

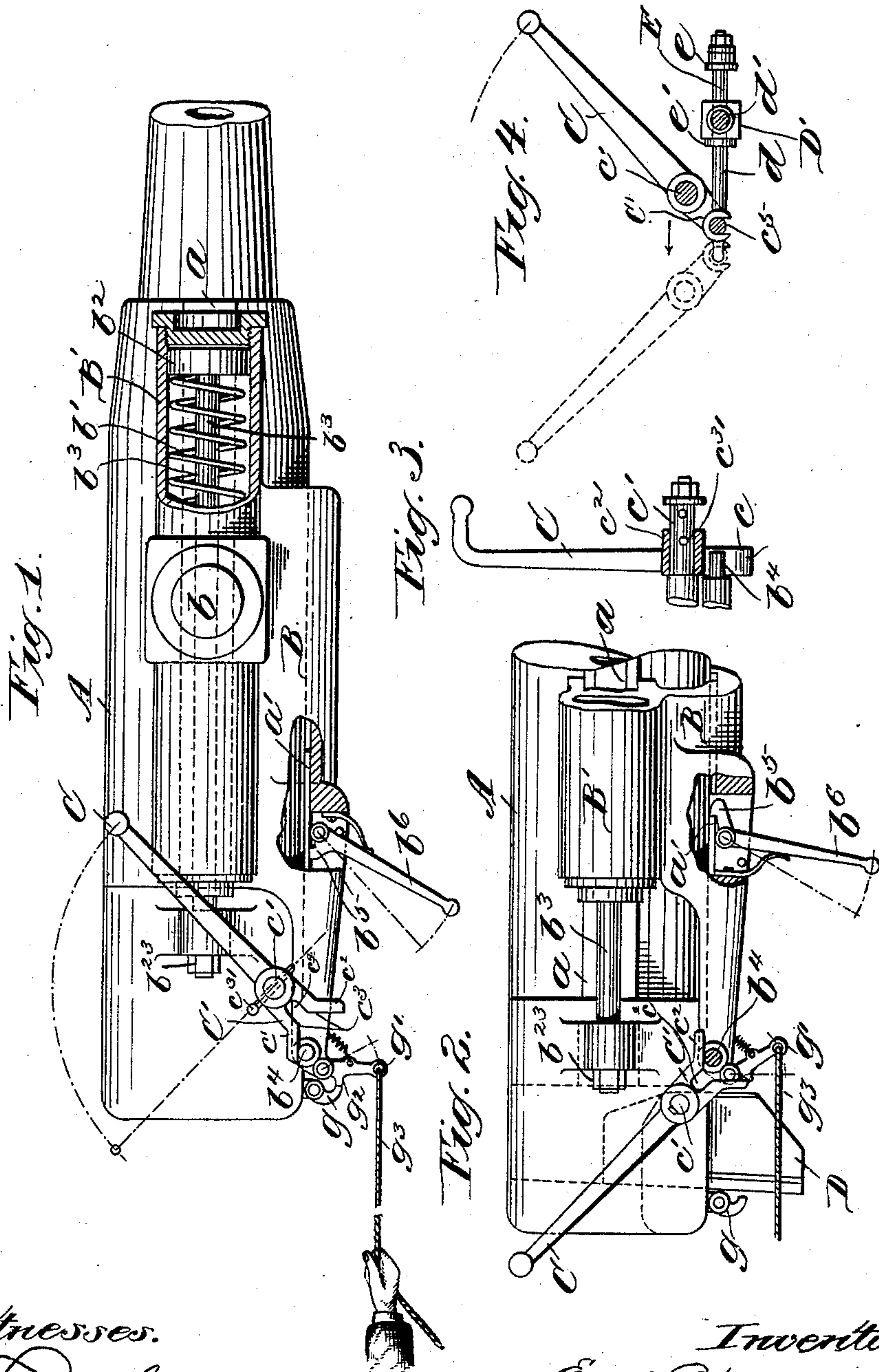
(No Model.)

3 Sheets—Sheet 1.

EMIL RITTER V. SKODA.
AUTOMATIC QUICK FIRING GUN.

No. 429,819.

Patented June 10, 1890.



Witnesses.
J. Thomson Cross.
Henry G. Dietrich

Inventor.
Emil Ritter von Skoda
per Henry G. Dietrich
Att'y.

(No Model.)

EMIL RITTER V. SKODA.

