

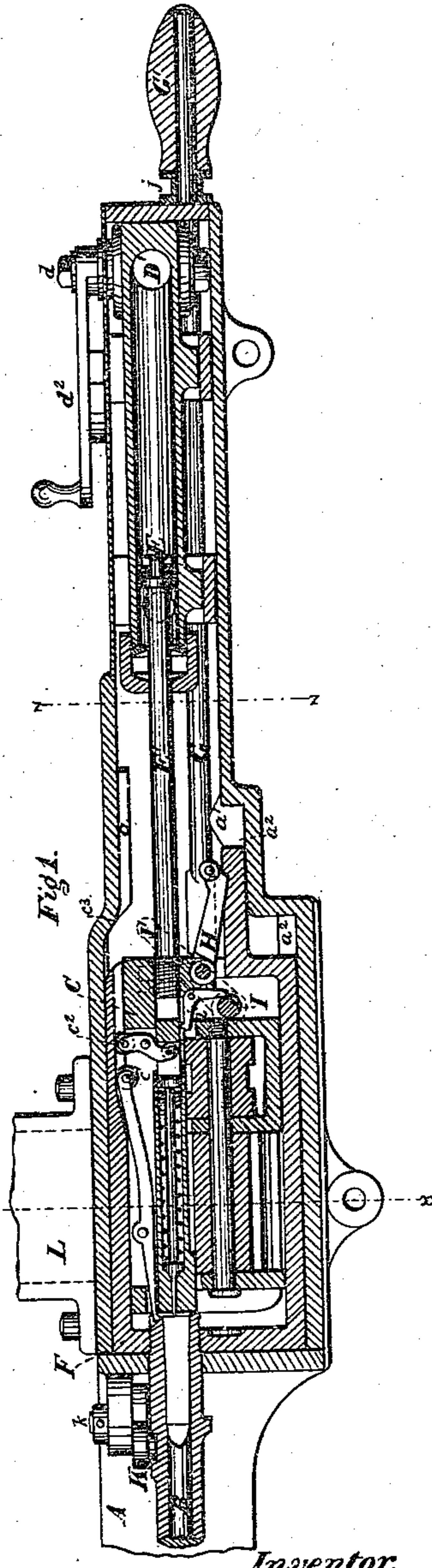
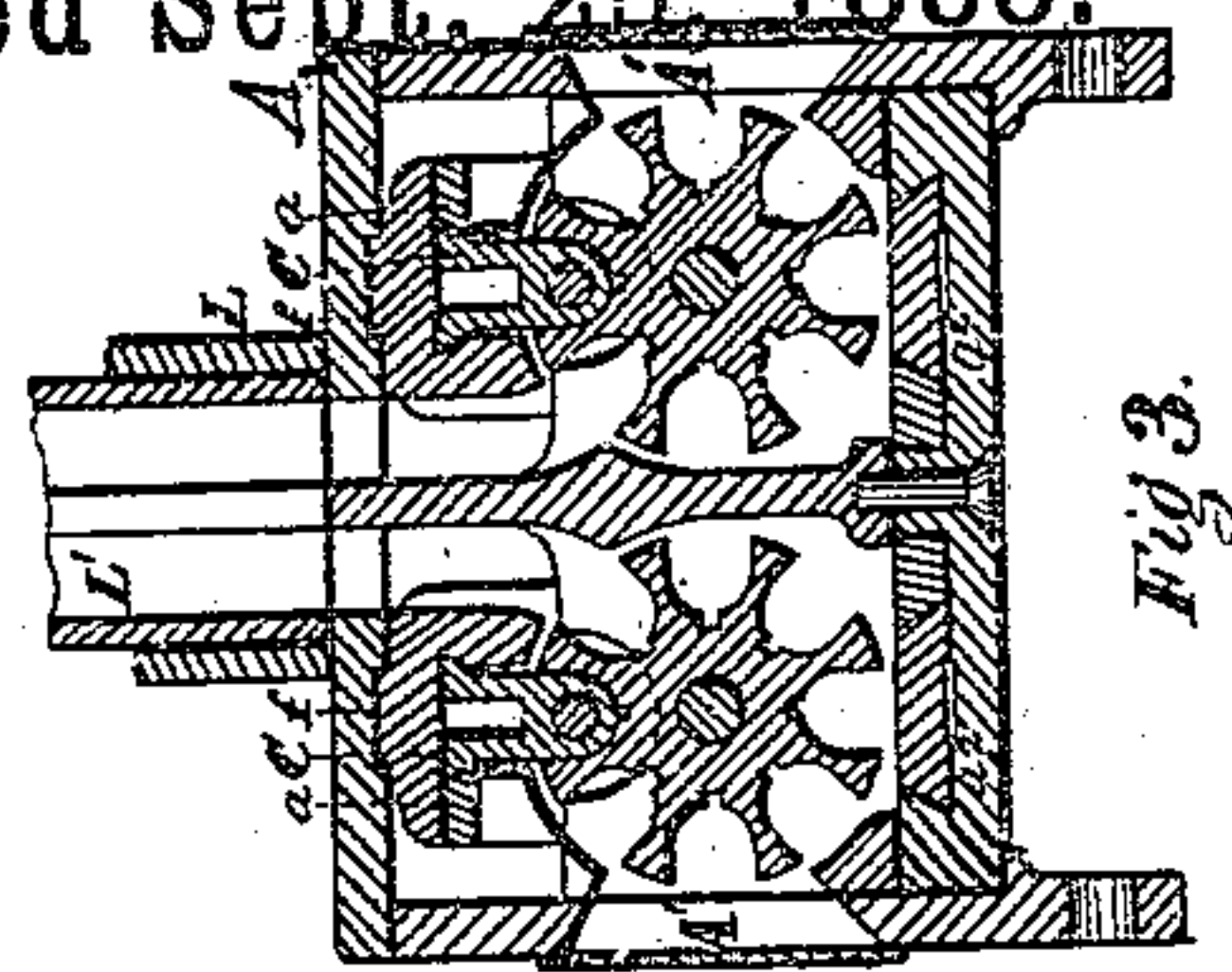
