

(No Model.)

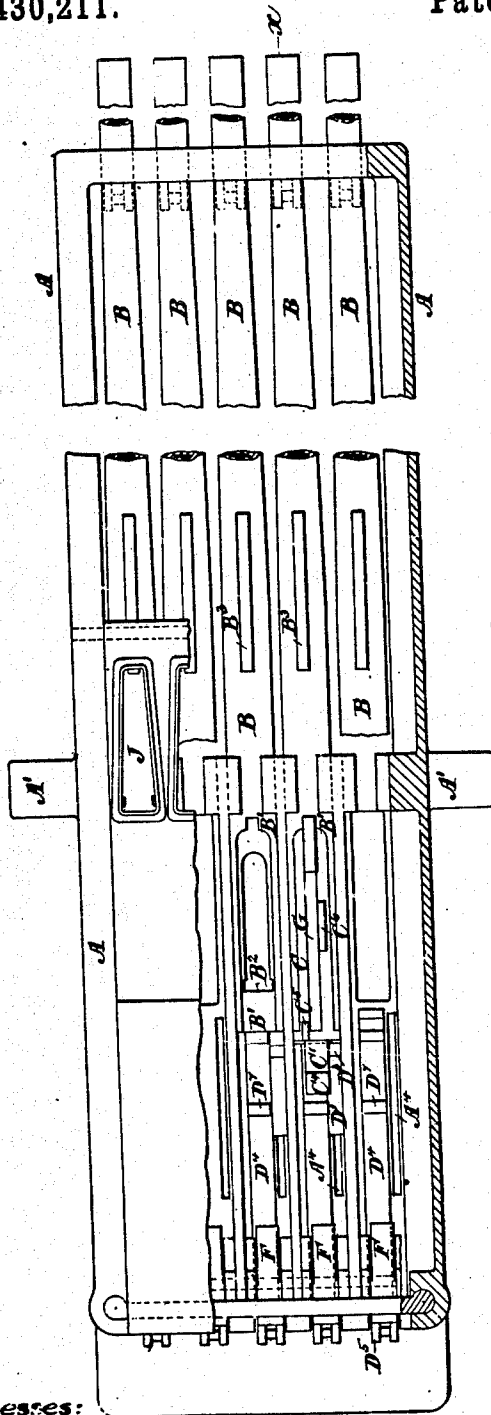
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H. S. MAXIM.
AUTOMATIC MACHINE GUN.

No. 430,211.

Patented June 17, 1890.

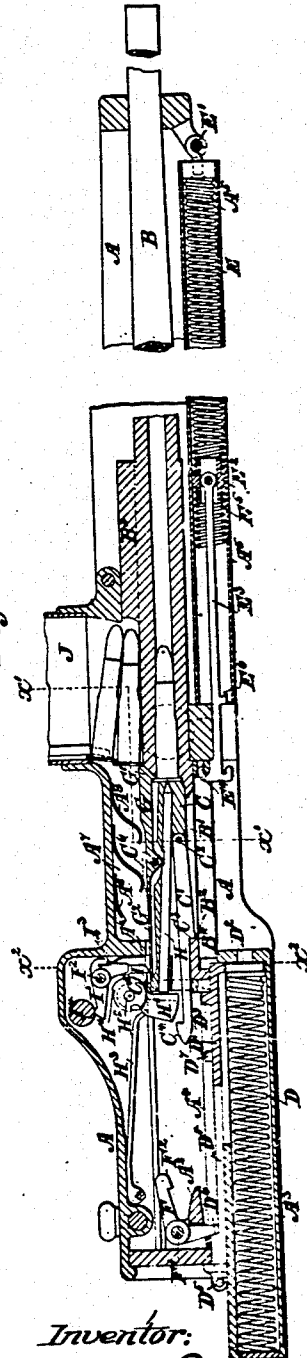
Fig. 1.



Witnesses:

Frank E. Hartley
Frank B. Murphy.

Fig. 2.



Inventor:

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By Duncan, Curtis & Page atty.

(No Model.)

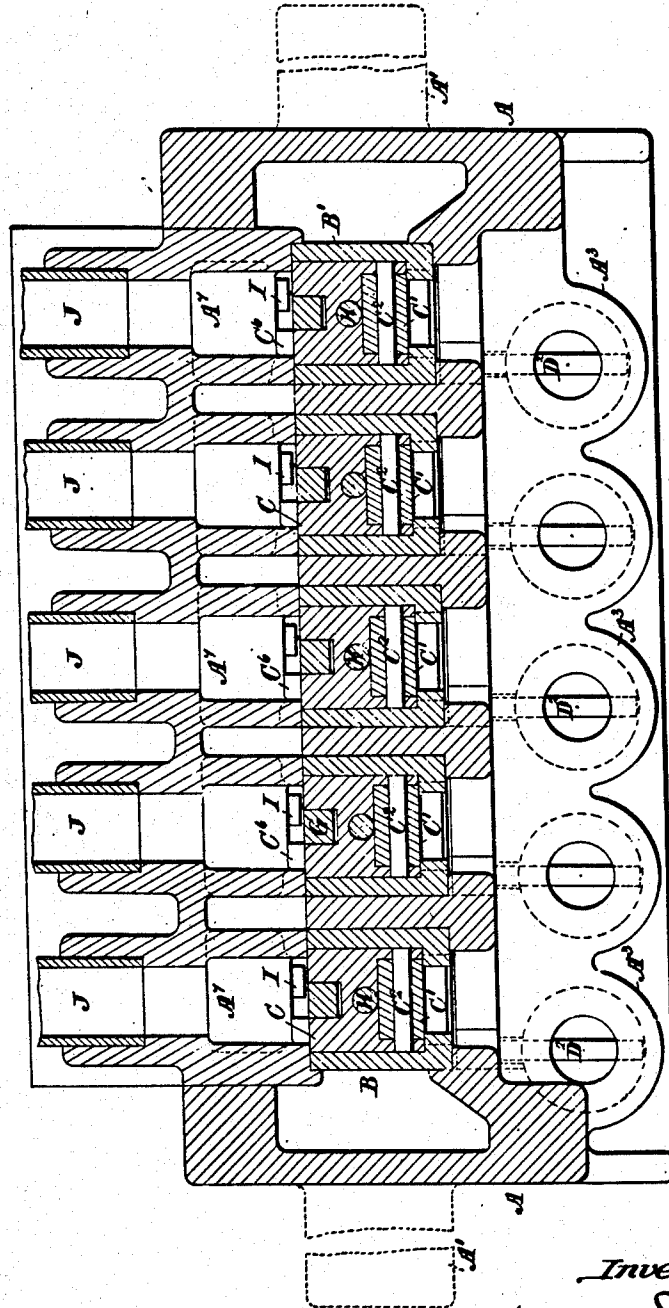
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Fig. 3.



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(No Model.)