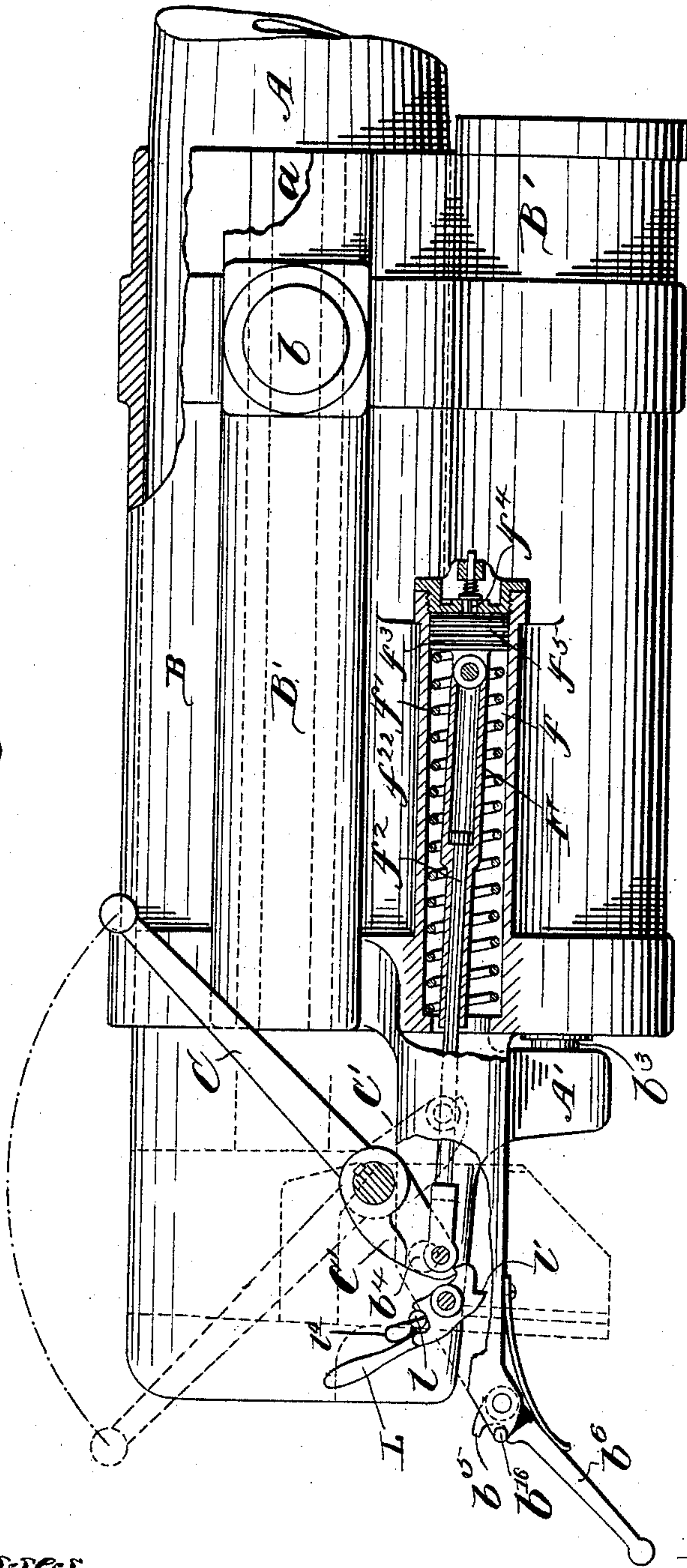
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AUTOMATIC QUICK FIRING GUN.

No. 429,819.

Patented June 10, 1890.

Fig. 5.



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J. Thomson Cross
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(No Model.)

3 Sheets—Sheet 3.

EMIL RITTER V. SKODA.
AUTOMATIC QUICK FIRING GUN.

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Fig. 7.

