

W. GARDNER.
MACHINE-GUNS.

No. 174,130.

Patented Feb. 29, 1876.

Fig. 1.

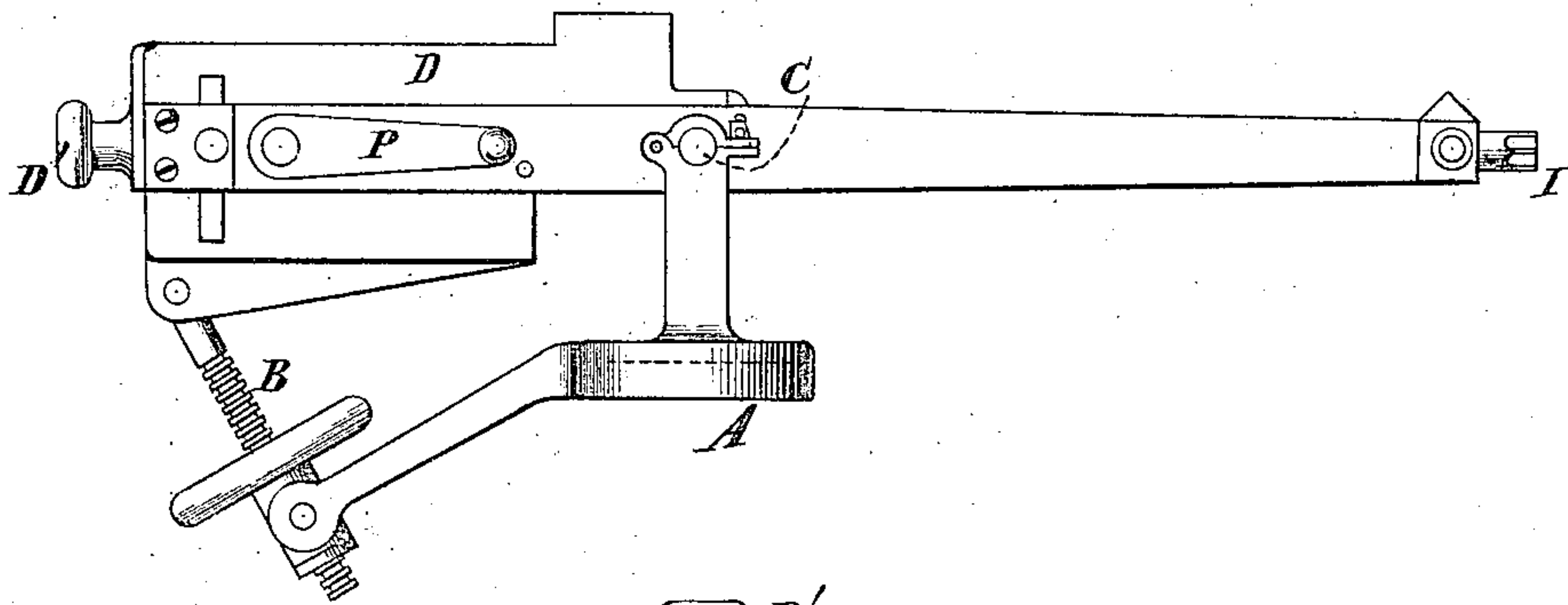


Fig. 2.

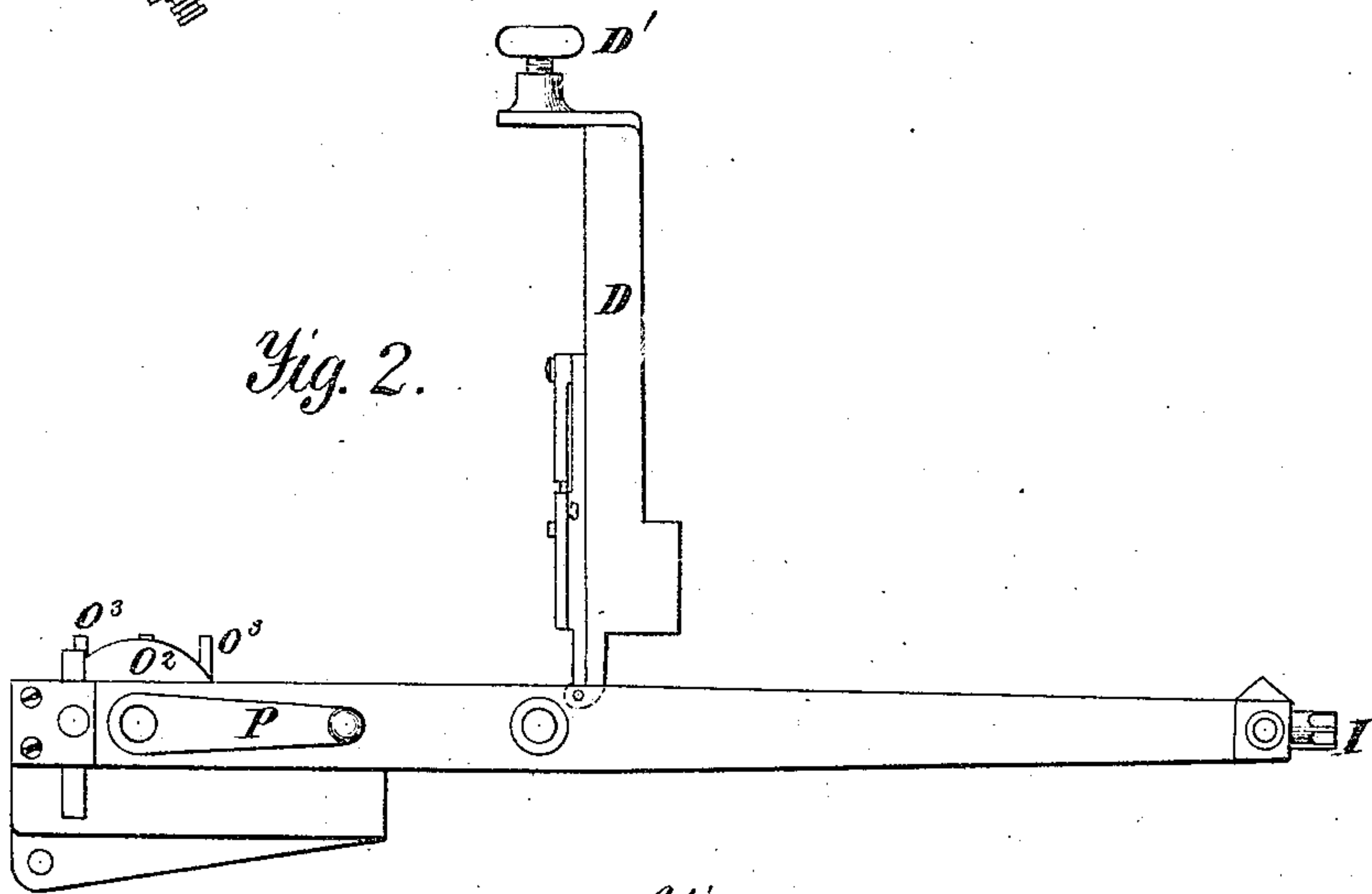
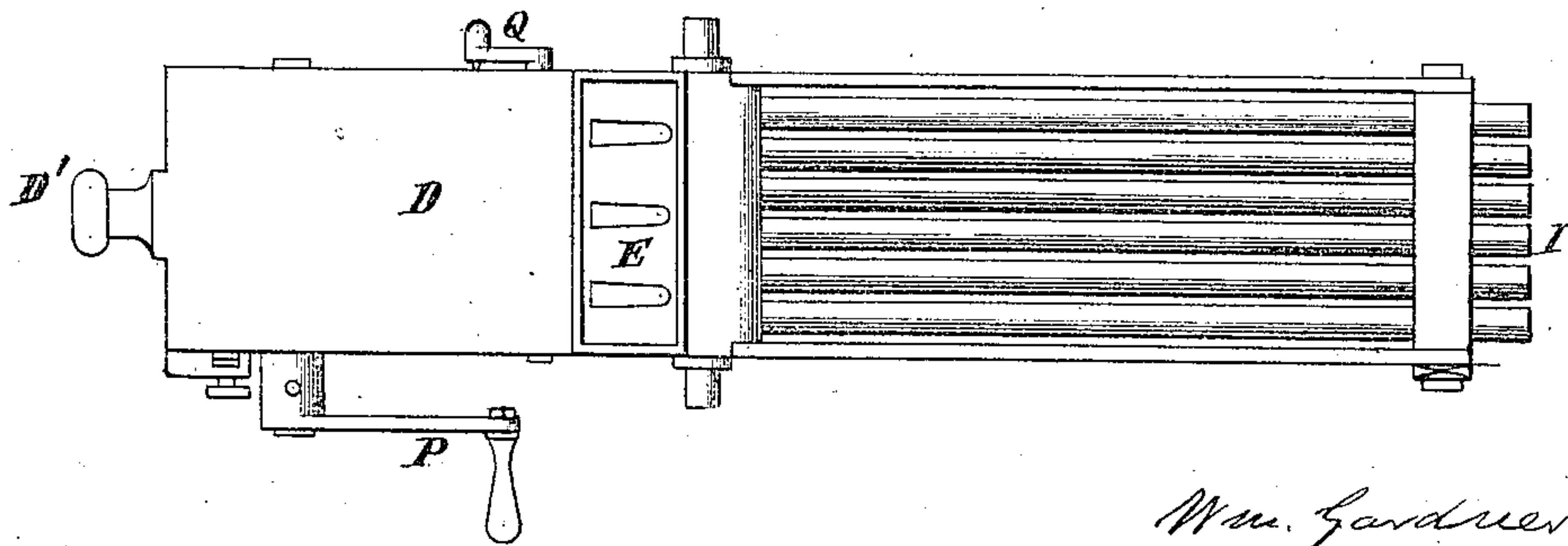