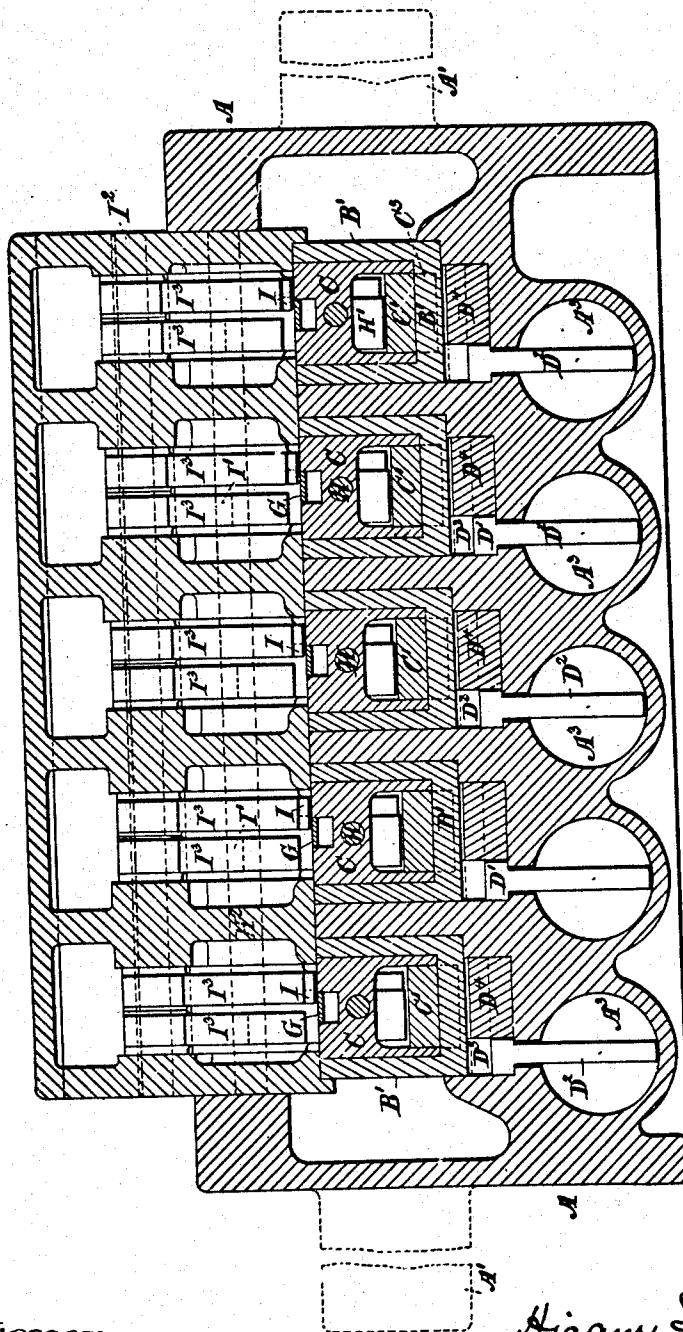
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Fig. 4



