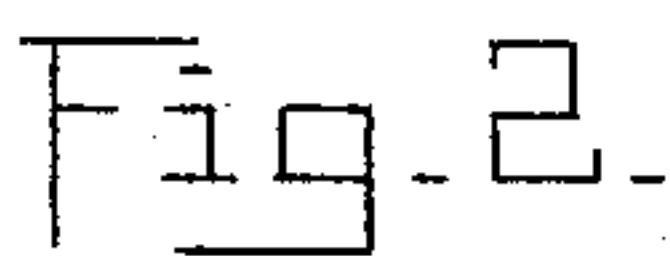
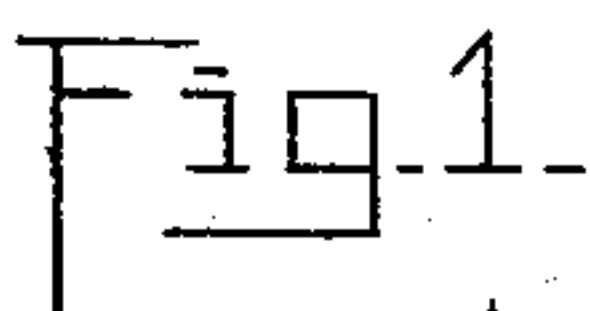


3 Sheets—Sheet 1.

No. 570,878.

Patented Nov. 3, 1896.



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J. F. McELROY.
MULTIPLE SERIES CONTROLLER.

No. 570,878.

Patented Nov. 3, 1896.

Fig. 3.