Fig. 3.



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Fig. 4.

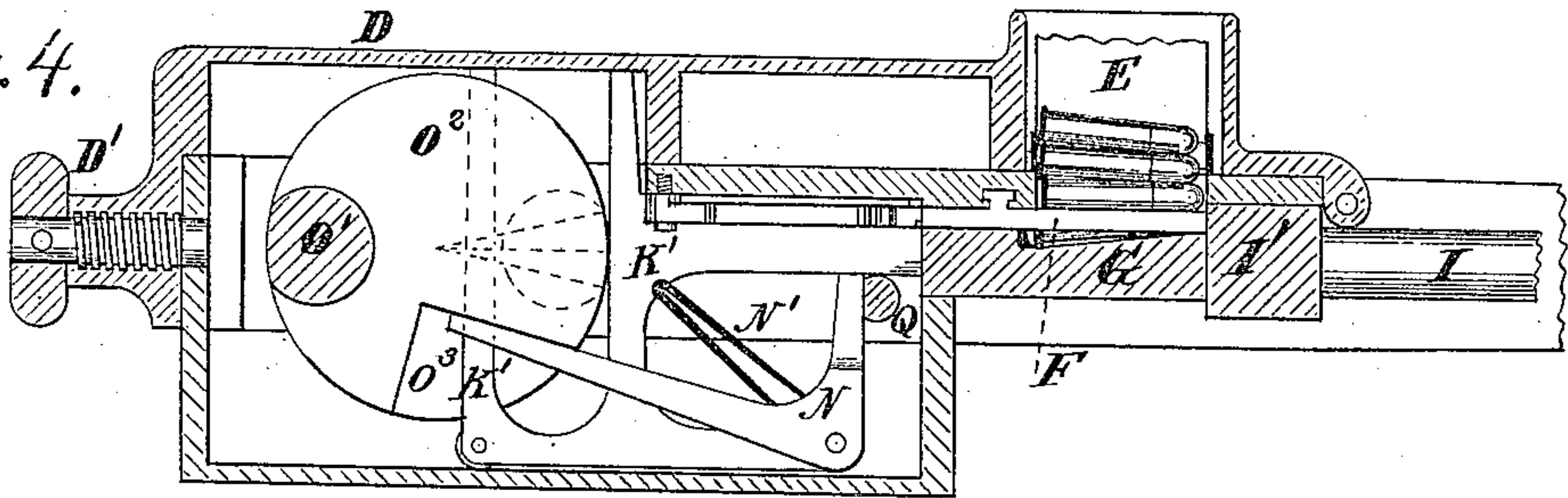


Fig. 5.