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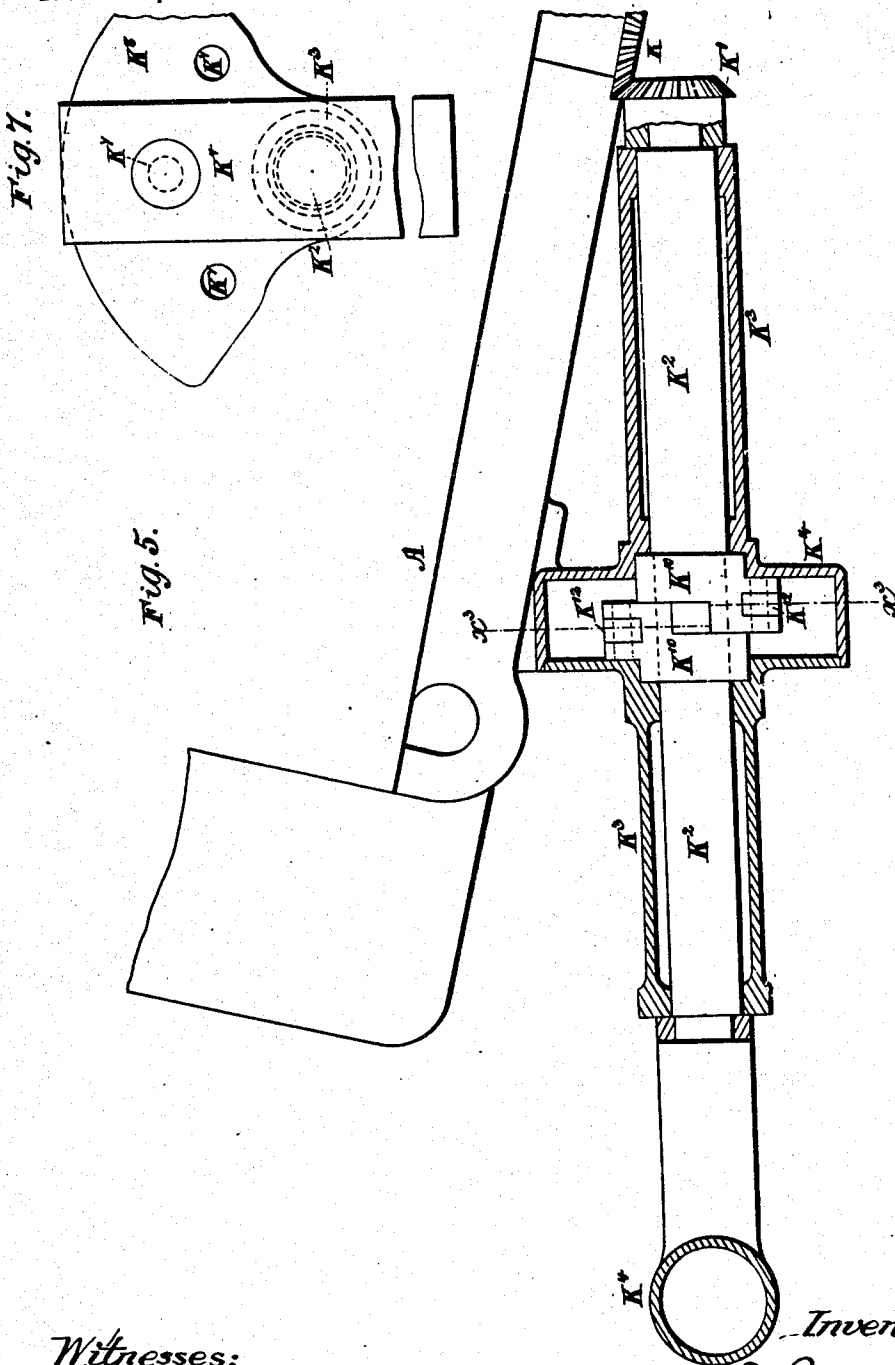
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H. S. MAXIM.
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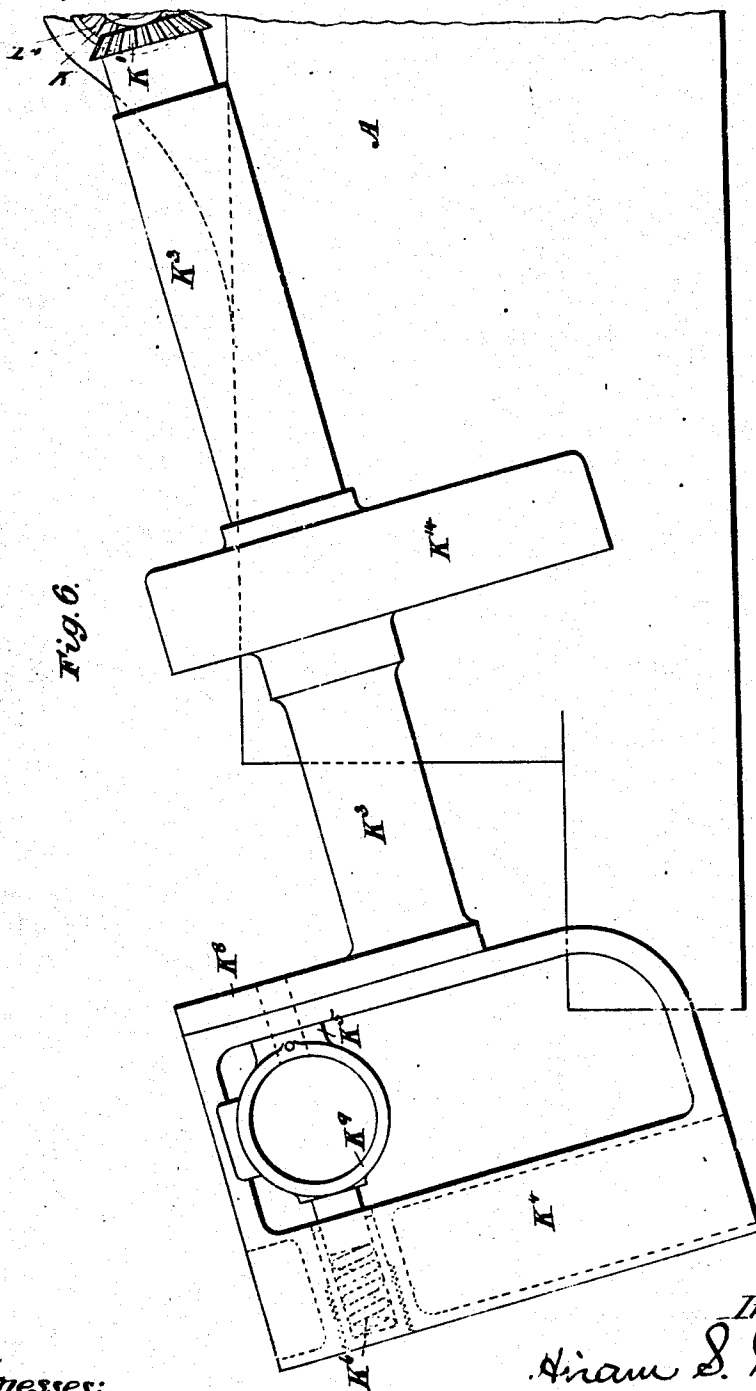
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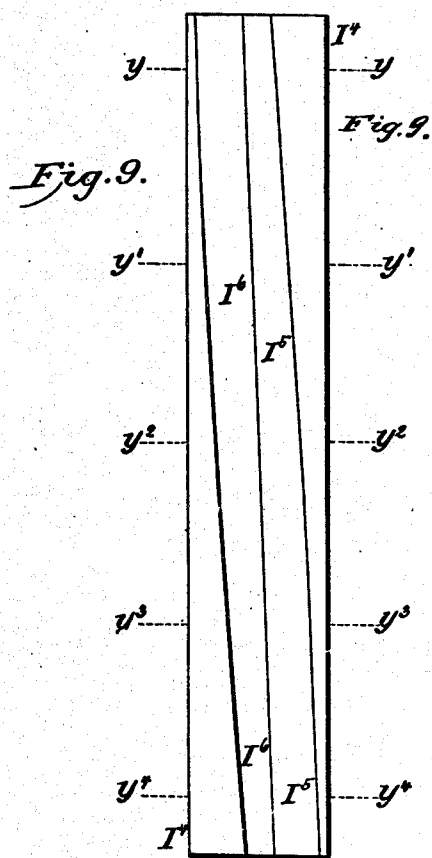
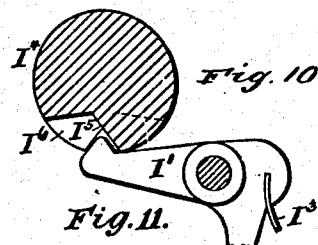
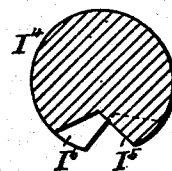
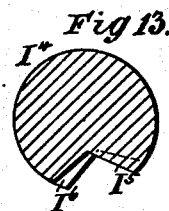
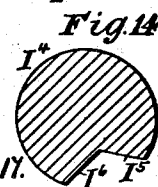
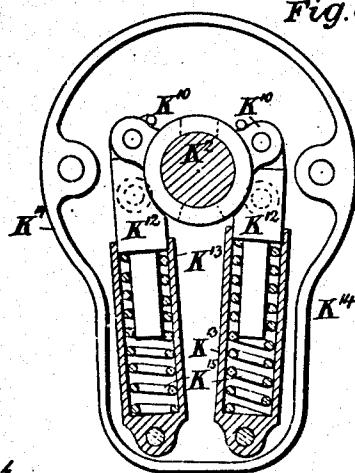
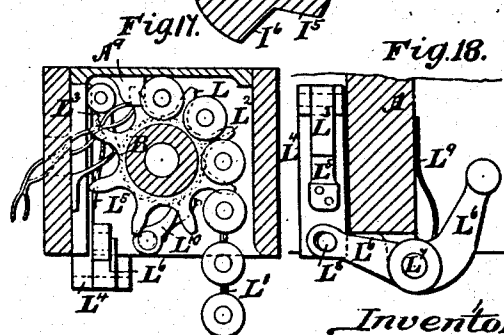
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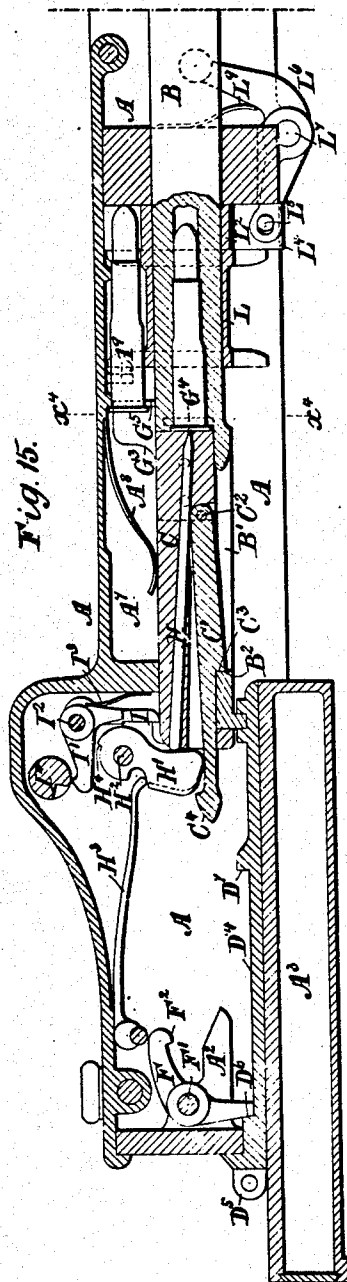
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AUTOMATIC MACHINE GUN.