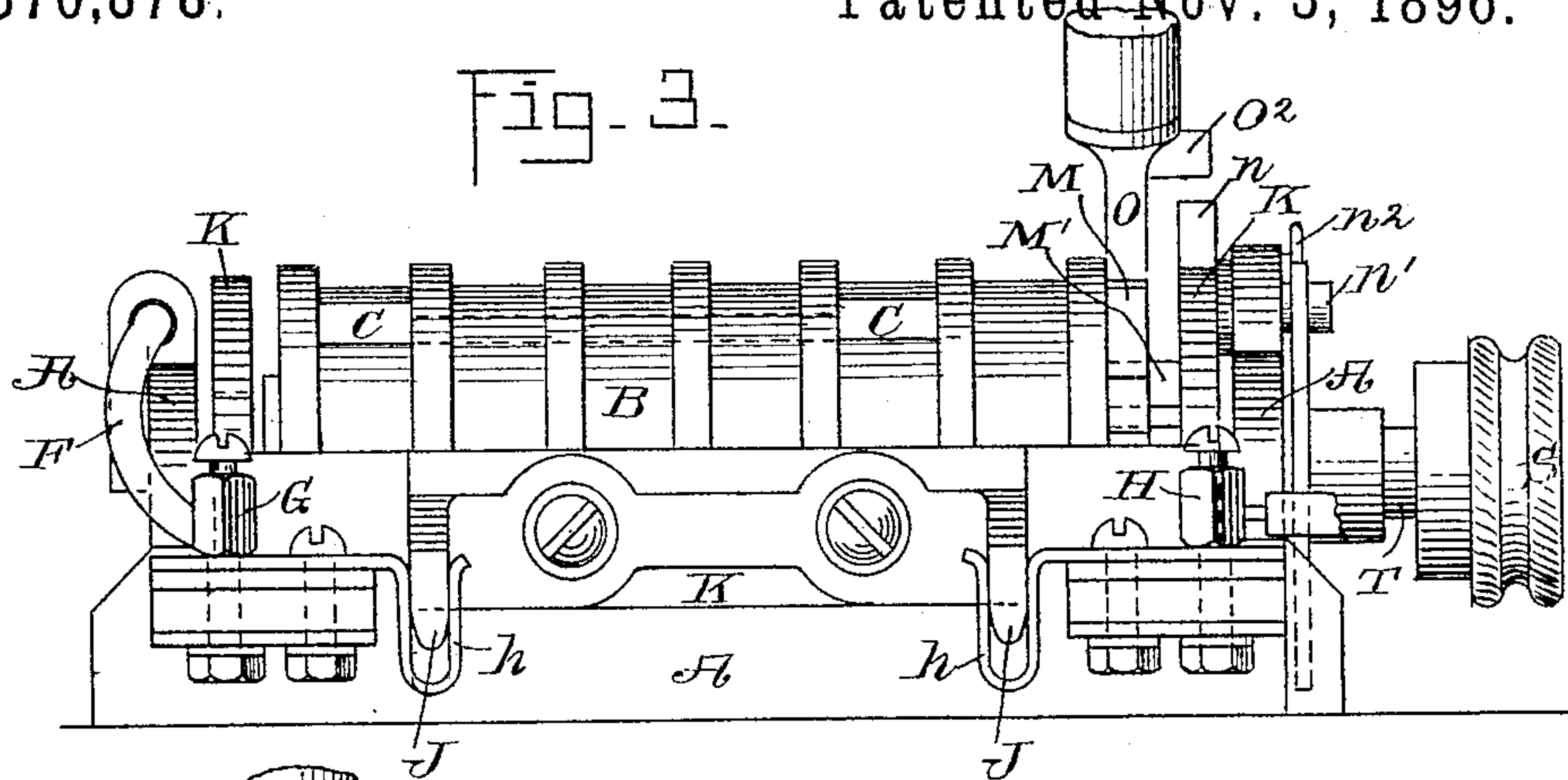


Fig. 4.