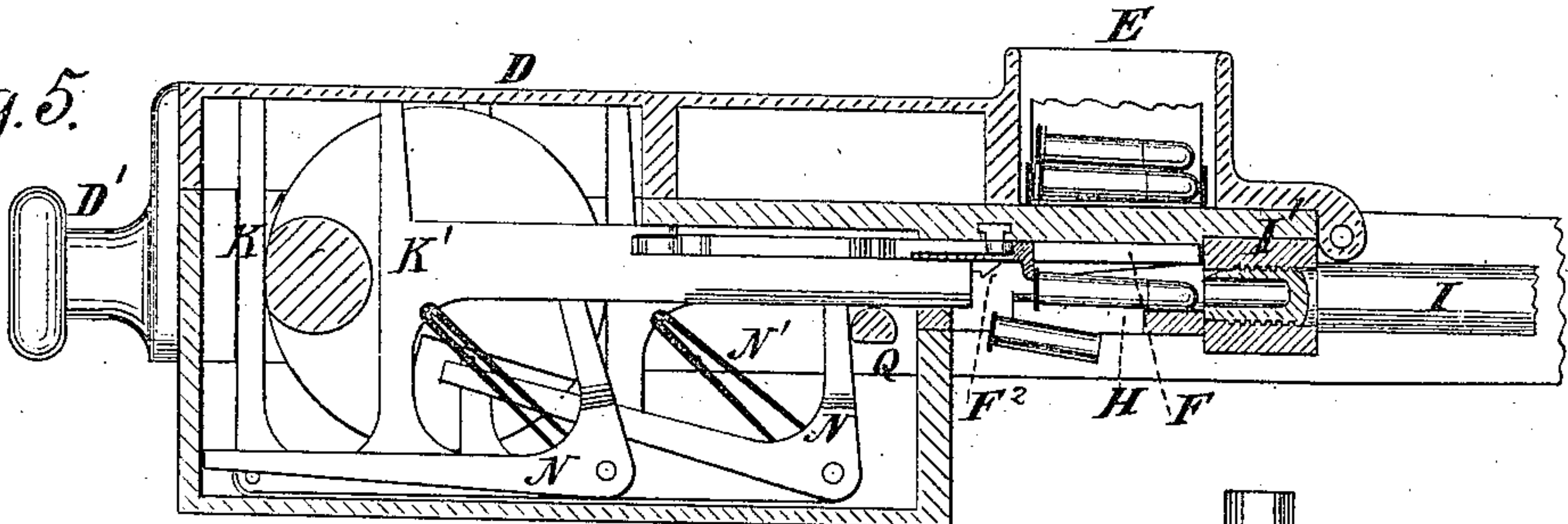


Fig. 6.

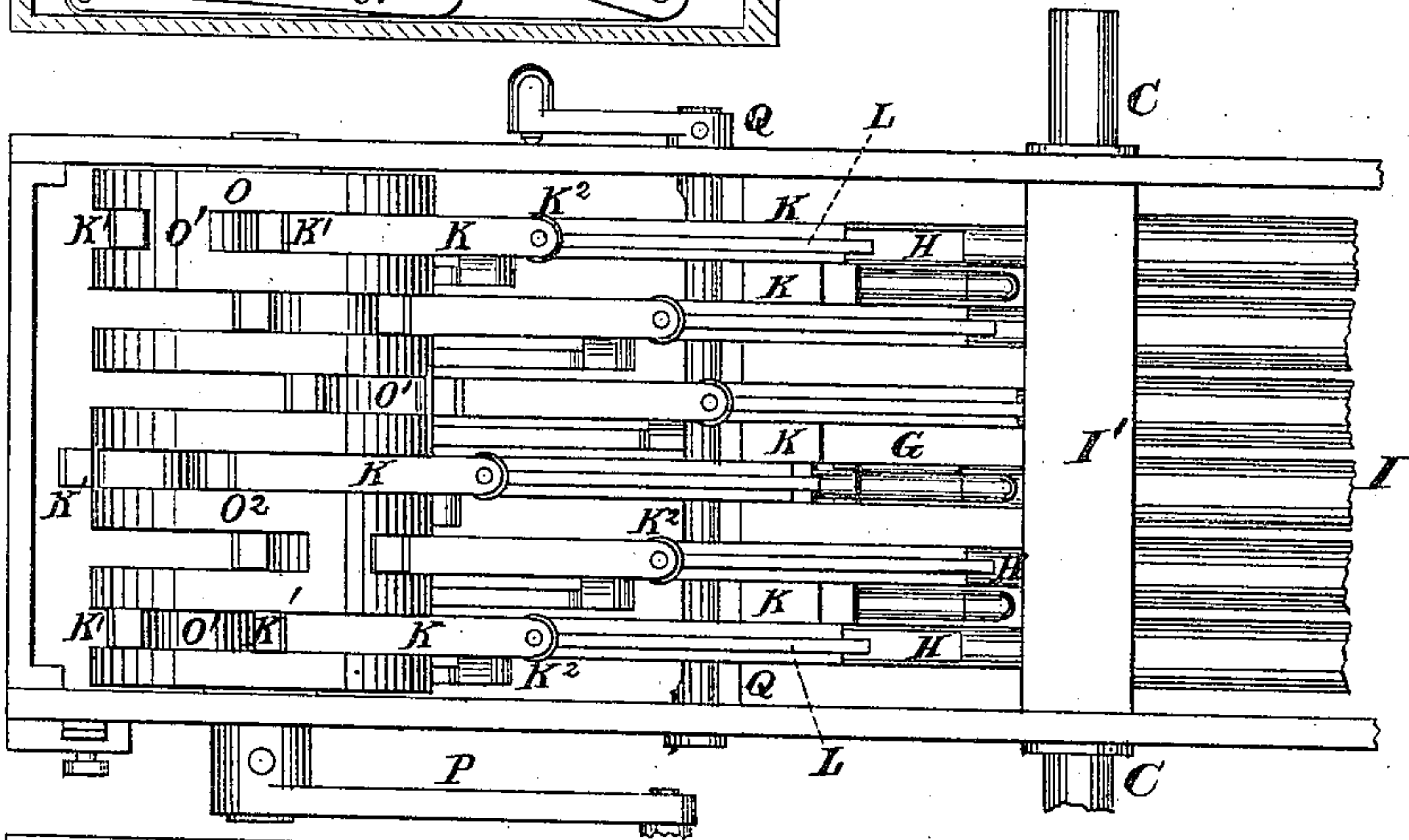
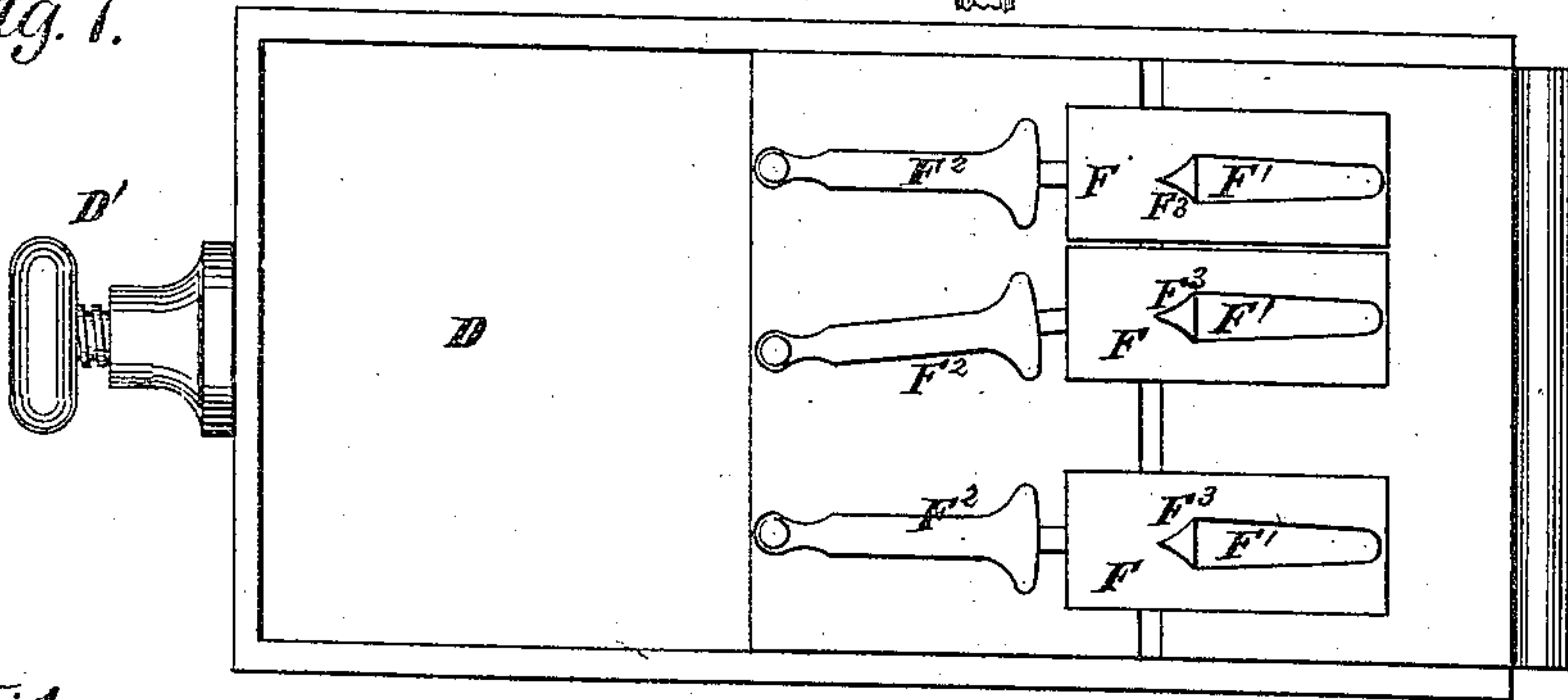