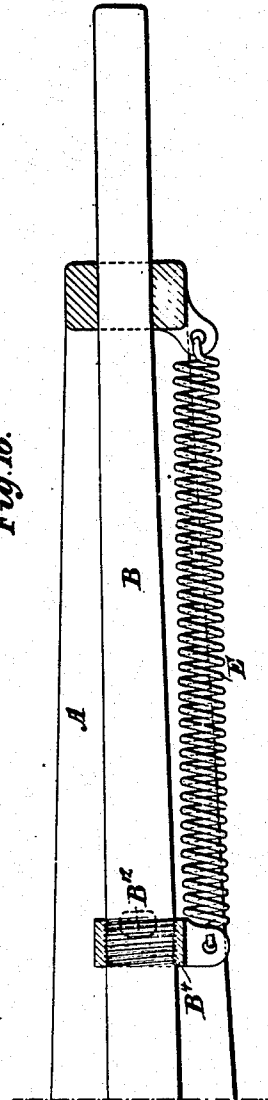
No. 430,211.

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Fig. 16.



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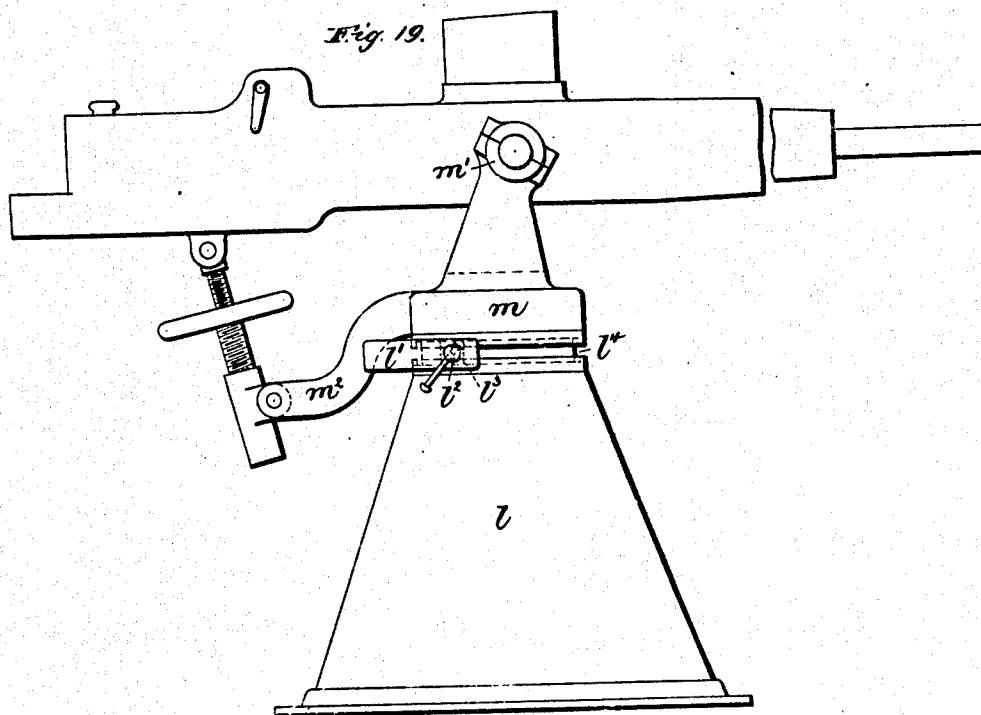
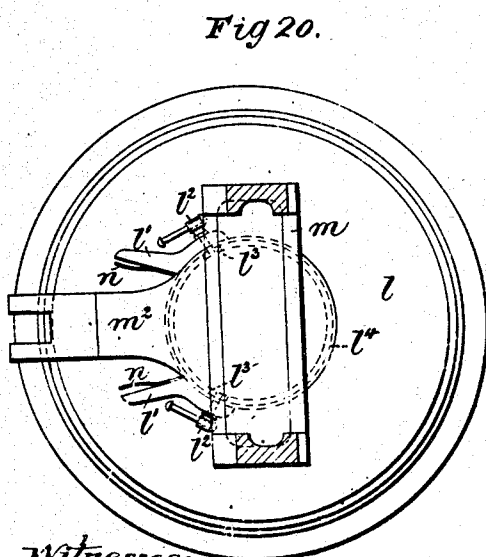
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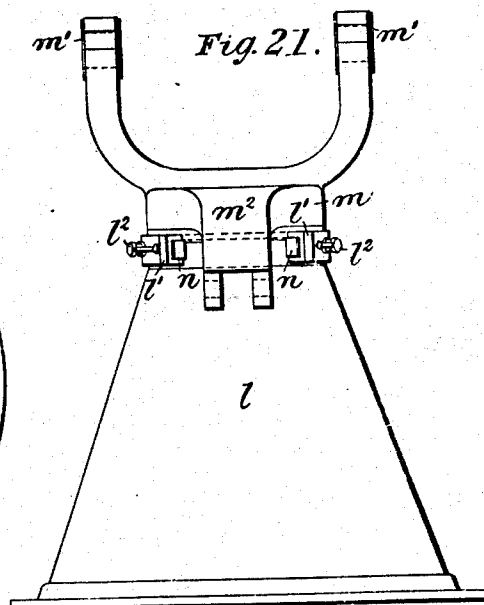
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UNITED STATES PATENT OFFICE.

HIRAM STEVENS MAXIM, OF LONDON, ENGLAND.

AUTOMATIC MACHINE-GUN.

SPECIFICATION forming part of Letters Patent No. 430,211, dated June 17, 1890.

Application filed December 28, 1886. Serial No. 222,849. (No model.) Patented in England June 1, 1886, No. 7,354.

To all whom it may concern:

Be it known that I, HIRAM STEVENS MAXIM, mechanical engineer, a citizen of the United States of America, and a resident of London, England, have invented new and useful improvements in Fire-Arms, (for which I have applied for provisional protection in Great Britain, No. 7,354, dated June 1, 1886,) of which the following is a specification, reference being had to the accompanying drawings.

My present invention is an improvement in that class of guns invented and patented by me and now generally known as "automatic guns." The general distinguishing characteristics of such guns are that they have the capability when once discharged of performing automatically by means of energy produced by or resulting from such discharge, the several steps necessary for subsequent discharges—that is to say, the mechanism involves a stationary part and a movable or recoiling part, which latter is in one of various ways set in motion by the force of the discharge and caused to store energy which returns the operative parts of the gun to their normal or original position. The recoil and return of the parts named are made to extract the empty shell, replace it by a new one, and to explode the latter.

The improvements which form the subject of my present application are applicable to machine or battery guns, sporting arms, military rifles, and partly to large and heavy guns. The main features of the invention relate more particularly, however, to that form of gun described by me in previous patents, in which the barrel and parts of the breech mechanism are arranged to recoil in an outer frame or support. The mechanism which I have now devised, however, is greatly simplified, and the operation of the gun in many respects improved.

One feature of my present invention is the provision of means whereby when the breech is closed the breech-block will be securely locked to the barrel until the barrel and other parts movable therewith have terminated or nearly terminated their recoil or backward movement, and will then be automatically disengaged from the said barrel. I provide, also, means by which this backward and subsequent forward movement of the

barrel (the latter independently of the breech-block) will effect the extraction of the empty shell and the forward movement of the breech-block the insertion and discharge of a fresh one, and of this mechanism I have invented various forms or modifications, the main principles of which I have illustrated herein.