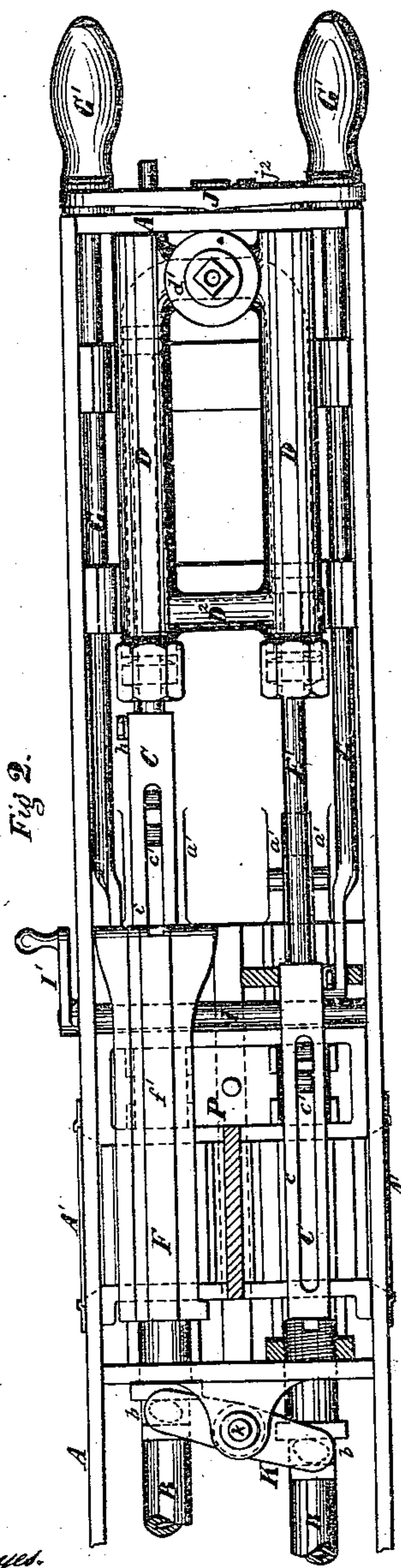
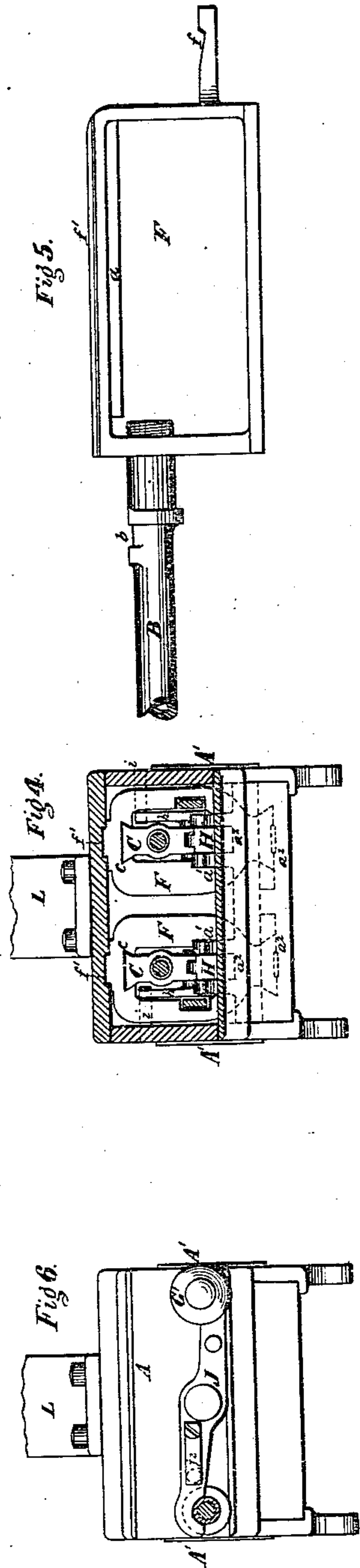
(No Model.)