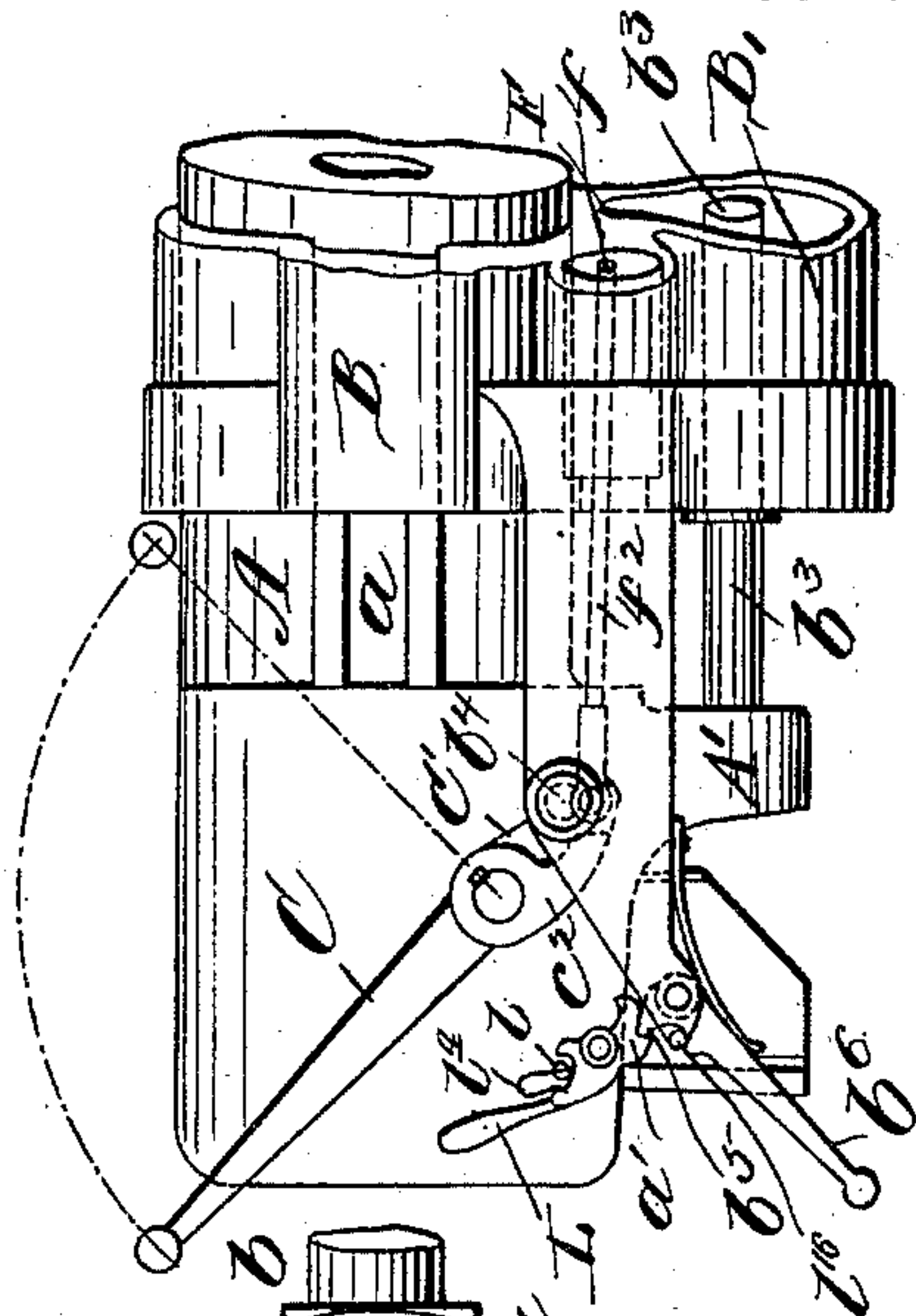


Fig. 8.

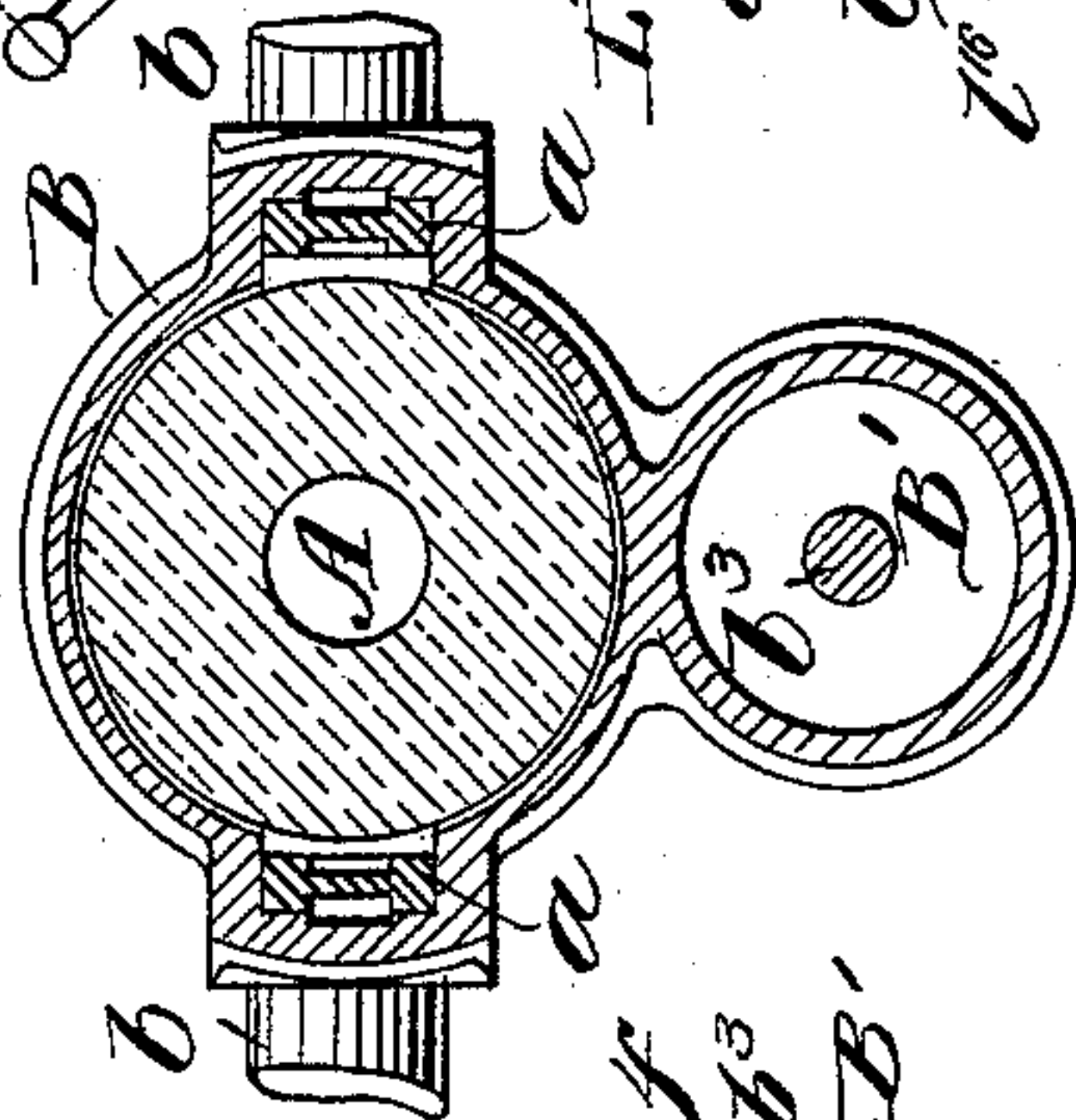


Fig. 6.