I employ with the gun a cartridge-feed device of suitable character, which will at the proper times present the cartridges in position to be thrust into the breech by the breech-block.

My invention further consists in combining a plurality of barrels and breech mechanisms of the general character referred to, together with means for operating the same independently or simultaneously or successively.

My invention also comprises certain details of construction and accessories to the main devices constituting the gun proper, the nature of which will be hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a plan, partly in horizontal section, of a machine-gun having five barrels and constructed according to my present invention. Fig. 2 is a section on the line xx , Fig. 1. Fig. 3 is a transverse section on the line $x'x'$, Fig. 2, drawn to an enlarged scale. Fig. 4 is a transverse section on the line $x''x''$, Fig. 2, also drawn to an enlarged scale. Fig. 5 is a plan, partly in horizontal section, and Fig. 6 is a side elevation, showing a portion of the said gun. Figs. 5 to 14, inclusive, are drawn to an enlarged scale. Fig. 7 is a rear elevation showing parts of the gun detached. Fig. 8 is an elevation, partly in section, on the line x^3x^3 , Fig. 5, showing details of construction. Fig. 9 is a plan of a trigger rod or shaft, hereinafter described. Fig. 10 is a transverse section through the said rod on the line yy , Fig. 9, showing also in side elevation a sear, hereinafter described. Figs. 11, 12, 13, and 14 are transverse sections on the lines $y'y'$, $y''y''$, y^3y^3 , and y^4y^4 , Fig. 9, respectively. Figs. 15 and 16 show in side elevation and partly in vertical longitudinal central section another form or modification of my improved gun. Fig. 17 is a transverse section on the line x^4x^4 , Fig. 15. Fig. 18 is a side

elevation, partly in vertical section, showing details of construction. Fig. 19 is a side elevation showing one of my guns supported upon a cone-mounting. Fig. 20 is a plan of the said mounting, partly in horizontal section. Fig. 21 is a rear elevation of the said mounting.

A is a strong metal frame, which is provided with trunnions A', and is designed to be supported upon a tripod or other suitable mounting or carriage.

B B are the barrels, which are firmly attached to metal frames or blocks B', fitted to slide longitudinally to and fro with the said barrels, in or between suitable guides formed on or attached to the frame A.

C C are the breech-blocks, which are fitted to slide to and fro in the inner frames or blocks B'.

In the apparatus shown in Figs. 1 to 4 each barrel has its breech mechanism arranged to operate independently of that of any of the other barrels. In other words, there are five automatic guns arranged side by side in a common frame or support. These guns are similarly constructed. I will therefore hereinafter describe only one of the said guns. The breech-block C has a bar or strut C' hinged or pivoted thereto, as at C'', Figs. 2 and 3. This bar or strut is formed with a shoulder or projection C³, which is adapted to engage with a shoulder B'' on the inner frame B' when the breech is closed, and thus lock or secure the breech-block in the said frame and support the said block against the force of the explosion in the barrel. The rear end C⁴ of this pivoted bar is taper or wedge shaped, and is hooked, as shown. An arm or projection A'' is formed or fixed on the rear end of the frame A, so that when the inner frame B' and parts carried thereby have nearly terminated their recoil the under side of the hook C⁴ of the bar C' will strike the arm or projection A'', and the said bar will thus be lifted out of engagement with the shoulder B'' on the frame B'. In some instances a roller is used instead of this arm or projection.

D is a spiral spring, which is arranged within a chamber A⁵, formed in the frame A. A bar D' is fitted to slide longitudinally to and fro between suitable guides above the chamber A⁵, and is provided with an arm D'', which works in a slot A⁴ in the top of the said chamber. The bar D' is also provided with a shoulder or projection D³, with which the breech-block C engages in its recoil, so that the said bar is drawn back with the said block. The spring D is thus compressed by the breech-block in its backward movement, and then reacts to effect the forward movement of the same.

D⁴ is a bar, which is fitted to slide between guides formed on the frame A, and is connected with the inner frame B', as shown in Fig. 2, so that the said bar will move to and fro with the said frame. The bar D⁴ is provided with eyes D⁵ outside the frame A, so

that a suitable handle can be connected therewith to draw back the frame B' by hand when necessary. The said bar is, moreover, provided with shoulders or projections D⁶ D⁷, for the purpose hereinafter specified.

E is a spiral spring, which is arranged within a tube or chamber A⁵, attached to the under side of the frame A. This spring is connected at its forward end to the frame A by means of a hook E', and at its rear end to a plunger E'', fitted to slide in the said tube or chamber A⁵. This plunger is connected with the inner frame B' by means of a rod E³, coupled to the said plunger and provided with a hook E⁴, which engages with the said frame B'. When the said frame recoils, the spring E is extended. The said spring then reacts to effect or assist in effecting the return movement of the said frame and parts carried thereby. To prevent or diminish the shock produced by the recoil of the said frame and parts carried thereby, I provide a spring E⁵, which in the latter part of such recoil will be compressed between the plunger E'' and the rear end of the chamber A⁵. This spring, moreover, by its reaction assists in effecting the return movement of the barrel B and frame B', while the breech-block is held back, as above set forth, and thus effectually insures the starting of the empty cartridge-shells from the barrel, in the manner hereinafter described.

The rod E³ is provided with a hook E⁴, whereby it may be coupled to the rear end of the chamber A⁵ when it is disengaged from the frame B' to permit the drawing back of the said frame by hand.

F is a bent lever, which is pivoted at F' to the frame A, and is formed with a hook F'', adapted to engage with the hook C⁴ of the pivoted bar or strut C', for the purpose of holding back the breech-block during the forward or return movement of the barrel and inner frame. In the to-and-fro movement of the frame B' the shoulders or projections D⁶ D⁷ on the sliding bar D⁴ act alternately upon the bent lever F to cause its engagement with and disengage it from the said pivoted bar C'.

G is the extractor, which is carried by and pivoted to the breech-block C. The extraction of the empty cartridge-shells is effected by the moving forward of the barrel and inner frame, while the breech-block is held back by the hooked lever F—that is to say, the cartridge-shell is held stationary with the breech-block while the barrel is moved forward and thus drawn off the said shell. The empty shells fall through apertures provided for the purpose in the frames A and B'. The extractor is so constructed and arranged that when the frame B' and parts carried thereby are in their rearmost position the parts G' of the said extractor will be in contact with the part A⁶ of the frame A. The extractor will therefore be held firmly in engagement with the head or flange of a cartridge-

shell while the said shell is being started from the barrel. The said extractor is reduced in thickness at G'' to form a spring which bears upon a shoulder at the rear end of the breech-block. The hooked end of the extractor can therefore be readily moved over the flange of a cartridge in the barrel, and will then be held in engagement therewith by the said spring.

10 H is the firing-pin.

H' is the hammer, which is pivoted at H'' to the frame A.

H³ is the mainspring, which is attached in any convenient manner to the said frame.

15 I I' are two sears, which are pivoted upon a pin or rod I'', fixed in the outer frame, and are acted upon by springs I³, which tend to hold them in engagement with the bent portion H⁴ of the hammer H' when the hammer is cocked.