Fig. 7.



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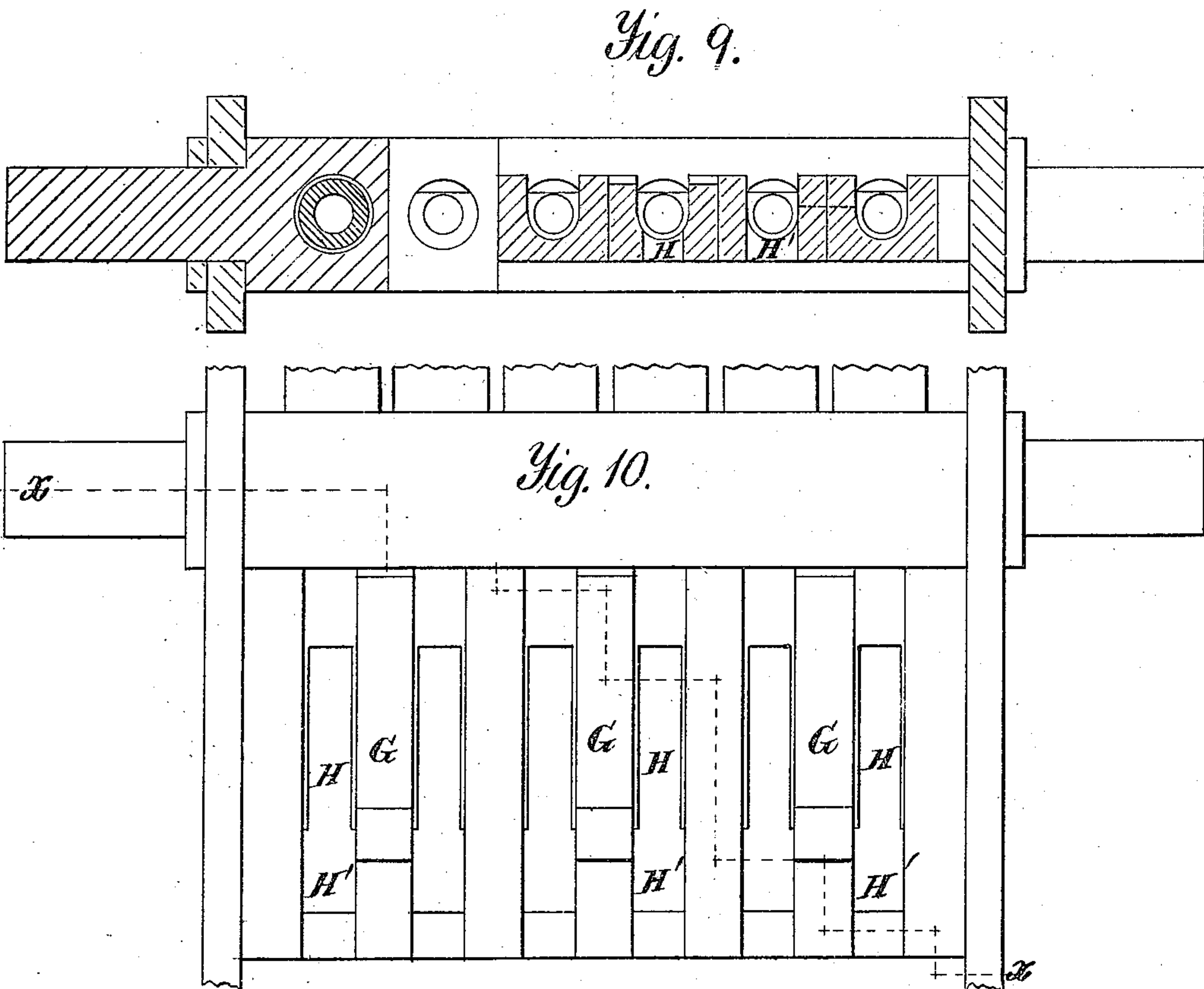