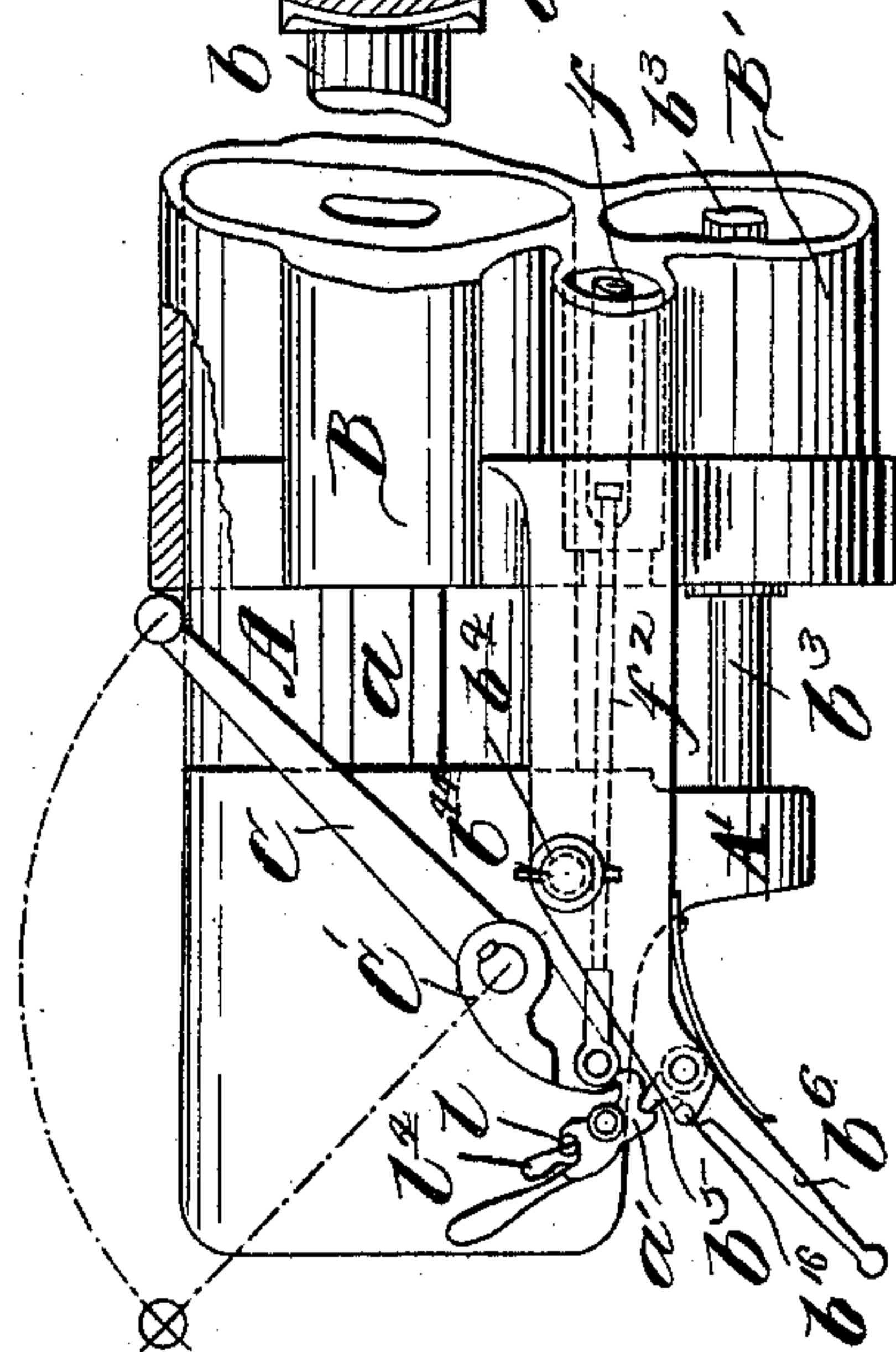


Fig. 10.

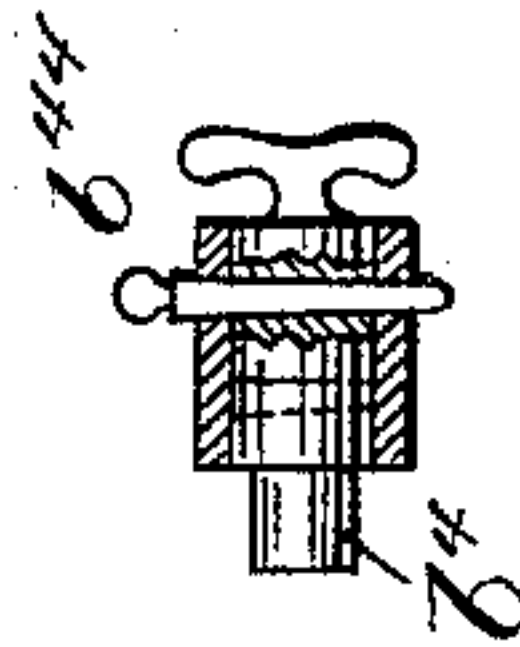
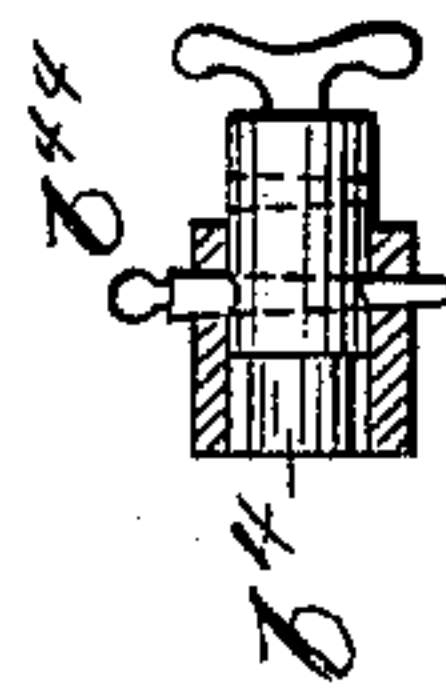


Fig. 9.