20 The sear I extends downward and is arranged to be automatically disengaged from the hammer by means of a projection C⁵ on the breech-block at the termination of the forward movement of the said block. The sear I' is a bent

25 lever, one arm of which extends beneath the trigger-rod I⁴, and which is disengaged from the hammer by hand by means of the said trigger-rod, as hereinafter described. The hammer is cocked in the recoil of the inner

30 frame B' by means of a projection C⁶ upon the breech-block. The said hammer is so formed that before it acts upon the firing-pin H it will depress the pivoted bar C', and thus insure the engagement of the shoulder C³

35 thereof with the shoulder B'' on the inner frame, and when the said hammer has operated to fire the gun it will prevent the disengagement of the said pivoted bar from the inner frame until the hammer is again cocked.

40 J is a vertical hopper, feeder, or magazine, which is arranged above the barrel B, with the rear end a short distance in front of the breech end of the barrel when the latter is in its firing position. The lowermost cartridge

45 in the said magazine rests upon the top of the barrel behind a projection B³ thereon. When the barrel recoils, the said cartridge is moved backward by the said projection into a chamber A⁷ in the frame A. To the top of

50 this chamber, within the same, are secured springs A⁸, which pass downward upon the cartridge thus introduced into the chamber.

When the barrel and inner frame have moved forward and the empty shell has been extracted, the said cartridge is forced down in front of the breech-block by the springs A⁸, and is supported upon the frame B', so that the said block in the forward movement will push the said cartridge into the barrel.

60 The mechanism above described operates as follows—that is to say: The parts are shown in Fig. 2 in the positions which they occupy when the firing-pin has been struck by the hammer and the projectile is about to move

65 forward in the barrel. The explosion of the cartridge causes the recoil of the barrel B and inner frame B' and parts carried thereby.

In this recoil the projection B³ pushes the lowermost cartridge in the magazine backward into the chamber A⁷, the spring D is 70 compressed, and the spring E is extended, as above described. The hammer is cocked, and is held in its cocked position by the sears I I', or only by the sear I, according to the position of the trigger-rod I⁴, as herein- 75 after described. The pivoted bar C' then comes in contact with the arm or projection A'' on the frame A, and is thereby disengaged from the shoulder B'' of the frame B'. Moreover, the bar D⁴ is moved backward 80 until its projection D⁷ strikes the lever F and causes the same to engage with the pivoted bar C' and hold back the breech-block. In the latter position of the backward movement of the frame B' and parts carried thereby the 85 spring E⁵ is compressed. By the reaction of the springs E E³ considerable force is exerted to move forward the frame B' and barrel B, while the breech-block is held back by the hooked lever F. The barrel is thus forcibly 90 drawn from the empty cartridge-shell, which is held back by the extractor G.

As soon as the barrel is clear of the cartridge-shell, the latter drops out of the gun through the apertures in the frames A B', and 95 the cartridge in the chamber A⁷ is pushed down by the springs A⁸ into position to be thrust into the barrel. When the frame B' has terminated or nearly terminated its forward movement, the shoulder or projection 100 D⁶ on the sliding bar D⁴ strikes the lever F and disengages the same from the pivoted bar C'. The spring D then reacts and effects the forward or return movement of the breech-block. When the breech-block has thrust 105 the cartridge into the barrel and closed the breech, the projection C⁵ on the said block strikes the sear I and disengages it from the hammer. If the sear I' is held by the trigger-rod I⁴ out of engagement with the hammer, 110 as shown in Fig. 2, the hammer, when released from the sear I, as above described, will immediately act upon the firing-pin and the gun will continue firing so long as it is supplied with ammunition. If, however, the 115 trigger-rod I⁴ is so placed that the sear I' will engage with the hammer when cocked, the said trigger-rod must be turned in order to again fire the gun.

When two or more guns are arranged side 120 by side in a single frame, as shown, for example, in Figs. 1, 2, 3, and 4, I prefer to provide means whereby the starting of all of the said guns can be effected by a simple movement of a lever or handle in one or the other 125 direction. In the gun shown in the said figures I use for this purpose the trigger-rod I⁴. This rod and the means for operating the same are illustrated in Figs. 5 to 14. The said trigger-rod is formed with spiral working-surfaces I⁵ I⁶, so that when turned in 130 either direction it will act successively upon the sears I' of the several guns to release them from the corresponding hammers com-

mening at one or the other side of the series or row of guns, according to the direction in which the said rod is turned. Moreover, by turning the said rod through a small angle one or more of the said guns can be started, while the other guns are left out of action. It will be seen that by adjusting this trigger-rod to the position shown in Fig. 10 all of the sears I' may be permitted to engage with the hammers. Moreover, when the said trigger-rod occupies such a position that its periphery beats against all of the sears I', the said sears will be held out of engagement with the hammers. The said trigger-rod may be provided with an ordinary lever or handle or other suitable device for operating it; but when it is applied to a machine-gun such as that shown in Figs. 1 to 14, I prefer to employ, in combination with the said trigger-rod, the devices shown in Figs. 6, 7, and 8, in which K is a bevel-pinion, which is fixed upon the trigger-rod I' and is geared with another bevel-pinion K', fixed on a spindle K''. This spindle is fitted with a capability of rotation in a tubular casing K³, firmly attached to the frame A, and is provided with a suitable handle K⁴. By turning this handle in one or the other direction the trigger-rod I' can be adjusted for the purposes above specified.

The said handle can, moreover, be used for pointing or training the gun and for holding it in any desired position while firing, a similar handle being provided upon the opposite side of the frame A, if desired, so that the gun can be adjusted by both hands. By these means the rapid working of the gun is greatly facilitated.

I sometimes provide the handle K⁴ with a bolt or catch K⁵ for locking it in any desired position. This bolt or catch is fitted to slide in holes in the back and front parts of the handle K⁴ and is acted upon by a spring K⁶, inserted in a hole or cavity in the said handle, whereby it is caused to enter one or other of the holes K⁷ in a segment K⁸, formed or fixed on the tubular casing K³. When the handle K⁴ is grasped by the hand, one of the fingers is passed through a ring or annular piece K⁹, forming part of the said bolt or catch, so that the said bolt or catch can be withdrawn from the hole K⁷, into which it has been pushed by its spring to permit the turning of the said handle. When the handle is in its central position, the bolt or catch enters the central hole K⁷ in the segment K⁸ and retains the said handle in this position, the trigger-rod I' will then be in the position shown in Fig. 10, and all the sears I' will be free to engage with the hammers.

I sometimes provide the following means for moving the handle K⁴ back to its central position after it has been turned in one or the other direction—that is to say, I fit upon the spindle K'' two arms K¹⁰, which are coupled to the plungers K¹². These plungers are fitted to slide in cylinders K¹³, which are pivoted at their lower ends to an enlarge-

ment K¹⁴ of the casing K². Spiral springs K¹⁵ are placed in the cylinders K¹³ and tend to push the plungers K¹² upward, and thus hold the parts in the positions shown in Fig. 8. When the handle K⁴ is turned in one or the other direction, the corresponding spring K¹⁵ is compressed, and when the said handle is released the said spring by its reaction moves the same back to its central position. The bolt or catch K⁵ may, if desired, be dispensed with when the devices shown in Fig. 8 are employed. The parts are in some instances so constructed and arranged that by turning the handle K⁴ in one direction all the barrels can be discharged simultaneously, and by turning it in the reverse direction successive shots can be fired.