2 Sheets—Sheet 1.

B. BURTON.
AUTOMATIC MACHINE GUN.

No. 390,114.

Patented Sept. 25, 1888.



Witnesses.
Charles Fredk. Hayes.
Henry Berhell

Inventor.
Bethel Burton

(No Model.)

2 Sheets—Sheet 2.

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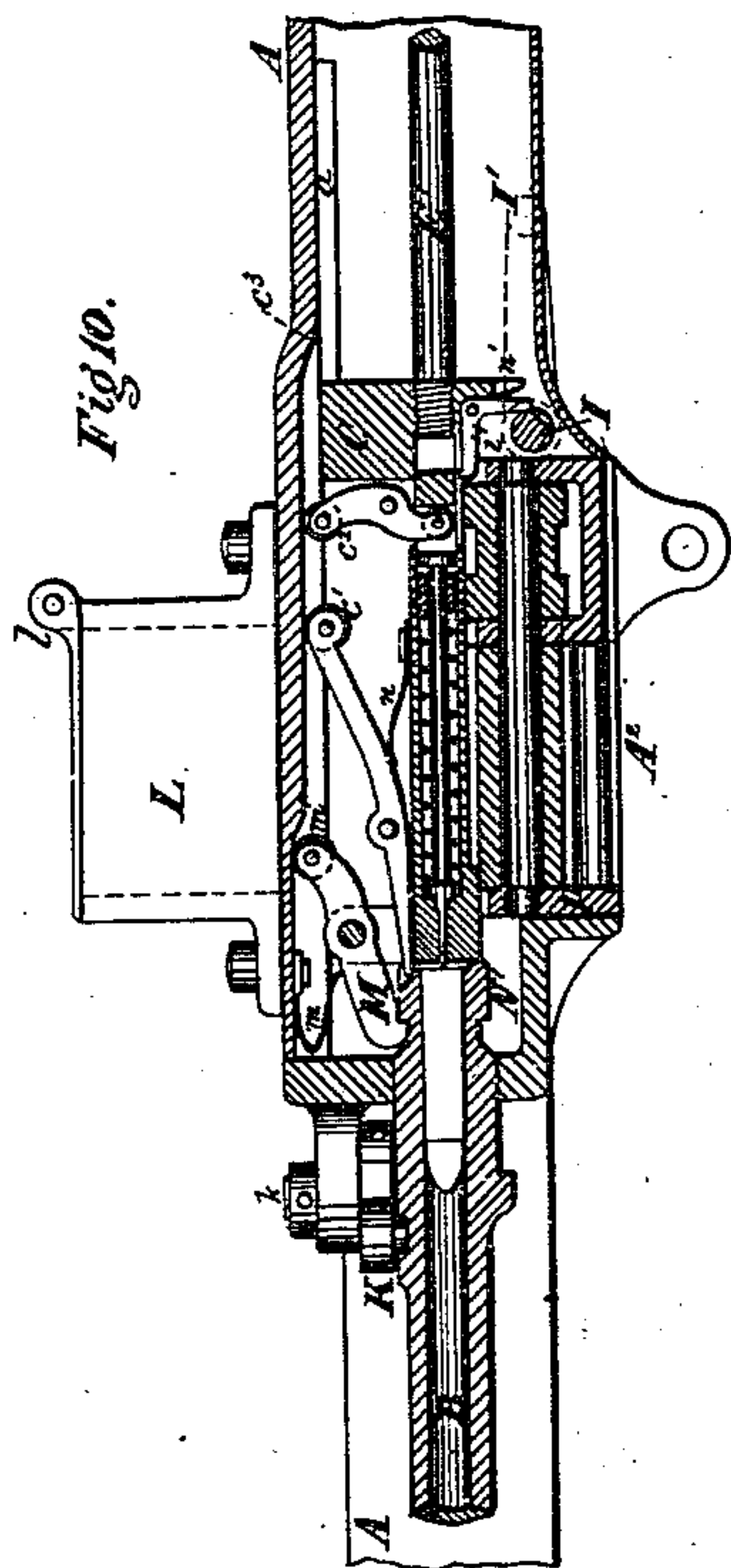


Fig. 10.