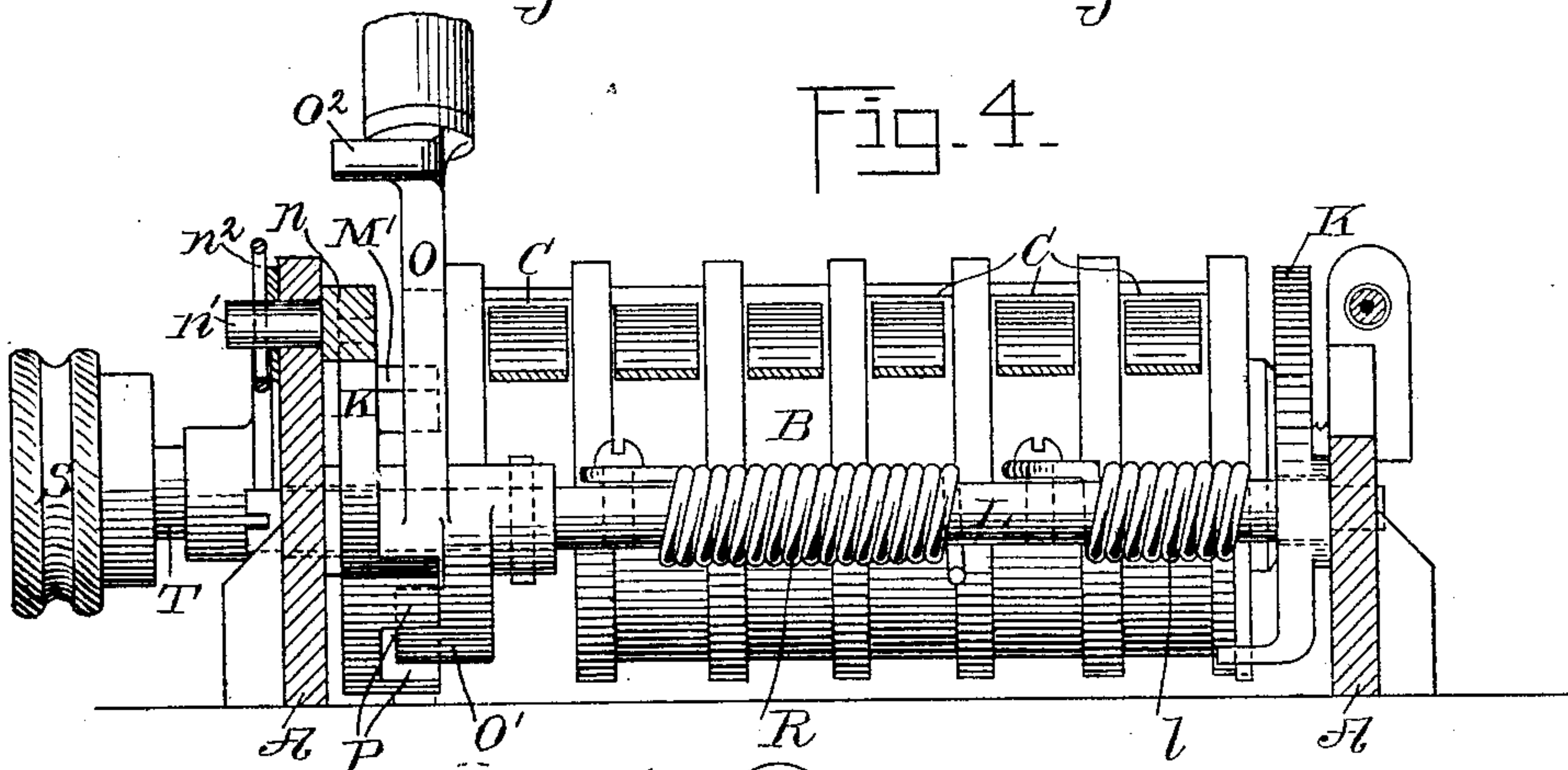