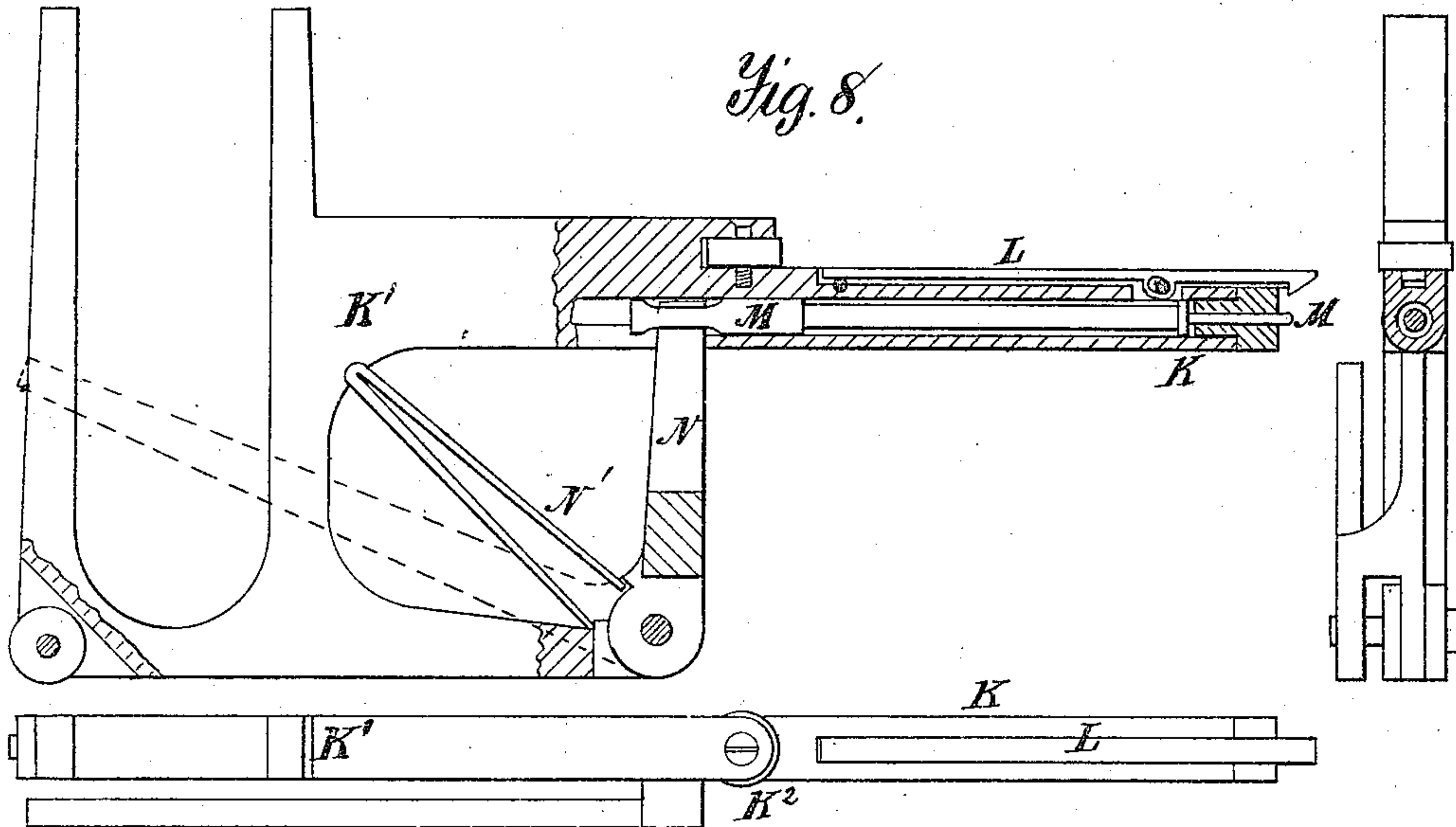
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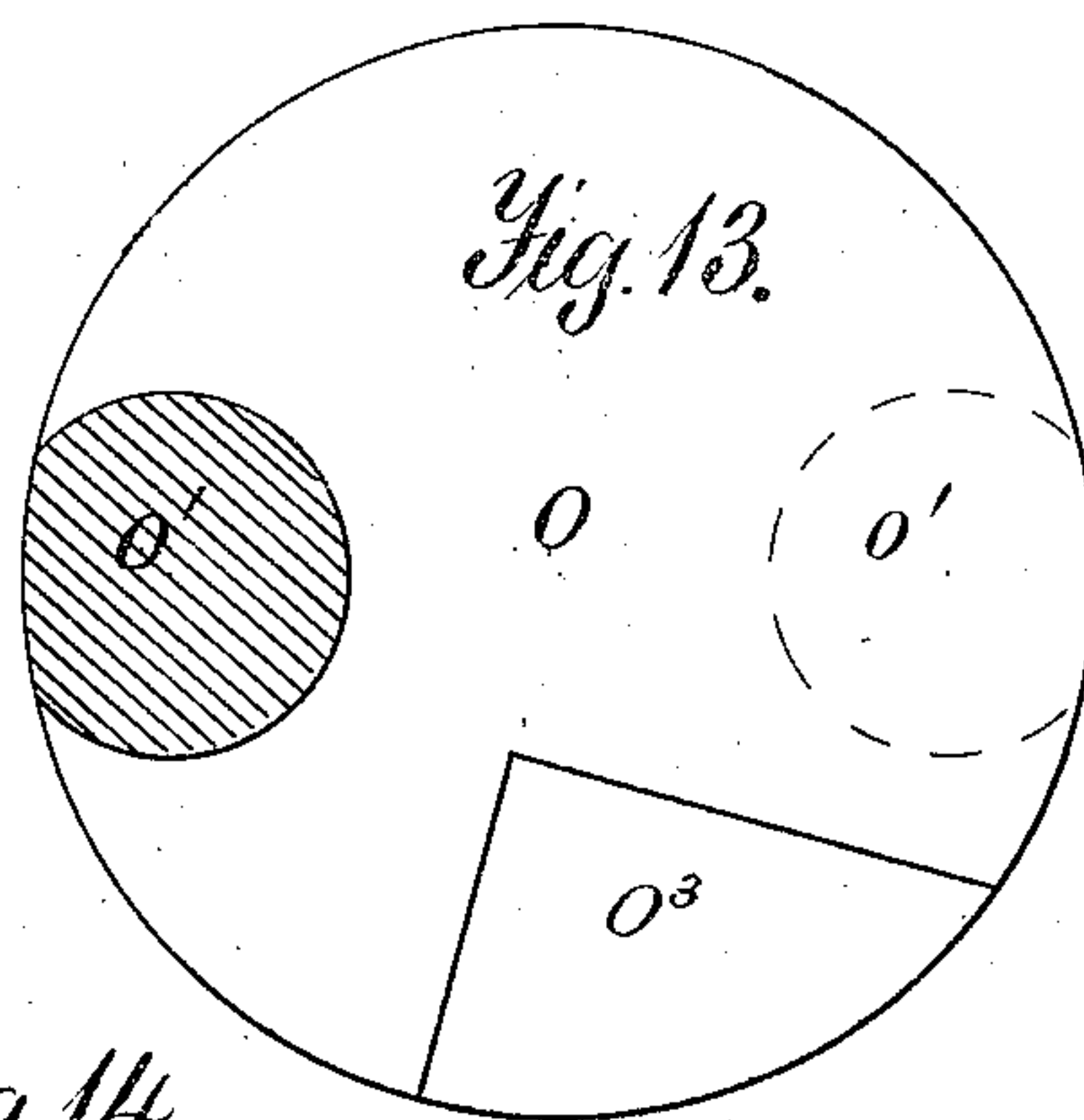