Witnesses.
Thomas Cross
Henry G. Dietrich

Inventor.
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per Harry M. Allen.

UNITED STATES PATENT OFFICE.

EMIL RITTER V. SKODA, OF PILSEN, BOHEMIA, AUSTRIA-HUNGARY.

AUTOMATIC QUICK-FIRING GUN.

SPECIFICATION forming part of Letters Patent No. 429,819, dated June 10, 1890.

Application filed October 9, 1889. Serial No. 326,392. (No model.) Patented in Germany December 1, 1888, No. 47,781; in France December 1, 1888, No. 194,483; in Belgium December 1, 1888, No. 84,141; in Switzerland December 1, 1888, No. 146; in Italy January 8, 1889, XXII, 24,485, XLVIII, 118, and in Austria-Hungary March 11, 1889, No. 47,482 and No. 5,728.

To all whom it may concern:

Be it known that I, EMIL RITTER VON SKODA, a subject of the Emperor of Austria, residing at Pilsen, in the Province of Bohemia, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in Automatic Quick-Fire Guns, (for which I have obtained Letters Patent in the following countries: in Austria under date of March 11, 1889, and numbered 47,482; in Hungary under date of March 11, 1889, and numbered 5,728; in Germany under date of December 1, 1888, and numbered 47,781; in France under date of December 1, 1888, and numbered 194,483; in Belgium under date of December 1, 1888, and numbered 84,141; in Switzerland under date of December 1, 1888, and numbered 146, and in Italy under date of January 8, 1889, Reg. Gen., Vol. XXII, No. 24,485, and Reg. Att., Vol. XLVIII, No. 118;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form part of this specification.

Referring to the drawings, Figure 1 is a sectional side elevation of so much of a gun as is necessary to illustrate my invention, the mechanisms being shown in their position before firing. Fig. 2 is a like view, the mechanisms being shown in their position after recoil of the gun. Fig. 3 is a detail view showing the means for adjusting the lever for operating the mechanism that imparts motion to the breech-block in opening or closing the breech-chamber, so that said mechanism may be operated either by hand or automatically. Fig. 4 is a detail view of a modification in the construction of the mechanism shown in Fig. 3. Fig. 5 is a view similar to Figs. 1 and 2, in which the lever that controls the mechanism for operating the breech-block is actuated during the forward movement of the barrel after recoil. Figs. 6 and 7 are similar views showing a modification in the construction of the devices for actuating the lever that operates the breech-block mechanism.

Fig. 8 is a vertical cross-section of the gun shown in Figs. 5, 6, and 7, taken immediately in front of the trunnions; and Figs. 9 and 10 are detail views.

The invention relates to that class of guns known as "rapid-firing guns," in which metallic cartridges are employed, and has for its object to increase the efficiency of such guns and simplify the handling thereof by providing means whereby the mechanism for operating the breech-block as well as the firing mechanism is or may be controlled by the movements of the gun in its recoil or in its return to its normal position.

To these ends the invention consists in the combination, with the gun, of a support in which said gun is movable longitudinally and with which the gun is adapted to revolve on horizontal journals, of a power-accumulator for accumulating the power exerted by the recoil of the gun, and of mechanism for operating the breech-block either by the power of the recoil or by the accumulated power due to such recoil, also in devices for automatically controlling and operating the firing mechanism by the said power of the recoil or the accumulated power due to such recoil, and, finally, in structural features and combinations of parts, substantially as hereinafter described, and as set forth in the claims.

In carrying out my invention the details of construction and arrangement of the various mechanisms may be varied, as will hereinafter appear, without departing from the spirit of the invention.

Referring more particularly to Figs. 1, 2, and 3 of the drawings, A indicates the breech end of the gun, in which is formed a vertical slot immediately in rear of the breech-chamber for the breech-block, and in which said block has a vertical movement to open and close the breech. Any suitable mechanism adapted to be operated by means of a lever on the outside of the gun may be employed to impart the necessary motion to the breech-block for opening and closing the breech-chamber. In a like manner any suitable mechanism may be employed for bringing the firing-pin to a full-cock.

In my application for Letters Patent of the United States filed October 4, 1889, Serial No. 325,987 I have shown a very efficient and simple mechanism not only for imparting the necessary motion to the breech-block, but also for bringing the firing-pin to a full-cock, the latter mechanism being controlled by the breech-block-actuating mechanism, and both mechanisms are controlled by a hand-lever. Although I prefer the mechanisms referred to, I do not limit myself to the use thereof, as any other mechanisms controlled by a lever on the outside of the gun may be employed.

C indicates the lever for operating the breech-block mechanism, and through the latter the mechanism for bringing the firing-pin to a full-cock, and g indicates the trigger by means of which the firing-pin is released. In the present case this may be automatically effected through the medium of the spring-actuated lever g' as the gun reaches its normal position after recoil, the trigger g striking the nose g^2 of the lever g' . The trigger g may also be operated by hand through the medium of the lever g' and a lanyard g^3 .