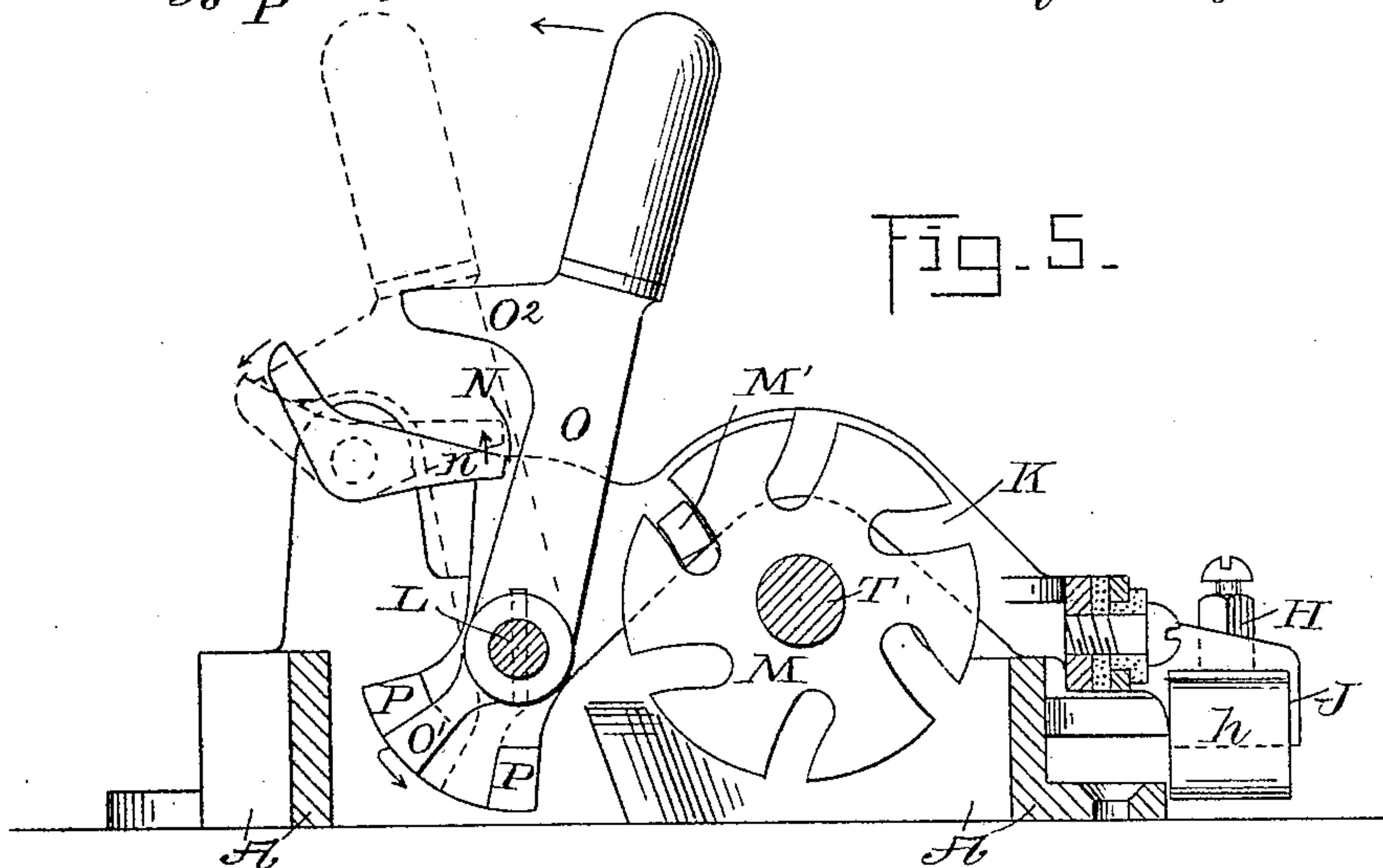