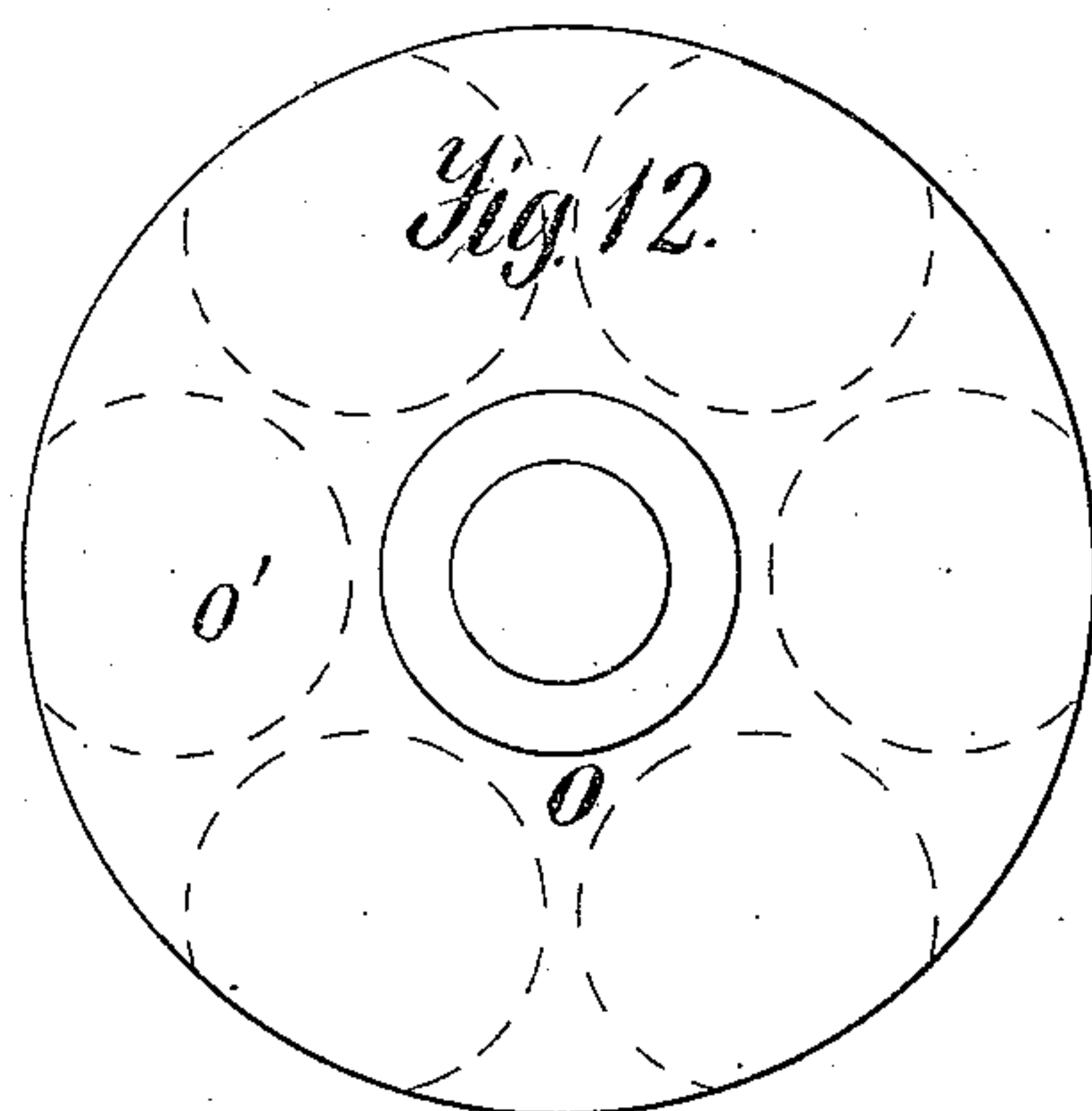
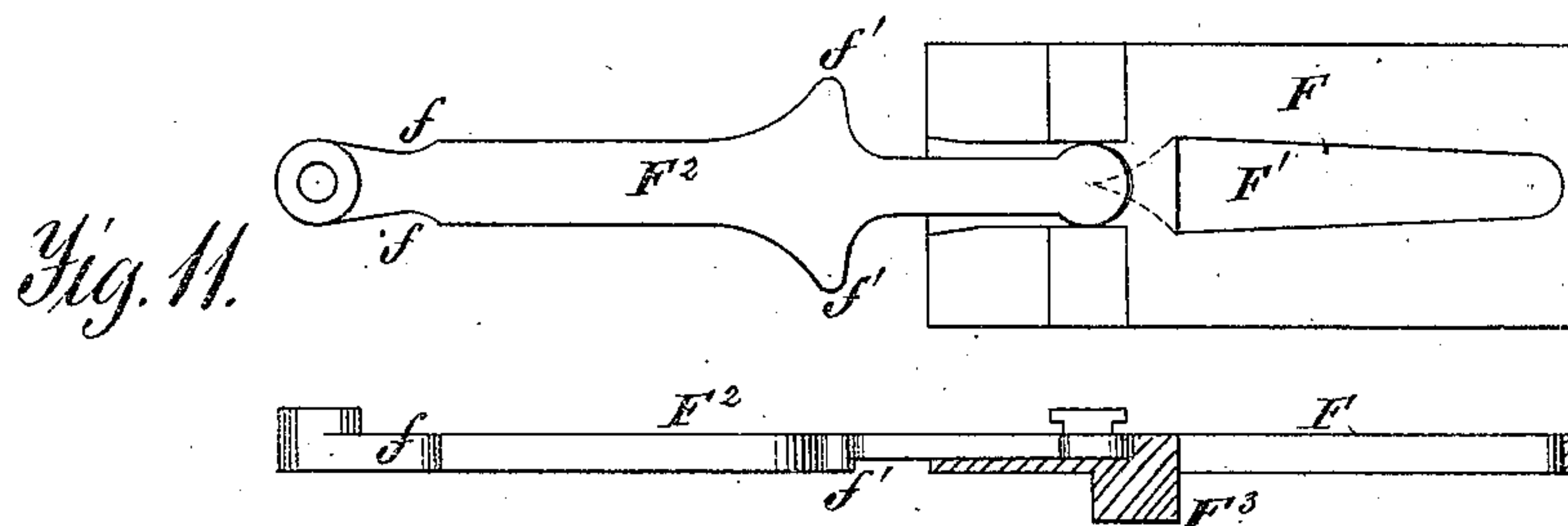
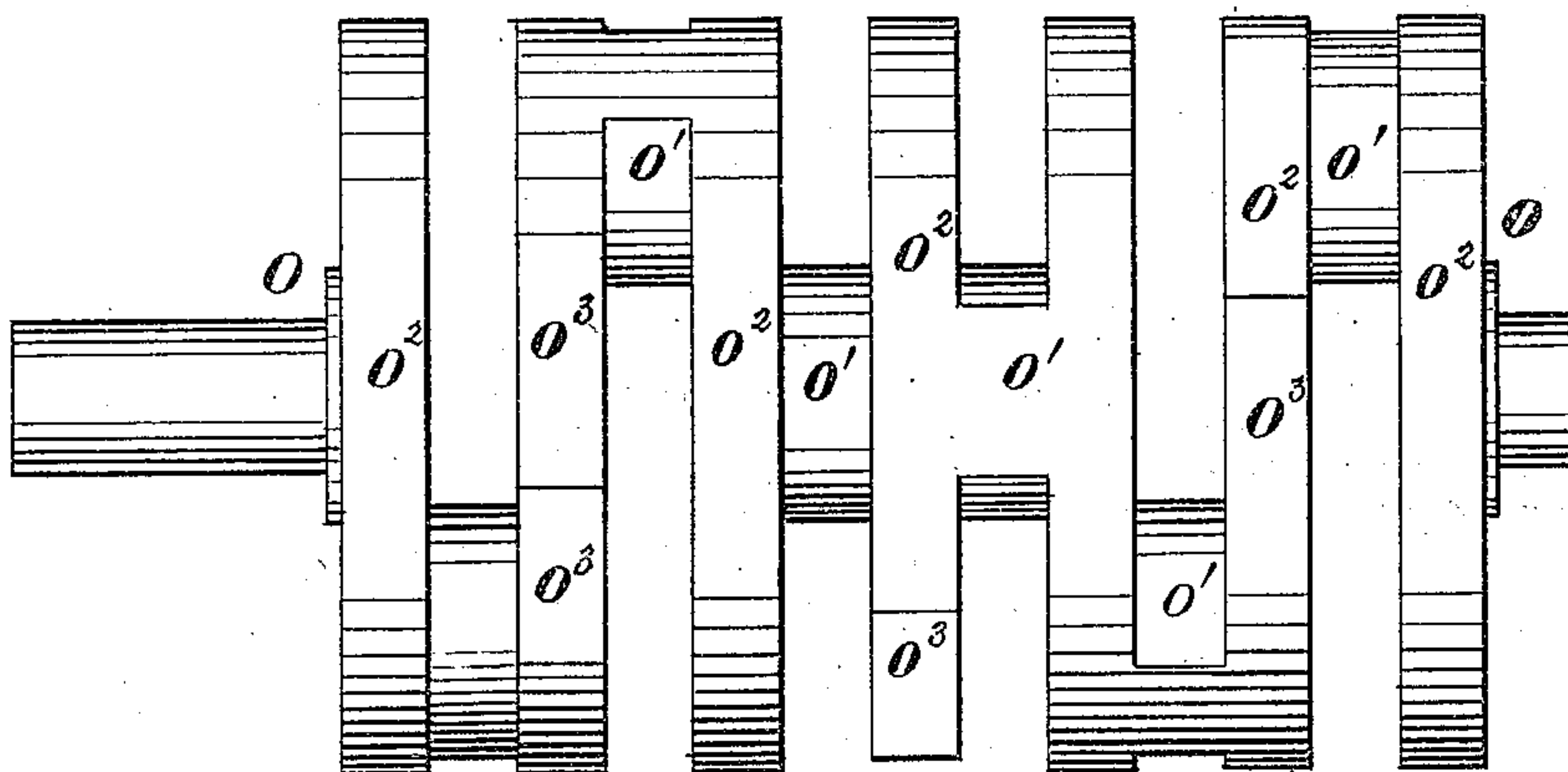