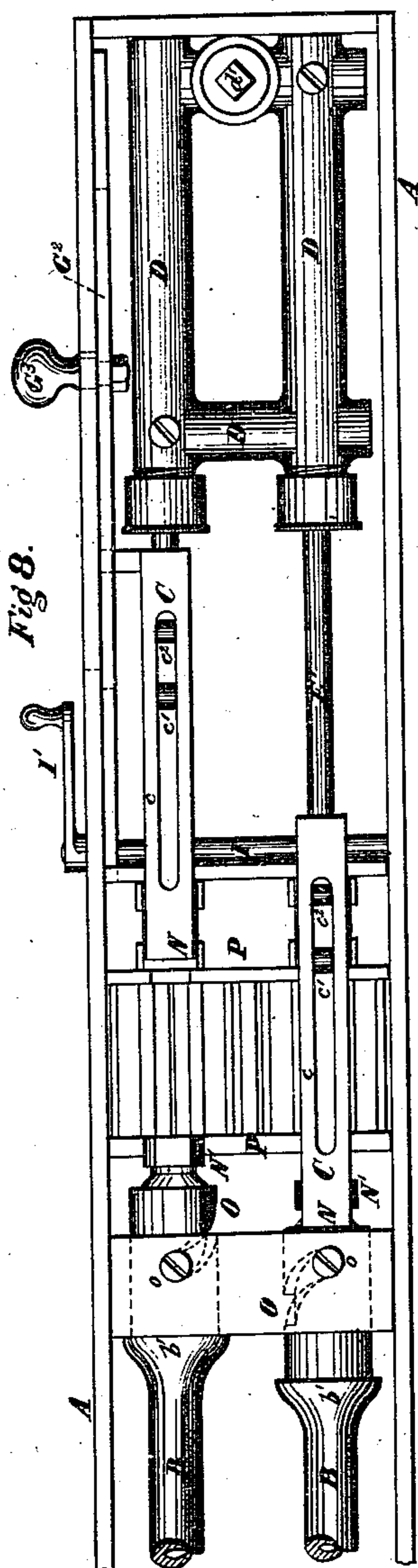
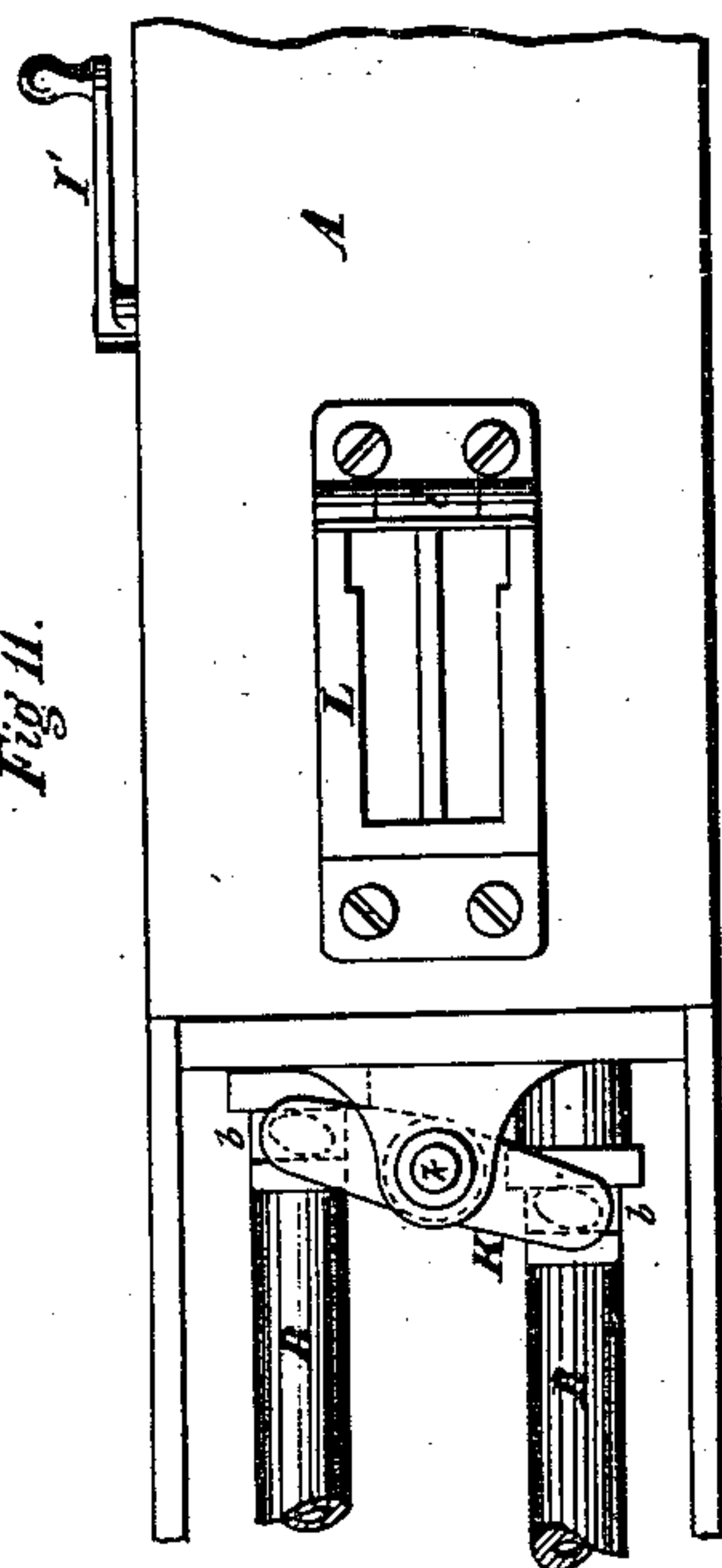


Fig. 8.