Fig. 5.



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Fig. 6.

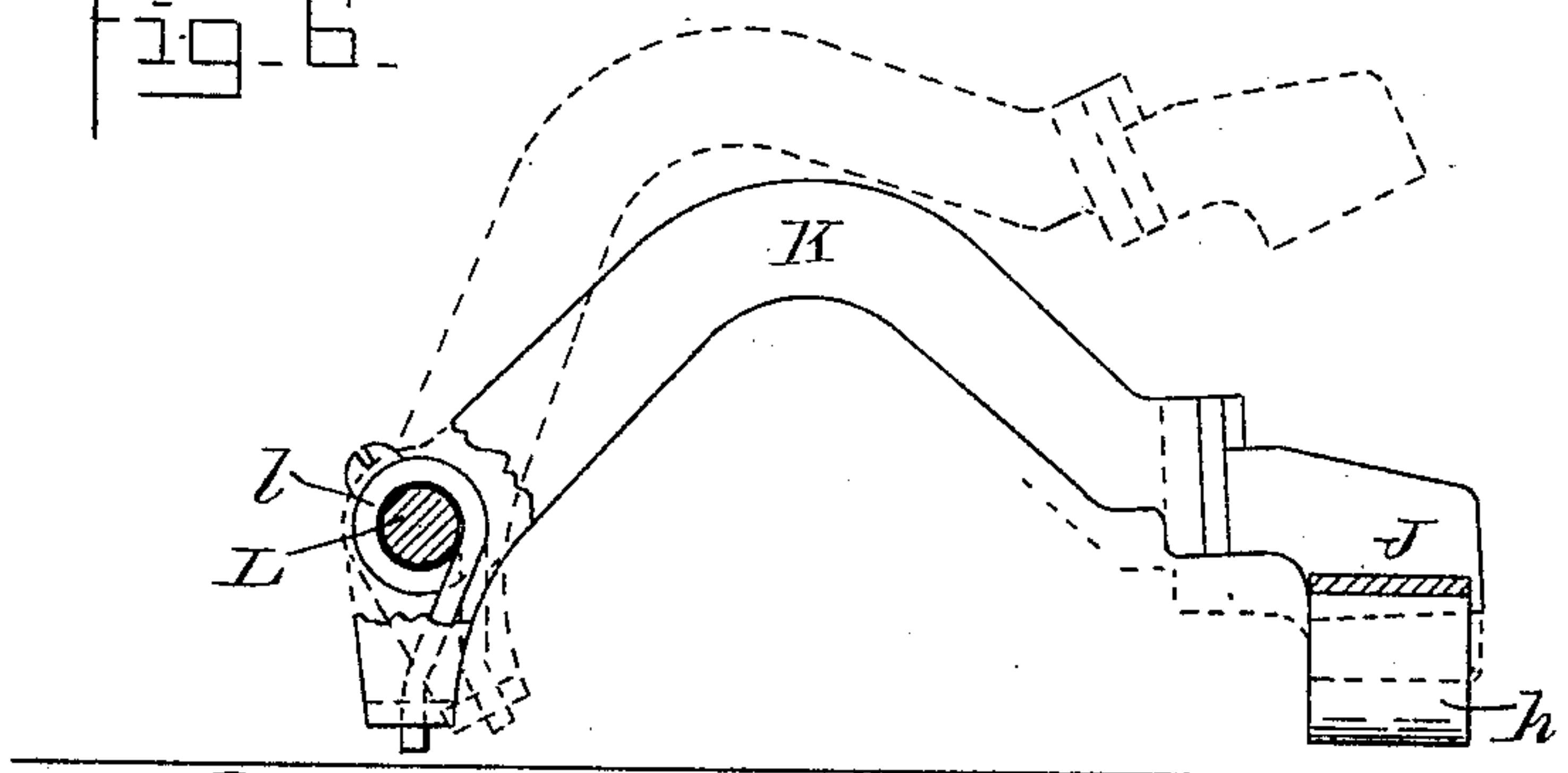


Fig. 7.