Fig. 14.



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UNITED STATES PATENT OFFICE.

WILLIAM GARDNER, OF TOLEDO, OHIO.

IMPROVEMENT IN MACHINE-GUNS.

Specification forming part of Letters Patent No. 174,130, dated February 29, 1876; application filed August 10, 1875.

To all whom it may concern:

Be it known that I, WILLIAM GARDNER, of Toledo, in the county of Lucas and State of Ohio, have invented a new and useful Improvement in Machine-Guns, of which the following is a specification:

This invention relates to that class of guns in which the operation of loading and firing is carried on by means of mechanism put in motion by any convenient prime mover. The character of the invention will be defined in the following description and claims.

In the annexed drawings, making part of this specification, Figure 1 is a side elevation. Fig. 2 is a side elevation showing the gun with top of the casing raised. Fig. 3 is a top view, illustrating the use of six barrels in the gun. Fig. 4 is a longitudinal central and vertical section. Fig. 5 is a longitudinal vertical section, showing the lock attached to the mechanism shown in Fig. 4. Fig. 6 is a plan of the firing mechanism as seen when the top of the casing is removed. Fig. 7 is a bottom view of the top of the casing. Fig. 8 is an elevation, showing the details of the construction of the lock. Fig. 9 is a transverse section on the line *xx* of Fig. 10. Fig. 10 is a plan of the grooved block into which the cartridges are fed. Fig. 11 is a plan of the perforated slide and eccentric lever, and an elevation of the same. Fig. 12 is an end view of the crank and firing-cam. Fig. 13 is an elevation showing the relative position of the notch and crank. Fig. 14 is a front elevation of the same.

The same letters are employed in all the figures in the designation of identical parts.