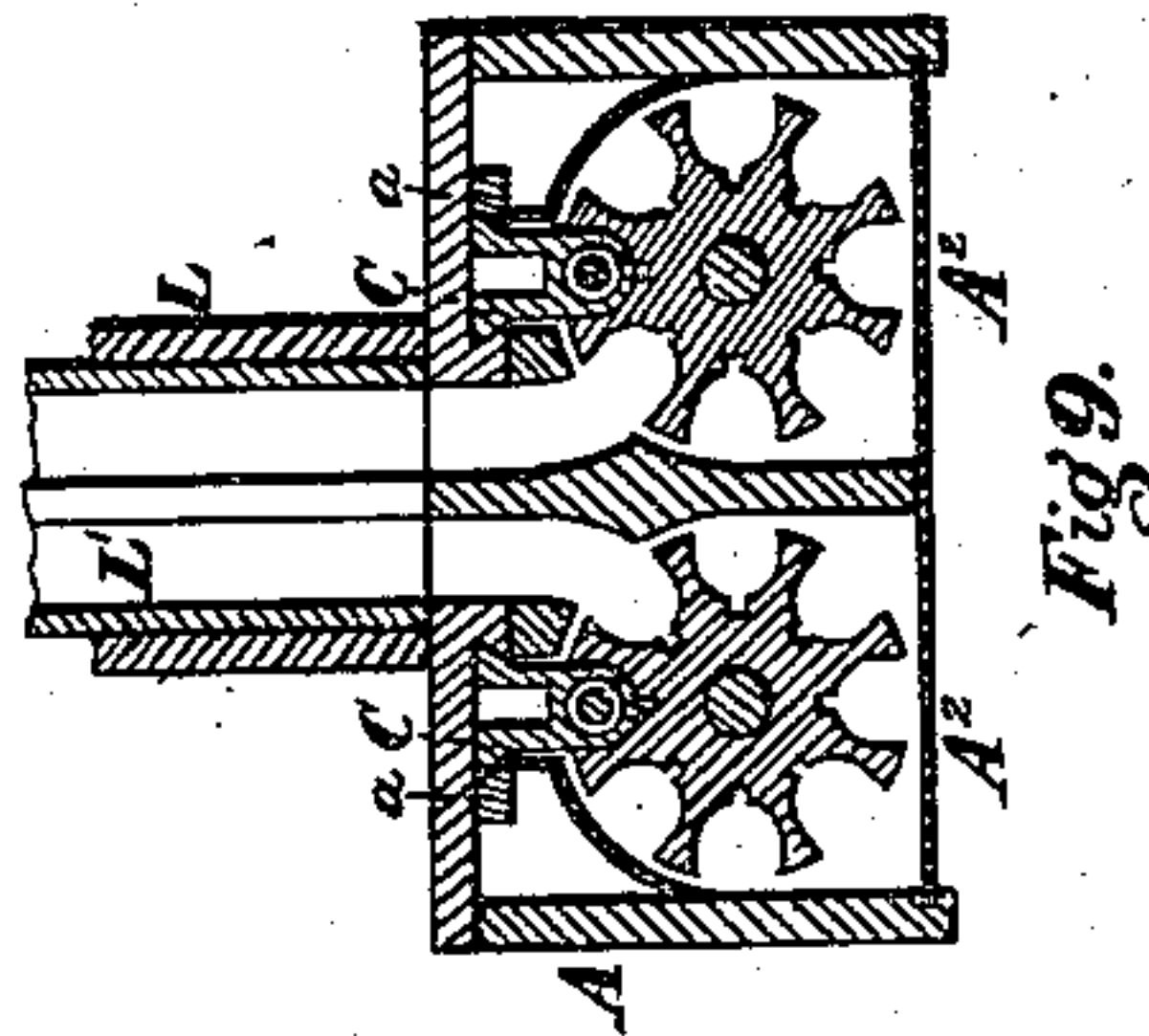


Fig. 9.

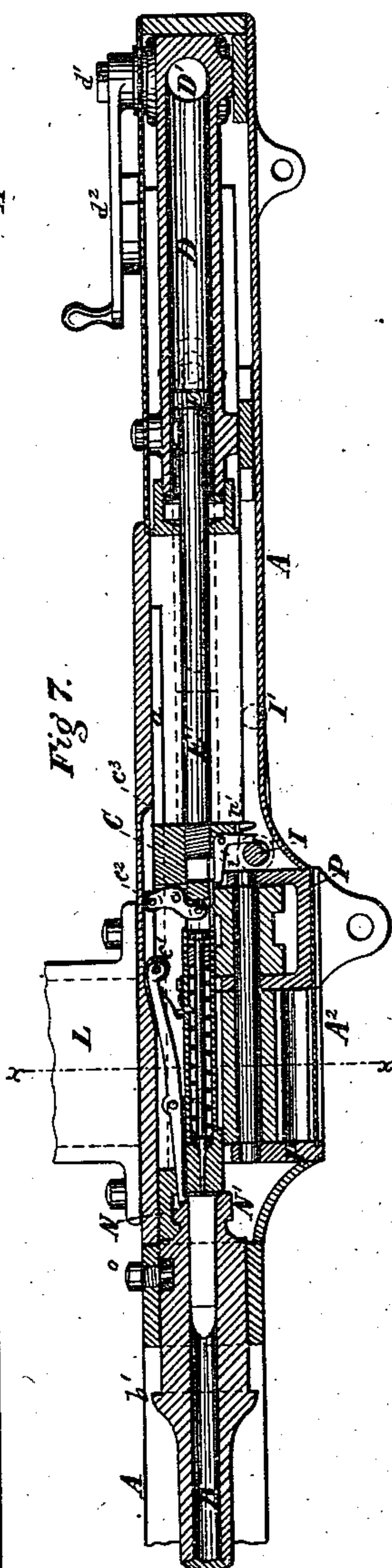


Fig. 7.

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Inventor:
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UNITED STATES PATENT OFFICE.

BETHEL BURTON, OF LONDON, ENGLAND.

AUTOMATIC MACHINE-GUN.

SPECIFICATION forming part of Letters Patent No. 390,114, dated September 25, 1888.

Application filed April 2, 1886. Serial No. 197,588. (No model.) Patented in England March 22, 1886, No. 4,008.

To all whom it may concern:

Be it known that I, BETHEL BURTON, at present residing in the city of London, England, have invented a new and useful Automatic Machine-Gun, (for which Letters Patent have been granted me in Great Britain, No. 4,008, dated March 22, 1886,) of which the following is a specification.

My invention relates to that class of gun known as "automatic machine-gun actuated by its own recoil;" and it particularly relates to a new class of automatic machine-guns having two or more barrels, and where the recoil of the exploded charge of one loads and fires the other, and vice versa, and, where more than one pair of barrels are used, each pair will work independent of the other should any one pair break down.

The important features of my present invention are:

First. All the movements of the actions and barrels are positive and not dependent on auxiliary springs to perform their different functions.

Secondly. Instead of using one barrel I use any number required, and the recoil of one barrel from the exploded charge opens the breech, ejects the spent shell, and brings a loaded cartridge in front of the bolt, ready to be shoved into the barrel. It also pushes the other bolt and barrel forward together with the cartridge, closes the breech, and fires the charge, the explosion of which closes the breech of the other action, and so on, firing alternately, first one and then the other. Thus as many actions and barrels as may be required may be constructed side by side and fired in pairs, or all together, so that in case any one of the actions or barrels is disabled the others can continue firing.

Thirdly. By firing the same number of charges through two or more barrels that are required to be fired where only one barrel is used, I obtain thereby the minimum heating of the barrels, thus avoiding the necessity of using a water-jacket round the barrels, although a water-jacket may be used, if desired.

Fourthly. The force of the recoil from the exploded charge is regulated and controlled by means of a valve, placed, by preference, in the rear communication between the cylinders.