I sometimes employ in a gun constructed upon the principles above set forth a grooved wheel and a belt or band for feeding the cartridges successively into such a position that they may be moved back in the recoil of the barrel into a chamber in the frame A, as above described. I prefer that this wheel should be fitted to rotate upon the barrel, and that the parts should be so constructed that the barrel is free to move to and fro in the said wheel.

In Figs. 15 to 18 L is a feed-wheel fitted to rotate upon the barrel B, which is capable of to-and-fro movement in the said wheel. L' is a band or belt containing cartridges, which is used in combination with the said feed-wheel. L'' is a ratchet-wheel, which is formed or fixed on the feed-wheel L. A pawl L³ is pivoted to a pawl-carrier L⁴, fitted to slide up and down between guides on the frame A. This pawl is acted upon by a spring L⁵, whereby it is caused to engage with the said ratchet-wheel. L⁶ is a bent lever, which is pivoted at L⁷ to the frame A and is coupled to the pawl-carrier L⁴ by means of a pin or bolt L⁸, passing through an elongated slot in the said lever, as shown. The said lever is operated as hereinafter described. L⁹ is a spring which is attached to the frame A and acts upon the lever L⁶ in such a manner that it tends to keep the pawl-carrier at the top of its stroke and effects the upward or return movement of the said carrier. A retaining-pawl L¹⁰ is pivoted to the frame A and engages with the ratchet-wheel L''. Two spring-plates G³ are attached to the breech-block C—one on each side thereof. Each of these plates is provided with two projections G⁴ G⁵. The projections G⁴ are adapted to spring over and engage with a flange of a cartridge in the barrel to effect the extraction of the empty cartridge-shell. The projections G⁵ are adapted to spring over and engage with the flange of a cartridge in the uppermost groove of the wheel L to draw back the said cartridge into the chamber A⁷. A projection A⁹ is formed on the frame A, so that in the partial rotation of the feed-wheel to bring the cartridge into the loading position, the said cartridge will strike the said projection, and

thus be prevented from moving past its central position.

The other parts of the gun shown in Figs. 15 to 18 are constructed and arranged like those of the several guns shown in Figs. 1 to 4, with the following exceptions—viz., the spring E is not inclosed in a chamber or casing, and instead of being attached to the inner frame B', as above described, the said spring is attached at its rear end to a lug formed on a ring B⁴, which is fixed upon the barrel B. This ring B⁴ has a projection B¹², which in the recoil of the barrel operates the lever L⁶ and pawl-carrier I⁴.

I sometimes provide the gun when made with two or more barrels with means for automatically effecting the spreading or dispersal of the bullets. For this purpose I mount the gun upon a pivot or swivel and employ devices such as those shown in Figs. 19 to 21, in which *l* is the lower part or base of a cone-mounting, and *m* is the swiveling part thereof, which is provided with the bearings *m'* for the trunnions of the gun. The swiveling part *m* of the gun-mounting is made with an extension or tail-piece *m''*, and the base *l* is provided with two stops *l'*, which are secured to the said base by bolts *l''*, provided with nuts *l'''*, fitted to slide in an annular T-shaped groove *l⁴* in the base *l*, so that by slackening the said bolts the said stops can be adjusted. Each stop has a spring *n* attached thereto.

When either of the outer barrels is discharged, the recoil turns the gun in one or the other direction on its pivot until the tail-piece or extension *m''* strikes one or other of the said springs. The said spring is thus compressed, and then by its reaction moves the gun in the reverse direction. By adjusting the aforesaid stops the angle through which the gun is thus moved can be regulated. When it is desired to keep the gun stationary, the said stops are so adjusted that both springs are tightly pressed against the said extension or tail-piece.

By mounting two or more of my automatic guns in a single frame, so that they will operate independently of each other, as above described, I obtain the advantage over machine-guns worked by hand that, whereas in such machine-guns if a cartridge is jammed in one barrel the whole of the barrels are rendered inoperative. In my improved arrangement the jamming of a cartridge in one gun of the series does not affect the action of the other guns thereof, which will continue to work as usual.

Some of my present improvements are applicable to guns designed to be worked by hand.

By my present improvements I am enabled to so construct the breech mechanism that it will be very light, and will occupy a small space. Consequently I can make a multiple-barrel-machine or battery gun which will compare favorably with respect to both size

and weight with the machine-guns heretofore used. Moreover, I can make an automatic rifle so small and light that it can without inconvenience be used in place of an ordinary rifle.

Having now described my invention, what I claim is—

1. In an automatic or machine gun, the combination, with a sliding barrel, of a breech-block normally locked to the barrel, so that after a discharge they recoil together, a releasing device adapted to unlock the breech-block at the termination of the recoil, a catch or device adapted to engage with the breech-block and prevent its forward movement when unlocked from the barrel, and means for releasing the same when the barrel has returned to its forward position, as described.

2. The combination, with the sliding barrel, of a breech-block, a locking device securing the breech-block to the barrel, a detent adapted to engage with and release the locking device at the termination of the recoil, a catch in position to engage with and restrain the breech-block against forward movement when unlocked from the barrel, and a detent movable with the barrel and adapted to release the breech-block when the barrel returns to its normal position, as described.

3. The combination of the sliding barrel, a frame or support in which said barrel is mounted and is adapted to slide, an inner frame formed on or fixed to the barrel, a breech-block capable of movement in or on said inner frame, a locking device for securing the breech-block to the barrel, a detent adapted to encounter and unlock the said device at the termination of the recoil of the barrel, a catch in position to engage and restrain the breech-block against forward movement when released from the barrel, and means for releasing the same when the barrel has returned to its forward position, as set forth.

4. The combination, with the sliding barrel, of a breech-block normally locked thereto, means for releasing the breech-block at the termination of the recoil and restraining it against forward movement, a cartridge-chamber located over the normal position of the breech-block, from which a cartridge may be received between the breech and the restrained breech-block, and a tripping device movable with the barrel and adapted to release the breech-block when the barrel has reached its normal or forward position.

5. The combination, with a sliding barrel, of a breech-block normally locked thereto, whereby it recoils with the barrel, a detent in the path of the locking devices for releasing the breech-block and barrel at a given point in the recoil, and retractile devices connected to the barrel and adapted to effect a return movement thereof independently of the breech-block, as set forth.

6. The combination of a sliding barrel, a breech-block arranged to recoil therewith and

normally locked to the barrel, means for unlocking or releasing the breech-block and barrel at the termination of the backward movement or recoil of the barrel, a catch or restraining device with which the breech-block moves into engagement after leaving the barrel, and a tripping device for releasing the said block when the barrel reaches a given point in its return or forward movement, as set forth.

7. The combination, with a frame, of a plurality of barrels, each adapted to slide or recoil, inner frames, each of which is formed on or attached to one of said barrels, breech-blocks fitted to slide to and fro in said inner frames, respectively, locking devices securing the breech-blocks against their respective barrels, detents for unlocking the breech-block at a given point in the recoil, catches with which the breech-blocks engage after being released from the barrels, and tripping devices for releasing the breech-blocks when the barrels have reached a given point in their forward movement, as set forth.

8. The combination, with two or more automatic guns and a common frame or support in which said guns are arranged to operate independently of each other, of a device common to all the guns for controlling their operation, as set forth.