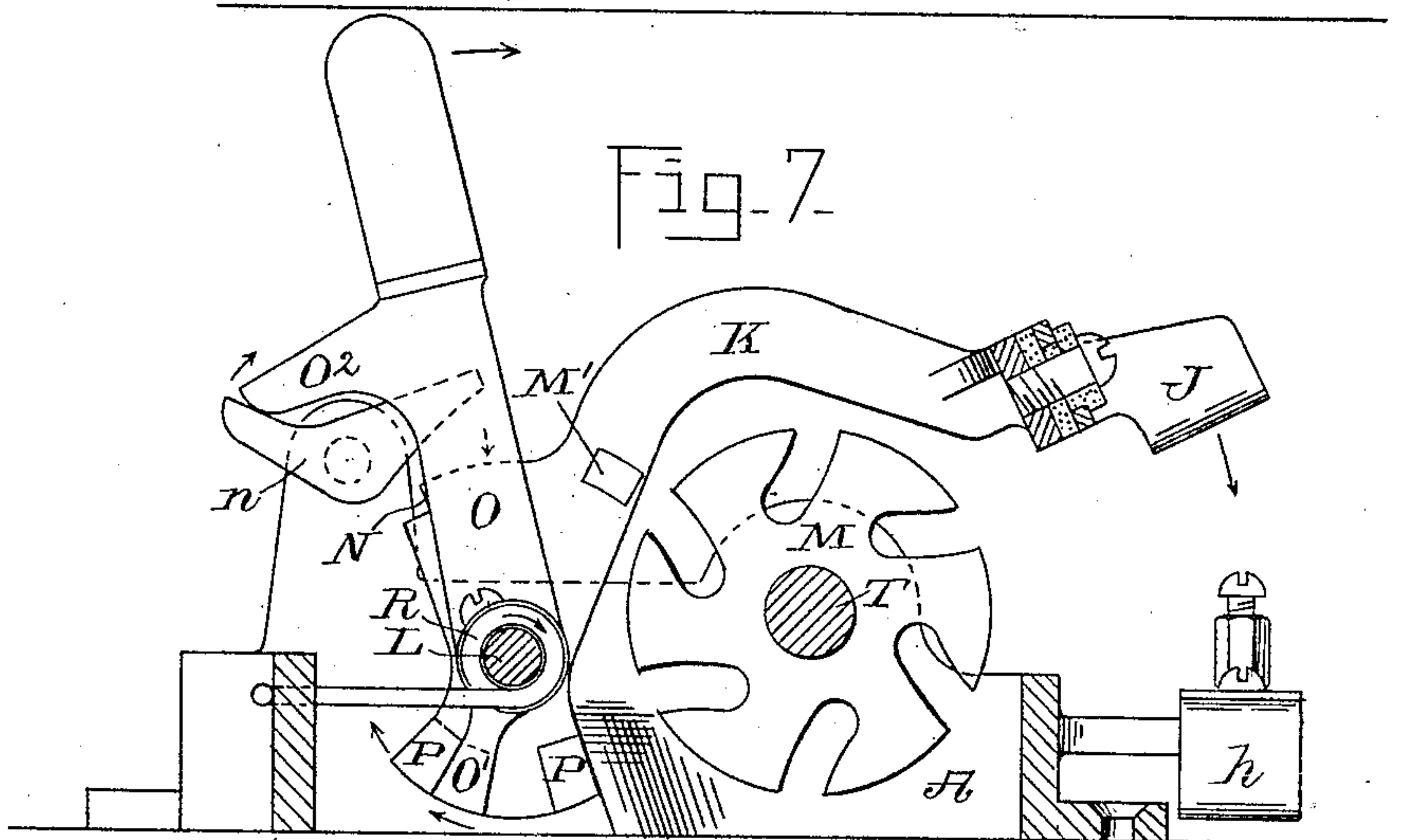
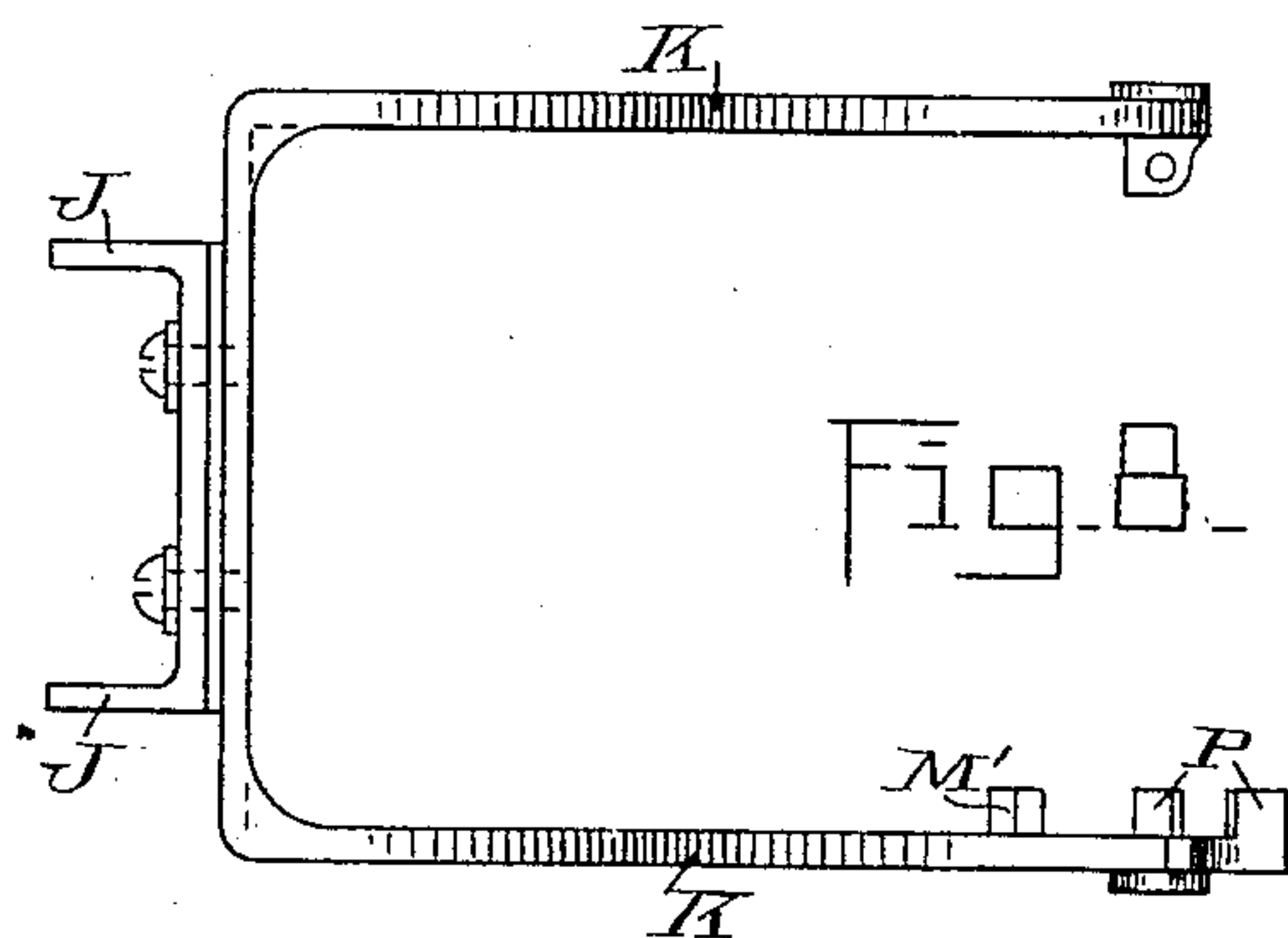