Fifthly. The discharged barrels are brought forward by means of a balance-lever pivoted

at its center to the frame, and at either end to the barrels, so that when one barrel recedes the other barrel advances, and vice versa.

Sixthly. To delay the opening of the breech for a certain period of time I make use of a self-acting brace, which permits the bolt and barrel to travel together for a certain distance, and when the brace releases the bolt the bolt travels back by the force from the unescaped gases. The force exerted by those gases upon the bolt is utilized for the purpose of operating the companion action and barrel by means of the action of the pistons in the cylinders. I do not confine myself to this particular system, whereby the barrel and bolt are kept together for a certain distance. The same may be accomplished by other distinct methods which I sometimes use. One of those methods consists of a solid clutch on the bolt, which engages in a flange on the barrel, and is made to engage and disengage by means of a cam hereinafter described. Another method consists of a lever pivoted to the bolt, which is thrown in and out of gear by a cam-action; also hereinafter described.

The cartridges are supplied to the gun by an upright hopper—such as is in general use on machine-guns—from which the cartridges drop into a revolving feed or pannier, by which they are conveyed in front of the bolt and by which the spent shell is carried off when extracted and thrown out through an opening in the side or bottom of the frame of the gun. This pannier is revolved by the reciprocating motion of the bolt. I wish it to be understood that I do not claim the pannier actuated by the bolt as my invention, except in combination with my invention; nor do I confine myself to this particular feed, as any other suitable feed may be used.

My present invention moreover comprises various improvements, hereinafter described, applicable to other guns.

In the accompanying drawings I have shown different methods or modifications of an automatic machine-gun designed to operate in accordance with the general plan of my present invention, in which—

Figure 1 is a longitudinal vertical section of my breech action, frame, and barrel. The front parts of the frame and barrel of all the longitudinal views and plans are broken off

for convenience. Fig. 2 is a top plan view of the same, the top plate removed to show the several parts. Fig. 3 is a cross vertical section through $x x$, Fig. 1, showing the hopper and box. Fig. 4 is a vertical cross section through $z z$, showing the rear end of the hopper-box. Fig. 5 is a side view of the barrel and the frame F. Fig. 6 is a rear end view of the gun, showing the steering and starting handles and the double action fastener for keeping the handle in place. Fig. 7 is a longitudinal vertical section showing one form or modification of said gun. Fig. 8 is a plan view of the same with the top plate removed to show the action and barrels. Fig. 9 is a vertical cross section through $x x$, Fig. 7, showing the revolving pannier and the hopper placed in the hopper-box. Fig. 10 is a longitudinal vertical section with the rear end of the frame removed for convenience, showing another form or modification of said gun. Fig. 11 is a top plan view of the same.

Letters alike indicate parts alike throughout the several illustrations.

A indicates a metal frame of the usual type of machine guns.

B B are the barrels.

C C are the bolts.

D D are the cylinders.

D' is the rear connection between the two cylinders with the valve d' therein.

D² is the front connection between the cylinders.

E E are pistons in the cylinders D D.

E' E' are the piston rods secured to the ends of the bolts.

F F are the frames attached to the ends of the barrels B B, which work in ways $a^2 f'$.

G G are the starting rods.

G' G' are the steering and starting handles, Figs. 1 and 2.

H H are bell-crank braces for supporting the bolts C C in the frames against the base of the cartridge in the barrel during a portion of the travel of the bolt.

I is a rod which passes through the frame A.

I' is a handle for operating the rod I, by which the firing of the gun can be started or stopped.

J is a double-ended fastener for retaining the steering and starting handles G' G' in place.

K is a balance-lever pivoted to the frame A by a pin, k .

L is the hopper-box; L', the hopper.

A' A' are the openings in the sides of the frame A, through which the cartridges are ejected, having a folding or sliding door.

A² is a folding or sliding door in the bottom of the frame A, Figs. 7, 9, and 10, for a similar purpose.

O is a cam formed in the barrel, engaging a pin in the cross-bar of the frame A for the purpose of giving a reciprocating rotary motion to the barrel.

N is a clutch on the end of the bolt C, which engages a flange, N', on the end of the barrel.

G² is a rod attached to the rear end of the bolt C, which slides in a grooved way in the inside of the frame A.

G³ is a knob or handle which passes through the frame A and is secured to the rod G². The handle G³ reciprocates in a slot in the side of the frame A.

M, Fig. 10, is another form of clutch designed to operate in conjunction with the balance-lever K.

The frame A is constructed in the usual way. Grooved ways $a^2 a^3$ are made in the bottom of the frame A, and other ways, $f' f'$, are made in the top plate of the frame A. There is attached to the barrel a frame, F, from which an arm having a step, f , extends, and in the frame A a grooved way is made for the arm f to slide in. The frame F, with the barrel B, is placed in the frame A, sufficient space being left for the frame and arm to recoil back the distance required. In the frame F a dovetail way, a , is made, and on the frame A a corresponding dovetail, a , is made. The bolt C is made to work in those dovetails. In the bolt is placed the usual firing-pin and helical spring. There is also an extractor, c' , of a peculiar construction, pivoted in the bolt, and a cocking lever, c^2 , and a sear, i' . To the end of the bolt C a piston-rod, E', is attached, on which there is a piston, E. In the rear of the frame a pair of cylinders, D D, are placed, having connections D' and D². The piston E works in the cylinder D, and the mouth of each cylinder is provided with a stuffing-box, through which the piston-rod works. In the connection D' a valve, d' , is placed, having an arm, d^2 , Figs. 1 and 7, by which it is turned. The cylinders are filled with air or a suitable fluid matter in the rear of the pistons. I prefer to leave the cylinders empty in front of the pistons in case the packing of the pistons E E might leak and cause jamming, whereas now the fluid or air can pass from one cylinder to the other.