9. In a magazine fire-arm, the combination of a sliding barrel and breech-block separable from and in line therewith, a cartridge-feeding device or magazine, a shoulder or projection on the barrel, adapted in the recoil of the barrel to engage with a cartridge and force the same to the rear of the normal position of the breech, whereby on the separation of the barrel and breech-block the said cartridge may be moved transversely into line with the barrel, as set forth.

10. The combination of a sliding barrel arranged to recoil at each discharge, a frame formed on or fixed to the barrel, a breech-block fitted to slide to and fro in said frame, a bar or strut pivoted to said breech-block and adapted to engage with the frame and lock the breech-block in closed position, a detent in the path of said strut for disengaging the same and unlocking the breech-block and barrel, a catch adapted to engage and restrain the breech-block against forward movement, and a tripping device for releasing the same, adapted to be brought into operation by the forward movement of the barrel and frame to a given position, as set forth.

11. The combination of the outer frame A, the barrel B, capable of sliding therein, the inner frame B', attached to the barrel and provided with a shoulder B'', the breech-block C, capable of sliding to and fro in the frame B', the bar or strut C', pivoted thereto and provided with the shoulder C³ and hook tapered end C⁴, the arm or projection A'' on said outer frame, adapted to engage the bar C', the hooked lever F, pivoted to the outer frame, and the sliding bar D', connected with

the inner frame and provided with shoulders or projections D⁶ D⁷, as and for the purpose set forth.

12. The combination of a sliding barrel arranged to recoil at each discharge, a breech-block movable in line therewith, a firing-pin extending through the breech-block, a locking device for securing the breech-block to the barrel, and a hammer in position to engage said locking device and effect the locking of the block to the barrel before it strikes the firing-pin, as set forth.

13. The combination, with the barrel, the inner frame B', the breech-block C, adapted to slide therein, the pivoted bar or strut C', adapted to engage with the inner frame, and the firing-pin H, of the hammer H', pivoted in position to encounter the strut C' and lock the breech-block to the barrel before it (the hammer) strikes the firing-pin, as set forth.

14. In a machine-gun of the kind described, wherein both barrel and breech-block are capable of recoil and independent forward movements, the combination, with the barrel, of a spring connected therewith for effecting its return or forward movement and a spring to receive and diminish the effect of the shock produced by the recoil, as herein set forth.

15. The combination of the sliding barrel B, one or more springs connected therewith for effecting the return or forward movement thereof, the breech-block C, means for restraining it against forward movement at the termination of its recoil, and a spring or springs connected therewith for effecting its forward movement when released, as set forth.

16. The combination, with the outer frame A and the sliding barrel B, of the plunger E'', connected to the barrel, the spring E, connected to the frame and plunger, and the supplementary spring E³, which is compressed by the plunger when drawn back by the recoil of the barrel, as set forth.

17. The combination, with the outer frame A, the sliding barrel B, and the two springs E and E³, interposed between the frame and a part connected to the barrel, whereby on the recoil of said barrel one of said springs, as E, will be distended and the other compressed, as and for the purpose set forth.

18. The combination, with the outer frame, the sliding barrel, and breech-block, of the spring D, and the sliding bar D', carried by the breech-block and adapted on the recoil of the breech-block to compress the spring D, as set forth.

19. The combination of the cartridge magazine or feeder J, and the sliding barrel B, provided with a shoulder or projection B³ on the upper side of the barrel and forward of the magazine, adapted to engage with a cartridge in the feeder when the barrel recoils, as set forth.

20. The combination, with the magazine or

feeder J, the chamber A⁷ to the rear of said feeder, and the springs A⁸, contained therein, of the sliding barrel B, provided with a shoulder or projection B³, adapted when the barrel recoils to engage with a cartridge in the feeder and force it into the chamber A⁷, as set forth.

21. The combination of the hammer II', the sear I, the projection C⁵ on the breech-block for disengaging said sear from the hammer, the sear I', and the trigger-rod I⁴, whereby said sear I' may be disengaged from the hammer by hand, as set forth.

22. The combination, with two or more automatic guns and a common frame or support in which said guns are mounted in a horizontal line, substantially as described, of an adjustable trigger rod or shaft common to all the guns mounted transversely to the barrels and formed with a spiral surface with which the sears of the barrels are adapted to engage, as set forth.

23. In an automatic gun provided with two or more barrels arranged in a common frame, the combination, with the sears I' of the respective barrels, of the trigger-rod I⁴, provided with the spiral surfaces I⁵ I⁶, adapted to permit the disengagement of the sears, and means for partially rotating said rod in either direction, as set forth.

24. The combination, with the trigger-rod I⁴, of the shaft K'', the bevel-pinions K K', connecting said rod and shaft, and the handle K⁴, fixed on said shaft, substantially as and for the purpose set forth.

25. The combination, with a trigger-rod I⁴, of the shaft K'', the bevel-pinions K K', connecting said rod and shaft, the handle K⁴, fixed on said shaft, and the spring-catch K⁵, substantially as and for the purpose set forth.

26. The combination, with the trigger-rod I⁴, the shaft K², and the bevel-pinions K K', connecting said rod and shaft, of the arms K¹⁰ on the shaft K², the oscillating cylinders K¹³, the springs K¹⁵, contained therein, and the plungers K¹², working in said cylinders and connected with the arms K¹⁰, as and for the purpose set forth.

27. The combination, with the outer frame A, the sliding barrel B, and the inner frame B', of the sliding bar D⁴, connected to said frame and extending to the outside of said outer

frame, so that it may be utilized for drawing back said barrel and inner frame by hand, substantially as and for the purpose set forth.

28. The combination, with the outer frame A, the sliding barrel B, the inner frame B', and the breech-block C, substantially as described, of the extractor G, formed with the enlarged part G', so that it will be held down by the part A⁶ of said outer frame during the extraction of an empty cartridge-shell, substantially as set forth.

29. The combination of two or more sliding barrels B, an outer frame A, in which said barrels are arranged, inner frames B', formed on or attached to said barrels, breech-blocks C, fitted to slide to and fro in said inner frames, bars or struts C', pivoted to said breech-blocks and adapted to engage with said inner frames, arms or projections A'' on said outer frames, hooked bent levers F, pivoted to said outer frames, sliding bars D⁴, connected with said inner frames and provided with shoulders or projections D⁶ D⁷, extractors G, firing-pins II, fitted to slide in said breech-blocks, and hammers II', so arranged that before they strike said firing-pins they will cause the engagement of said bars or struts C' with said inner frames, substantially as and for the purpose set forth.

30. In an automatic gun, the combination, with a pivoted support, of a frame mounted thereon and capable of limited range of movement about the support in a horizontal plane, of gun-barrels mounted in said frame and adapted by their discharge and recoil to impart motion to the frame and produce a dispersal of the bullets while firing, as set forth.

31. The combination, with a gun-mounting, the upper part whereof is pivoted upon the base thereof, of a tail-piece or extension m'', formed or fixed on the said upper part, stops l, adjustably secured to said base, and springs n, attached to said stop, substantially as set forth.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

HIRAM STEVENS MAXIM.

Witnesses:

DAVID YOUNG,
45 Southampton Buildings.
C. JUNGE.