-belt Q is introduced in the opening below the cover P until the first cartridge comes in contact with one of the threads of the worm R. By turning the handle U not only the barrel G and the breech-piece C will be recoiled, but also the whole mechanism contained therein. By this recoil the worm R is turned by means of the spiral grooves r' , Fig. 3, it being turned by the lever S, which is actuated by the rod T, Fig. 3. By continuing the rotary movement of the crank-handle U the first cartridge is brought directly above the barrel, thus putting the cartridge in a position ready for loading. The handle U serves to put the whole mechanism in motion. By turning the same a circle is described on its axis, which carries an eccentric u' , engaging with the

slide V, and advances or retracts said slide. The pivot I of the cam-block A, traversing the breech-piece C, can be voluntarily engaged with the opening v' , Fig. 3, in the slide V. This cam, in communication with the whole system, participates on the recoil movement. This uniting of the pin I with the slide V is accomplished by means of the lever W, Figs. 18 and 29, which is adjusted to the extremity of the pin I at the point v' , where the said pin is provided with a spiral groove and can be made to advance by depressing the lever W, as before stated. The pin I is provided with a longitudinal groove, in which slides a stud fixed to the breech-piece to prevent the turning of the said pin I. The whole mechanism being thus united, the rotation of the handle U will transmit through the slide V and the pin I a horizontal movement to the breech-piece C and the barrel G. The cam A is oscillated by the contact of its segment cog-teeth a^2 with the teeth of the rack H whenever the breech-piece recoils, and also when it advances. In the breech-piece C, between the barrel G and the cam A, is the carrier B, maintained by guides and which can be moved only in the direction of its length and in line with the axis of the barrel G. The carrier B has on its rear extremity an arm or roller b' . When by means of the cam-groove a^2 the carrier B has accomplished its backward movement, it will be sufficiently far back to get behind the cartridge which is in the feeding-belt Q. Then by means of a shoulder b^2 at the end of slot b^3 the lower arm of the lever M is tilted, the upper branch of which presses against the flange of a cartridge and depresses it a little in front of the carrier B, so that said carrier is able to push it forward on its forward motion. A spring m' maintains the lever M in its normal position. The feed-belt Q is so constructed that each cartridge is held by two elastic arms $q' q^2$, Fig. 11, the profile of which inclines horizontally, so that when the cartridge is pushed ahead it will be lowered. The elastic arms are joined to the feed-belt in any convenient manner, and they may have at their rear extremity a small flange q^3 , Fig. 11, which prevents the cartridge from moving rearward. After leaving the clips the cartridges appear in front of the piston or carrier B, and their flanges become by the descent engaged with the extractors $b^4 b^5$, Fig. 21. Continuing the movement, the crank-handle U having accomplished half a turn, the whole system is brought forward and the cam A redescends, pushing the piston B against the cartridge until the cartridge is pushed into the firing position within the barrel. Sliding in grooves in the cam-block A is the hammer E, Fig. 23. In the cavity e^5 in the hammer E is the main-spring F, which presses the hammer forward. On top and near the end of the hammer is a notch in which the rear of the trigger L engages, the same being held in engagement by the spring V' . The ham-

mer E has a lug e^2 , which slides on the incline e^3 , that is formed to the breech-piece C, which forces the hammer to recoil by the rotary motion of the cam-block A. This is when the notch e' is back of the trigger, if the same lowers by the spring l' , and so puts the hammer E in the notch. The trigger-rod O is held to the rear by the spring o^3 , the resistance of which may be easily overcome by pressure of the finger. Up to this point I have explained the action of my mitrailleuse as actuated by means of the handle U, which, by its continuous rotation, effectuates all the necessary movements required to produce successive discharges. Continuous discharge of my gun without the help of this handle U occurs by taking advantage of the recoil caused by the explosion of the cartridge to actuate the feeding, cocking, and firing mechanism of the gun. By depressing the lever W the end of the pin I will be withdrawn from the slide V. No communication will now exist between the handle U and the interior mechanism. If therefore, after proceeding with the first operation of loading, one lifts with the finger the cam-block A by its handle a' the gun is ready to be fired, which is done by pressing the trigger-rod O. The explosion will recoil the barrel, the breech-piece, and all the organs therein contained. This recoil is limited by the contact of the cog-teeth on the segment a^2 with the cam and the rack H. All the movements which I have before stated, in the case where my gun is actuated by the handle U, are reproduced, therefore, in like manner and in the same order. Thus after having introduced the feed-belt Q, having raised and lowered the cam-block A to throw the first cartridge into loading position, the mitrailleuse is ready for discharge as soon as the trigger-rod O is pressed. It is clear that at the moment the first shot is fired the whole breech system is thrown back, the cam A will oscillate on its axis I, thereby raising the hammer E, bringing back the carrier B, extracting the discharged cartridge, and bringing the carrier into a position to push the next cartridge from the feed-belt into the firing position, said cartridge having already been brought into loading position by the worm R, which is worked by the lever S, Fig. 24, and the rod T, Fig. 25, said rod participating in the recoil movement of the barrel. These operations once accomplished, the spring X will throw the whole system forward, the cam-block A will be lowered by the action of the rack H and push before it the carrier B, which will introduce the second cartridge into the barrel, the hammer is released and strikes against the firing-pin D, the explosion will then take place, and if one has continuously pressed on the trigger-rod O the gun will repeatedly be fired until the supply of cartridges is exhausted. The feed-belt can be removed at any time by raising the cover P, held in place by the catch p' .