Various means may be provided for setting the lever g' into the position shown in Fig. 1 when the gun is to be fired automatically, as described. This may be done by holding said lever in said position by means of the lanyard, either by holding onto the lanyard or by tying the same to some fixed support, or a locking-dog pivoted to the gun-support in front of the lever may be made to hold the same in the position indicated, or any other suitable means may be provided to accomplish the end in view.

As shown in Figs. 1 and 2, the lever C is fulcrumed upon a stud c^{13} , on which said lever is movable endwise, so that it may be manipulated by hand, the sleeve-bearing c^{21} of the lever being provided with a groove for the reception of a feather or spline on said stud, as shown in Fig. 3. The lever d , when adjusted to engage the stud b^4 or when adjusted to clear the said stud, so that it (the lever) may be operated by hand, is secured in position by means of a pin c^{31} . (See Figs. 1 and 3.) The arm C' of lever C is forked, the branches c' c^2 being spread to form the inclined faces c^3 and the recess c^4 , for the reception of the stud b^4 .

In Figs. 1 and 2 I have shown an arrangement of mechanism by means of which the breech-block-operating lever is actuated during and by the recoil of the gun, and I have provided means for automatically returning the gun to its normal position with sufficient force to release the firing-pin through the medium of the trigger g striking the nose of lever g' , as above explained. The means for returning the barrel into its normal position after recoil may also vary, but in all cases should be of such a nature as to be capable of taking and storing up the power of the recoil, so that the force of such recoil is utilized in carrying the gun back to its

normal position. To these ends the gun A is arranged to move endwise in a suitable bearing or support B, that is provided with trunnions b for obvious purposes. To the support are secured one or more cylinders B' . In Figs. 1 and 2 I have shown two such cylinders—one on each side of the support—and in Fig. 1 I have shown the trunnions formed on the said cylinders; but such cylinders may be differently arranged. For instance, a single cylinder on the under side of the gun may be used, or three such cylinders, as may be found necessary. The cylinders contain a piston b^2 , the rod b^3 of which is connected at b^{23} to the breech of the gun, and said rod b^3 is surrounded by a coiled spring b' , one end of which bears against the piston b^2 and the other against the rear end of the cylinder. It is obvious that as the gun recoils the spring b' will take up the force of the recoil, and in this movement of the gun the branch c of the forked arm of lever C will contact with the lug b^4 and throw the lever from the position shown in Fig. 1 to that shown in Fig. 2, thereby operating the breech action. As the gun reaches the limit of its rearward motion, a detent b^5 engages a notch in the gun and locks the same against forward motion under the stress of the springs b' . When the gun-barrel is so locked, the cartridge is inserted and the gun released through the medium of the lever b^6 of the detent b^5 . As the gun is being moved forward under the stress of the springs b' , the branch c^2 of the forked arm of lever C encounters the stop b^4 , thereby throwing the lever from the position shown in Fig. 2 back into the position shown in Fig. 1, thereby closing the breech, when the gun may be fired through the medium of the lever g' or automatically discharged by setting the said lever so that the trigger g will strike the same.

In Fig. 4 I have shown a modified arrangement for adjusting the lever C, so that it may be operated by hand or otherwise. In this construction the lever has a pin or stud c^5 on its short arm C' , that is held by the forked end of a rod d , adapted to slide in a bearing-block D' , provided with a journal or journals d' , mounted in suitable bearings formed on the support B. The rod d has two collars e and e' , that limit its motion in opposite directions. As the gun recoils, the rod is carried from right to left until the collar e strikes the block D' , a further motion of the gun throwing the lever from right to left, the reverse taking place when the gun moves back under the stress of the springs, as will be readily understood. If it is desired to operate the lever C by hand, the rod E is swung on its journal out of engagement with the pin of said lever.

In Figs. 5, 6, and 7 I have shown an arrangement of mechanism for operating the breech-action during the forward movement of the gun in its support B under the stress of a spring or springs. In the construction

shown in said figures the spring barrel or cylinder B', containing the motive spring for the gun, is arranged on the under side of the support B, the piston-rod b^3 being connected with an arm A', depending from the breech of the gun A. The lever C, for actuating the breech-block, is connected by a piston-rod F with a piston f^3 , provided with peripheral grooves f^4 , operating within a cylinder f , a spring f' surrounding the piston-rod F, the ends of said spring bearing, respectively, upon the piston f^3 and the rear end of said cylinder f . As shown, the piston-rod is composed of two telescopic sections f^2 f^{22} . When in its normal position (shown in full lines in Fig. 5) the lever C is locked against movement by a catch-lever L, held in engagement with the short arm C' of said lever C by means of a spring l^4 . The lever L is further provided with a locking-shoulder l' , adapted to engage with the short arm or catch b^5 of the locking-lever b^6 , fulcrumed at the rear end of the support B, and by means of which the gun is locked against forward motion. As the gun moves back under the recoil, the lever C is held against motion by the locking-lever L, while the motor-spring for the gun in cylinder B', as well as the motor-spring for the lever C in cylinder or barrel f , is compressed. As the gun reaches the limit of its recoil and moves forward again, the nose b^5 of lever b^6 catches on the shoulder l' of lever L, and this locks the gun against motion; but, since the stress of the motive spring for the gun is greater than that for the lever C, the locking-lever L for said lever C will be disengaged by the contact with the locking-nose b^5 of lever b^6 , so that the spring f' will be free to tilt the lever C from the position shown in dotted and in full lines, respectively, in Figs. 5 and 7 to open the breech and set the firing mechanism, the gun being still held against forward motion by the engagement of lever b^6 with lever L, the motion of said lever from left to right being limited by the stop l , above referred to. On the other hand, the motion of the lever b^6 from right to left is limited by a stop b^{16} . The gun may now be loaded and the lever b^6 manipulated to disengage its nose b^5 from the locking-shoulder l' of lever L. The gun now moves forward under the stress of its motor-spring, and as it is about to reach the limit of its forward motion the arm C' of lever C strikes the stud b^4 on the support B, whereby said lever is again moved into its normal position, thereby closing the breech, when the gun may be fired by hand or automatically, as described in reference to Fig. 2. The reversal of the lever C may be wholly effected by the stress of the spring f' or by the vacuum produced in front of the piston f^3 within its cylinder, and for this purpose the piston is fitted accurately within the cylinder f and is provided with annular grooves. In the head of the piston-cylinder is arranged a spring-loaded valve f^4 , (see Fig. 5,) that opens out-