The revolving panniers are placed in a frame, P, and made fast to the frame A. The frame F is cut away, in the manner shown in Fig. 1, to admit the end of the extractor c' and the cocking-lever c^2 to lift. The end of the extractor c' and both ends of lever c^2 are made with rollers, so that they will move freely. To the rear end of the bolt C, which projects downward, a bell-crank lever-shaped support, H, is pivoted. The end of the support H rests in a step, f , in the arm of the frame F. From this brace a pair of arms extends laterally out over the frame A. These arms are provided with rollers.

On the frame A, in the path of the travel of the support H, the cams $a' a'$ are formed, so that when the recoil takes place the rollers on the arms of the support H mount up the cams $a' a'$ and lift the end of the support out of the step f . The bolt C is thereby released from the frame F, by which time the bullet has reached near the muzzle of the barrel. The gases in the barrel acting on the bolt forces it back and

ejects the spent cartridge. When the cartridge-shell is withdrawn within a short distance of the rear of the pannier, the roller end of the extractor c' strikes the cam c^3 on the depression made on the top of the frame A and lowers the lever end of the extractor, thus lifting its hooked end clear off the cartridge. A spring under the extractor presses the hook end down.

To prevent the cartridge-shells from passing behind the pannier, I make the hole in the pannier-frame slightly narrower than the head of the cartridges, and make the bolt to correspond. The cocking-lever c^2 strikes the cam c^3 as the bolt C recedes, pressing the upper arm of the lever c^2 down, and the lower arm in the mortise made in the firing-pin is pressed back, forcing with it the firing-pin and compressing the helical spring in the bolt. The sear i' then engages in the head of the firing-pin and holds the helical spring compressed.

The firing-rod I has flats made thereon, so that when brought opposite the sear they do not come in contact with the sear; but by turning the handle I' a short distance the rod I presses the lower arm of the sear i' back, and releases the firing-pin, which is driven forward by the spring to fire the charge. By operating the handle I' the gun may be fired or not, as required.

The bolt C, piston rod E', and cylinders D are in a direct line, and when the recoil takes place the bolt and piston are forced back, pressing the air or fluid in one cylinder through the connection D' into the adjoining cylinder, forcing its piston with the bolt forward, and closing the breech. The upper arm, h , of the support strikes against a pin or projection, i , on the frame A, forcing the end of the brace H down into the step f on the arm of the frame. To avoid hammering the ends of the bolts C C against the ends of the barrels B B, I provide a balance-lever, K, which is pivoted to the frame A at k . A trunnion on either end of the lever K enters a groove, b , made in the top of the barrel, and as one barrel recoils back the other is forced forward by the lever K, and vice versa.

The panniers which convey the loaded cartridges from the hopper L' are made to turn one to the right and the other to the left, and are constructed and operated on the principle patented in Great Britain by J. D. Greene, dated June 18, 1875, No. 2,241, and require no description.

To prepare the gun to fire, the hopper L' is placed in the hopper box L and filled with cartridges. The handles G' are released from the fastener J. The handle G' on the starting-rod G is pulled back, and with it the forward bolt and barrel, and a loaded cartridge is brought in place, which the bolt thrusts into the barrel. The handle G' and fastener J are then put back in place, in the position shown in Fig. 6. A friction spring, J', prevents the fastener from moving. The handle I' is then turned into the firing position. The gun will

then go on firing as long as the hoppers are kept supplied with cartridges—first one barrel and action, then the other—the recoil 70 from one charge loading and firing the other, keeping up a reciprocating motion throughout. The excess of the recoil is taken up by the act of operating the several parts of the actions; but should that not be enough I provide the valve d' , which, when turned by the handle d^2 , so as to partially close the opening, the fluid or air that the cylinders are charged with is prevented from rushing through freely, and thereby the desired speed is obtained at 80 which the gun is required to fire.

In order to fill the cylinders with fluid, I prefer to insert it through an opening made down through the valve into the cylinders, the entering-hole stopped by a screw-plug, d . If 85 air is used, a proper valve will be required; or, indeed, the common atmosphere in the cylinders may answer the purpose.

In order to exclude dirt or dust entering the frame A and clogging the action, I provide 90 folding or sliding doors at A', which are closed when the gun is not in use.

In the modification of my invention illustrated in Figs. 7 to 9 the frame A is constructed similar to the frame described, in which the 95 panniers are securely fastened. Dovetail ways $a a$ are made on the under side of the top plate of the frame A, in which the bolts C C reciprocate. On the front end of the bolt C a solid clutch, N, is formed. On the end of the barrels B a flange, N', is made. A gap is made in this flange N' to admit the clutch N to pass through in order to engage with the flange N'. On the barrels B B cams O O are made, and in the cross-bar of the frame A, in which the 105 barrels B B reciprocate, studs $o o$ are placed, which are provided with friction-rollers. When one bolt is driven forward by the recoil of the other, it pushes the barrel before it, which, with the cam O and pin o , imparts a 110 horizontal rotary motion to the barrel, clutching it to the bolt. The recoil of the barrel reverses the action of the cams O O, causing the flange N' to release from the clutch N. When the barrel and bolt have traveled 115 a certain distance back, the bolt is then released from the barrel and recoils back in ways $a a$ in the under side of the frame A, and forces the piston-rod and piston through the cylinder, pressing the air or fluid before it through the 120 connection D' and into the adjoining cylinder, forcing the piston therein forward, performing the functions illustrated in Figs. 1 to 6, and as before described. The under side of the top of the frame A is cut away for a short distance, 125 forming a groove to admit the rear end of the extractor c' , and the upper end of the cocking-lever c^2 to lift. When the bolt C is forward, the end of this groove forms a cam, c^3 , which the upper arm of the cocking-lever c^2 strikes 130 as the bolt recedes, forcing back and cocking the firing-pin, when it is caught by the hook on the sear i' . The rear end of the extractor c' strikes the cam c^3 , and is thus lowered and

lifts the hooked end up clear off the rim of the cartridge. The hook of the extractor is kept pressed down by a spring under the rear end of the lever. In all other respects the gun is similar to that hereinbefore set forth.