In applying my mechanism to a small gun

I arrange my mechanism as illustrated in Figs. 12, 13, and 14, in which instead of having the carrier B support the recoil of the explosion I allow the recoil to act directly on the cam-block A, as indicated in Fig. 12, by reducing the length of the carrier B, which will now serve only for introducing and extracting the cartridges. The whole firing apparatus will therefore be contained in the cam-block A. In place of employing the rack H, I use an axis a^1 , which engages in a groove which will substitute the toothed segment a^2 of the cam-block A. The oscillating movement of the cam-block works exactly as I have described above where the toothed rack H is employed.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a breech-loading fire-arm, the combination of a block pivoted to the shell of the gun and provided on its side with a cam-groove, a pin on which said block is loosely pivoted and adapted to reciprocate in the direction of its length, a longitudinally-reciprocating carrier, and a stud secured to said carrier and adapted to reciprocate in said cam-groove, all said parts being arranged and adapted to operate substantially as described, and for the purposes set forth.

2. In a breech-loading fire-arm, the combination of a block pivoted to the shell of the gun and provided on its side with a cam-groove, a pin on which said block is loosely pivoted and adapted to reciprocate in the direction of its length, a longitudinally-reciprocating carrier, a stud secured to said carrier and adapted to reciprocate in said cam-groove, and a spring-hammer adapted to reciprocate in a groove in said cam-block, all said parts being arranged and adapted to operate substantially as described, and for the purposes set forth.

3. In a breech-loading fire-arm, the combination of a cam-block pivoted to the shell of the gun, a pin on which said block is loosely pivoted and adapted to reciprocate in said shell in the direction of its length, a gun-breech connected with said cam-block, and a firing-rod connected with said cam-block, all said parts being arranged and combined to automatically cock said hammer, substantially as described.

4. In a breech-loading fire-arm, the combination, with the breech and barrel of the gun, of a pin I, adjustably connected with the shell of the gun and adapted to reciprocate in the direction of its length, and a rotary crank-handle connected with said pin, breech, and barrel and adapted to reciprocate the same, and means for automatically closing and opening said breech, substantially as described.

5. In a breech-loading fire-arm, the combination, with the breech and barrel, of an adjustable pin I, and a rotary crank-handle adapted to reciprocate said breech, barrel, and

pin, and means for automatically feeding and firing the cartridges, substantially as described.

6. In a breech-loading fire-arm, the combination, with the breech and barrel, of a pin I, adjustably connected with the shell of the gun and adapted to reciprocate in the direction of its length, a rotary crank-handle adapted to reciprocate said breech, barrel, and pin, and means for automatically extracting and discharging the empty cartridge-shells, substantially as described.

7. In a breech-loading fire-arm, the combination, with a reciprocating breech and barrel, of a reciprocating pin I, a cam-block A, loosely pivoted to said pin, lever W, pivoted to the shell of the gun and adjustably pivoted to one end of pin I, gear-teeth a^2 on said cam-block A, toothed rack II on said breech, and carrier B, said combination being arranged and adapted to automatically feed and eject continuously a cartridge, substantially as described.

8. In a breech-loading fire-arm, the combination, with an operating crank-handle U, of a reciprocating slide V, provided with the slot v' , adapted to receive one end of reciprocating

pin I, all said parts being arranged and adapted to be removably connected with the operating mechanism of the gun, substantially as described.

9. In a breech-loading fire-arm, the combination of a cartridge feed-belt, a gun-barrel, a cartridge-carrier, a spring adapted to press upon said belt, and elastic holding-arms secured to said belt and adapted to depress the cartridge and present it to the carrier, substantially as described.

10. In a breech-loading fire-arm, the combination of a cartridge feed-belt, a gun-barrel, a cartridge-carrier, a spring adapted to press upon said belt, elastic holding-arms secured to said belt and adapted to depress the cartridge, and a flange secured to said belt between said arms and adapted to prevent the backward movement of the cartridge, substantially as described.

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

OSCAR WILLIAM BERGMAN.

Witnesses:

SAUL RUBY,

GEORG LAURENT, Jr.