wardly, so that any air that may get in front of the piston will be driven out during the return movement thereof. In practice I preferably combine both these means, as shown in said Fig. 5.

In order to adapt the lever C for operation by hand when the gun is in the position for firing, the lug b^4 has an endwise motion in bearings, and may be fixed in two positions by means of a pin b^{44} . When in the position shown in Fig. 9 the lug will project sufficiently from the outer face of the gun-support B to be struck by the short arm C' of lever C, but may be drawn in so that its outer face will lie flush with the like face of the gun-support, as shown in Fig. 10, so that the lever C may be operated by hand, as will be readily understood. If the piston f^3 were connected with lever C by a rigid rod, said lever could not be manipulated. By making the piston-rod of telescopic sections the section f^2 will move into section f^{22} when the lever C is moved from the position shown in full lines to that shown in dotted lines in Fig. 5.

It will be obvious to any one skilled in the arts that, instead of a spring-actuated piston-rod for moving the gun from its recoil position or for reversing the lever C, a piston operated by a compressible fluid may be used and the same results obtained.

In the construction of gun shown and described in reference to Figs. 5, 6, and 7 the trigger may be operated by hand or automatically in firing, as described and shown in reference to Figs. 1 and 2.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a gun of the class described, the combination, with the gun and a lever connected therewith and adapted to operate the breech mechanism, of a support in which the gun is free to move endwise and with which said gun is adapted to revolve on a horizontal axis, a power-accumulator connecting the support with the gun and adapted to take up and accumulate the power exerted by the recoil of said gun and carry the same back into its normal position by the power accumulated, and a reversing device in the path of the lever for reversing the position thereof by the motion of the gun, substantially as and for the purposes specified.

2. In a gun of the class described, the combination, with the gun and a lever connected therewith and adapted to operate the breech mechanism, of a support in which the gun is free to move endwise and with which said gun is adapted to revolve on a horizontal axis, a power-accumulator connecting the support with the gun and adapted to take up and accumulate the power exerted by the recoil of said gun and carry the same back, a reversing device in the path of the lever for reversing the position thereof by the motion of the gun, and a detent for locking the gun

against motion from its recoil to its normal position under the accumulated power, substantially as and for the purposes specified.

3. In a gun of the class described, the combination, with the gun and a lever connected therewith and adapted to operate the breech mechanism, of a support in which the gun has free endwise motion and with which said gun is adapted to revolve on a horizontal axis, a power-accumulator connecting the support with the gun and adapted to take up and accumulate the power exerted by the recoil of said gun and carry the same back into its normal position, and a tripping device in the path of the lever, adapted to reverse the position thereof during the recoil of the gun and to return said lever to its normal position as the gun is moved back by the accumulated power, substantially as and for the purpose specified.

4. In a gun of the class described, the combination, with the gun and a lever adapted to operate the breech mechanism fulcrumed on the gun, of a support in which the gun has free endwise motion and a tripping device in the path of the lever adapted to trip the same and reverse its position, said tripping device and lever being so arranged relatively to each other as to co-operate or to adapt the lever for operation independently of the tripping device, substantially as and for the purposes specified.

5. In a gun of the class described, the combination, with the gun and the trigger for the firing mechanism, of a support in which the said gun has a free endwise movement and a trigger-actuating lever provided on said support constructed and adapted to engage the trigger to operate the same automatically or otherwise, as described.

6. In a gun of the class described, the combination, with the gun, a lever fulcrumed thereto and adapted to operate the breech mechanism, and a detent adapted to lock the lever in a given position, of a support in which the gun has free endwise motion, a power-accumulator on said support adapted to take up and accumulate power during the recoil of the gun, a connection between the moving element of said power-accumulator and lever, and a tripping-lever adapted to trip the detent to disengage the lever, whereby the latter is reversed by the power accumulated or stored up during said recoil of the gun, substantially as described.

7. In a gun of the class described, the combination, with the gun, a lever fulcrumed thereto and adapted to operate the breech mechanism, and a detent adapted to lock the lever in a given position, of a support in which the gun has free endwise motion, a power-accumulator on said support adapted to take up and accumulate power during the recoil of the gun, a connection between the moving element of said power-accumulator and lever, and a tripping-lever adapted to trip the detent to disengage the lever, whereby the lat-

ter is reversed by the power accumulated or stored up during said recoil of the gun, and a tripping device in the path of the lever for operating the breech mechanism, adapted to trip the lever and move it back into its normal position when the gun is moved from its recoil into its normal position, substantially as described.