Another modification of my invention is illustrated in Figs. 9, 10, and 11, and is constructed as follows: The frame A and the action are similar to the last frame and action hereinbefore set forth. In this modification the barrels are made to slide freely back and forth in the cross bar of the frame A, in the manner shown in Figs. 1 and 2, and are supplied with the balance-lever K, attached to the frame and barrels in the manner before set forth and shown in Figs. 10 and 11. In the front end of the bolt C a lever, M, is pivoted. On one end of this lever a hook is formed, and a spring, *m*, is secured to the frame A to keep the hook end of the lever M pressed down in place. The other end of the lever M extends up and into a groove formed in the plate A. The rear end of this groove has an incline or cam, *m*. On the end of the barrels a flange, N', is formed, in which the hook on the lever M clutches. When the recoil takes place, the barrel and bolt travel back together for a short distance, when the roller end of the lever M strikes the cam *m*', causing it to lower and the hook end of the lever M to rise, freeing the bolt from the barrel and allowing it to recoil and act in conjunction with the adjoining bolt, piston, and cylinder in the manner and as hereinbefore set forth. When the barrel recoils a short distance and it is released from the bolt C, it is stopped by a collar, *b'*, which strikes the cross-bar of the frame A. As in the preceding gun, the balance-lever K forces the adjoining barrel forward, so that there is a reciprocating motion of the barrels kept up with the other parts of the actions. I do not, however, confine myself to the use of two or more barrels, placed side by side. A number of barrels may be put together in a circle and fired consecutively until all the barrels contained in the circle have been fired, and so on, two circles of barrels constituting the set, instead of two single barrels, as set forth. Each circle of barrels may be revolved by a pawl-and-ratchet motion, or by the action of cams, in the manner before referred to, for revolving the panniers or by some other similar or suitable device.

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 an automatic machine-gun, the combination, with a suitable frame, of a pair of reciprocating barrels, a yoke or bar pivoted to the frame between said barrels, and connecting them together, so that as one barrel is moved backward the other is moved forward, substantially as described.

2. In a machine-gun, the combination of a barrel provided with a hook or abutment, a breech-bolt, an instrument for interlocking

said abutment attached to the breech-bolt, and a cam-surface for disengaging the breech-bolt from the barrel, substantially as described.

3. In a machine-gun, the combination of barrel provided with frame F, a breech-bolt, a brace or support for locking the breech-bolt to the frame provided with a projecting arm and a cam surface for disengaging the breech-bolt from the barrel upon the backward movement of the parts, substantially as described.

4. The combination of a breech-bolt, an extractor provided with roller, as described, and a cam surface or projection on the frame for disengaging the extractor from the cartridge substantially as described.

5. The combination of a movable barrel, breech-bolt, a brace or locking-support for the bolt provided with a crank-arm, and a pin or projection on the frame for throwing the support into locking position, substantially as described.

6. The combination, in a machine-gun, of pair of breech-bolts arranged to slide from and toward the barrels, connected parallel cylinders D D, and pistons working in said cylinders, connected with the breech-bolts for bringing the breech system of one barrel into firing position upon the recoil of the other, substantially as described.

7. In a machine gun having a pair of barrels, the combination, with a pair of breech-bolts arranged to alternately slide from and toward said barrels, of a cartridge-feeder, firing-hammer, cocking-lever, and extractor, all connected with and operated by said breech-block, substantially as described.

8. The combination of a pair of reciprocating barrels, a pivoted yoke or bar connecting said barrels, a pair of breech bolts, a pair of pistons connected with said breech-bolts, parallel connected cylinders in which said pistons operate, and a cartridge-feeder, firing-hammer, cocking-lever, and extractor connected with and operated by said breech-block, substantially as described.

9. The combination, in a machine-gun having a pair of barrels, of a pair of breech-bolts, pistons connected with said breech-bolts, and a pair of parallel connected cylinders having a regulating-valve between them, substantially as described.

10. In a machine-gun having reciprocating breech-blocks sliding from the barrel to open and toward the barrel to close the breech, the tripping or firing rod I, arranged across the frame in the path of the sears and adapted to be thrown into and out of operative position by the crank or handle I', as described.

11. In an automatic machine gun, the combination, with the breech-bolts, of starting rods provided with handles for operating them and training the gun, and a fastener for locking and releasing the rods as required, substantially as described.

12. In an automatic machine-gun, the combination, substantially as described, of a pair of barrels, a pair of panniers for delivering

cartridges in line with and between said barrels and the breech-bolts, and a pair of breech-bolts, the panniers and breech-bolts being automatically and alternately operated by the
5 recoil of the charge, as set forth.

13. The combination of a reciprocating breech-bolt carrying the firing-hammer, a

cocking-lever, and a cam for operating the said lever upon the backward movement of the bolt, substantially as described.

BETHEL BURTON.

Witnesses:

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