The gun may be constructed with any number of barrels, in sets of two. I have illustrated it with six. More or less may be employed, but always in even numbers, as it will be more economical to make them work in pairs; though single barrels could be operated. I will describe the mechanism for operating a pair of barrels.

The gun is supported upon the base A, which may be attached to a gun-carriage, or to any fixed or movable support. The barrels are placed parallel to one another in a frame, and are adjusted altogether as one piece. The elevation is determined by the screw B, the frame turning upon trunnions C, and horizontally on a pivot under the center of the base A. The mechanism is inclosed in a tight

casing, by which it is protected, the barrels projecting in front of the case. The top D is hinged, so that it may be lifted off, and, when down, is secured by the set-screw D', or in other convenient manner. The casing is composed of two side pieces, which, as illustrated in the drawings, extend the entire length of the gun, and support the barrels, near their muzzles, by a cross-piece shown at I², Fig. 3. These side pieces, being separate, may be made of plates of wrought-iron or steel. They are supported on the cast block I¹, which has trunnions turned upon its ends outside the side pieces, and is bored to receive the ends of the barrels, which are screwed into it. By this construction of the frame the parts are perfectly supported, and the frame may be reduced in weight, and yet its strength preserved.

E is the hopper, in which the metallic cartridges are placed in due order. In the bottom of each hopper (there being one to each pair of barrels) is a hole, having below it an oscillating plate, F, also with a hole in the middle large enough to permit a cartridge to pass through it. When the two holes are in register, a cartridge will fall into the slot in plate F, shown at F¹, and lie upon the central bar G, which stands between the chambers, which are immediately behind the barrels. The plate F slides laterally in dovetails in the bottom plate of the hopper, and it is thrown from side to side by the oscillating bar F², shaped as shown, which is actuated by the friction-wheels K², attached to the reciprocating bar K, striking against the shoulders on the sides of the bar F². The friction-wheel first striking the shoulder *f* near the pivot throws the hole F¹ into register with the one in the bottom-plate of the hopper. It remains stationary while the wheel is traversing the straight portion of the bar F², and when it encounters the shoulder *f'* the plate will be pushed to one side, causing the cartridge to drop into its proper chamber. The return movement of the plate is caused by the similar action of the alternating plunger on the other side. When the cartridge is received in its chamber it falls upon a slotted plate, H. The form and position of this plate is such that its solid part will receive the point of the cartridge, and its flanged head will be supported upon the parallel sides of the slot,

which is not wide enough to permit the head to pass at this point, where it is received when it falls from the hopper. But in rear the slot is wider, as shown at H', so that at this point the cartridge will fall through. There is a stop, F³, on the under side of plate F, which shuts across the cartridge chamber and prevents the cartridge from sliding back and falling out of the slot when firing at an elevation, until the plunger K is pushed forward so far as to close the portion H' of the slot, so as to prevent the escape of the cartridge when it is drawn aside so as not to interfere with the movement of the plunger. I I are the barrels, placed immediately in front of the cartridge-chamber, into which their points are pushed, and they are fired by the following mechanism: K K are the reciprocating plungers, which slide to and from the barrels in the cartridge-chamber. Going forward, they strike the end of the cartridge lying on plate H, and push it forward into the barrel; when it is pushed home, the notched head of the extractor L engages the flange on the head of the cartridge, and the hammer is made to strike against the firing-pin M and discharge the cartridge. The return movement of the plunger draws back the cartridge held by the extractor, and when the head reaches the wide slot H' it will fall through the opening onto the ground, leaving the chamber open to receive another cartridge from the hopper.

The plunger is actuated by a crank, O¹, of which there is one for each plunger, as well as a cam-wheel, Q² notched at O³, which operates the hammer. The rear end of the plunger is U-formed, as shown at K¹, and embraces the crank O¹. This crank is flattened on one side in such manner that when that side is in action, which occurs just when the cartridge is pushed home, the crank will communicate no motion to the plunger until the cartridge has been fired. The recoil will be sustained by this flattened portion of the crank or cam which holds the plunger stationary during the period of firing.

The hammer is a bell-crank lever, N, the upper end of which is projected forward by the spring N', and the long arm rests against the under face of the cam O², which holds back the hammer until the long arm falls into the notch O³, when the spring throws the hammer sharply forward against the rear end of the firing pin M, driving it against and exploding the cartridge. The cams and cranks are rotated by the crank P, or by belt and pulley.

In order to provide against accidents, a flattened shaft, Q, is placed in front of the hammer in such position that if the part of greatest diameter is placed opposite the hammer it will intercept the blow before it can project the firing pin; but if the flattened side is presented, the hammer will have its full throw and force the firing pin out beyond the end of the reciprocating plunger and against the cartridge. The end of the hammer enters

a slot in the rear end of the firing-pin, which moves in both directions with it through a space determined by the position of the shaft Q.

The trunnions C are extensions of a block, I', into which the barrels are screwed at the breech, and it also forms part of the frame and one end of the casing.

The relative arrangement of the cranks and cams determines the order of fire, which may be consecutive or in volleys of all or part of the barrels as preferred.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In the frame of a machine-gun, in combination with the independent side pieces, the block I' into which the barrels are screwed, the ends of said block passing through and supporting the side pieces from the trunnions, substantially as set forth.

2. In combination with the casing and firing mechanism of a machine-gun, the hinged arm D carrying the hopper and cartridge feed-plate F, substantially as shown.

3. In a gun in which the barrels are arranged in pairs, the reciprocating feed-plate, slotted as shown, in combination with the hopper and cartridge-chambers, and intermediate partitions for feeding the cartridges alternately to the chambers, substantially as set forth.

4. In combination with the reciprocating feed-plate the arm F², shouldered as shown, and actuated by the plungers alternately, substantially as set forth.

5. In combination with the cartridge chamber, having the slots H H' of different widths, the reciprocating feed-plate F, and projecting point F³, for retaining the cartridges during part of the forward movement of the plungers, substantially as described.

6. In combination with the slots of varying widths, as shown at H H', the cartridge-extractor for discharging the empty shell, substantially as described.

7. In combination with the partition G, the narrow slot H, placed in such relation thereto that a cartridge falling from the partition will lie with its head upon the narrow slot and its point on the solid end of the bottom of the cartridge-chamber, substantially as described.

8. In combination with the barrel of a machine-gun, the reciprocating plunger K when constructed with the U-formed bearing for the actuating crank, substantially as set forth.

9. In combination with the plunger K and hammer N, the cranks O¹ and cams O² with notches O³, constructed in one piece, to be operated simultaneously by the crank P, substantially as set forth.

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

WM. GARDNER.

Witnesses:

THOMAS C. CONNOLLY,
A. RUPPERT.