8. In a gun of the class described, the combination, with the gun, a lever fulcrumed thereto and adapted to operate the breech mechanism, and a detent adapted to lock the lever in a given position, of a support in which the gun has free endwise motion, a power-accumulator or storing device on said support, a connection between a moving element of said accumulator and the gun, a power-accumulator or storage device, a connection between a moving element thereof and the lever, said accumulators or storage devices being adapted to take up and accumulate or store the power exerted by the gun in its recoil, and a locking and tripping lever on the support adapted to engage the detent, release the lever for operating the breech mechanism, and lock the barrel against motion under the stored-up power, whereby the lever is reversed to operate the breech mechanism by the power-accumulator connected with said lever before or during a portion of the forward movement of the gun, substantially as and for the purposes specified.

9. In a gun of the class described, the combination, with the gun, a lever fulcrumed thereto and adapted to operate the breech mechanism, and a detent adapted to lock the lever in a given position, of a support in which the gun has free endwise motion, a power-accumulator or storage device on said support, a connection between a moving element of said accumulator and the gun, a power-accumulator or storage device, a connection between a moving element thereof and the lever, said accumulators or storage devices being adapted to take up and accumulate or store the power exerted by the gun in its recoil, a locking and tripping lever on the support adapted to engage the detent, release the lever for operating the breech mechanism, and lock the barrel against motion under the stored-up power, whereby the lever is reversed to operate the breech mechanism by the power-accumulator connected with said lever before or during a portion of the forward movement of the gun, and a tripping device in the path of the lever for operating the breech mechanism, adapted to trip the same and return it to its normal position during said forward movement of the gun, substantially as and for the purpose specified.

10. In a gun of the class described, the combination, with the gun, a lever fulcrumed thereto and adapted to operate the breech mechanism, and a detent adapted to lock the lever in a given position, of a support in which the gun has free endwise motion, a power-accumulator or storage device on said support,

a connection between a moving element of said accumulator and the gun, a power-accumulator or storage device, a connection between a moving element thereof and the lever, said accumulators or storage devices being adapted to take up and accumulate or store the power exerted by the gun in its recoil, a locking and tripping lever on the support adapted to engage the detent, release the lever for operating the breech mechanism, and lock the barrel against motion under the stored-up power, whereby the lever is reversed to operate the breech mechanism by the power-accumulator connected with said lever before or during a portion of the forward movement of the gun, and a tripping device in the path of the lever for operating the breech mechanism, adapted to trip the same and return it to its normal position during said forward movement of the gun, said tripping device being adapted to be moved out of the path of said lever, substantially as and for the purposes specified.

11. The combination, with the gun, the operating-lever C, and the detent L, adapted to lock said lever into a given position, of the support B, in which said gun is movable endwise, the piston-cylinders B' and f on said support, their pistons and piston-rods connected, respectively, with the gun and lever C, and a tripping device on said support to trip the detent L and release the operating-lever, substantially as and for the purposes specified.

12. The combination, with the gun, the operating-lever C, and the detent L, adapted to lock said lever into a given position, of the support B, in which said gun is movable endwise, the piston-cylinders B' and f on said support, their pistons and piston-rods connected, respectively, with the gun and lever C, and a spring-actuated tripping and locking lever b⁶, adapted to engage the detent L to release the lever C and lock the gun against forward motion, substantially as and for the purposes specified.

13. The combination, with the endwise-movable gun, its trigger g, and the support B for the said gun, of the spring-actuated trigger-lever g' on said support and a setting device for setting the last-named lever in its operating position, said parts being arranged for operation substantially as described.

14. The combination, with the endwise-movable gun and the lever C fulcrumed thereon, of a tripping device consisting of a rod E, provided with stop-collars e and e', one end of which rod is hooked to a pin on the lever

and an abutment revoluble in fixed bearings, in which the said rod has free endwise motion, substantially as and for the purposes specified.

15. The combination, with the endwise-movable gun and the lever C fulcrumed thereon, of the stationary support B for the gun, a reversing mechanism comprising a piston-cylinder secured to the stationary support and having in its outer head a check-valve, a spring-actuated piston, and a connection between said piston and the lever C, whereby the position of the lever is reversed during the endwise movements of the gun, substantially as and for the purposes specified.

16. The combination, with the endwise-movable gun and the lever C fulcrumed thereon, of the stationary support B for the gun, a reversing mechanism comprising a piston-cylinder connected therewith, a piston movable within the cylinder, a telescopic piston-rod connecting the piston with the lever, and the adjustable tripping-lug b⁴, arranged in the path of the lever C on said stationary support, said parts being arranged for co-operation substantially as and for the purposes specified.

17. The combination, with the endwise-movable gun and the lever C fulcrumed thereon, of the stationary support B for the gun, a reversing mechanism comprising a piston-cylinder open at one end and closed at the other, secured to said support, and having an outwardly-opening check-valve in the closed end, a spring-actuated piston fitting air-tight within the cylinder, said piston being connected with the lever C, whereby said lever is reversed during the endwise movements of the gun, substantially as and for the purposes specified.

18. The combination, with the endwise-movable gun and the lever C, of the support B for the gun, a piston-cylinder open at one end and closed at the other, secured to said support, and having an outwardly-opening check-valve in the closed end, a spring-actuated piston fitting air-tight within the cylinder, said piston being connected with the lever C, a telescopic piston-rod connected with the lever C, and the adjustable tripping-stud b⁴ on the support for the gun, substantially as and for the purposes specified.

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

EMIL RITTER V. SKODA.

Witnesses:

HUGO JULIEN,
ADOLPH FISCHER.