Fig. 8.



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UNITED STATES PATENT OFFICE.

JAMES F. McELROY, OF ALBANY, NEW YORK.

MULTIPLE-SERIES CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 570,878, dated November 3, 1896.

Application filed August 28, 1894. Serial No. 521,534. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. McELROY, a citizen of the United States, residing in the city and county of Albany, State of New York, have invented a new and useful Improvement in Multiple-Series Controllers, of which the following is a specification.

My invention relates to electric switches used in connection with electrical apparatus in which the points of application are arranged in multiple series; and the object of my invention is to produce a multiple-series controller in which the electric current may be made and broken positively without sparking and which will lock the switch while the circuit is made. I attain this object by means of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan. Fig. 2 is a side elevation. Fig. 3 is a front elevation. Fig. 4 is a section along the line 1 1 on Fig. 1. Fig. 5 is a cross-section along the line 2 2 on Fig. 1, showing the manner of loosening the catch before breaking the circuit. Fig. 6 is a detail section along the line 3 3 on Fig. 1. Fig. 7 is a detail section along the line 2 2 on Fig. 1, showing the contact broken; and Fig. 8 is a detail plan view of the connection-posts and frame to which they are attached.

Similar letters refer to similar parts throughout the several views.

Within the stationary frame A, I mount the cylinder B, provided with contact-points C, and to which I secure a series of fingers D, connected with suitable contact-posts E. The wire F connects one pole, G, with one of the contact-posts E. The positive pole G and the negative pole H are each provided with a metallic strip *h h*, bent near its end in the shape of a hook, as shown in Fig. 3, to allow the posts J J, secured to the frame K, to enter said hooks. The frame K is adjusted in such a manner that each side thereof extends beyond the end of the cylinder B and is secured to the spindle L, which spindle is mounted in the frame A. To one of the arms of the frame K is secured one end of a spiral spring *l*, which spiral spring surrounds a portion of the spindle L, having the opposite end thereof attached to said spindle in such a manner that the resiliency of the spring will tend to

raise the contact-posts J J from contact with the hooks *h h*.

At one end of the cylinder I arrange a wheel M, having a series of notches *m* cut into its periphery, and upon the interior surface of the frame K, adjacent to said notched wheel M, I arrange a projecting lug M', adapted to enter said notches and thus prevent the revolution of the cylinder. The notches on the wheel M and the lug on the frame K are so arranged that when the lug is in position within a notch on said wheel the fingers D are some or all of them in contact with the metallic connecting-points C in the cylinder.

The end of one side of the frame K is provided with a shoulder N, against which the catch *n* rests when the posts J J are within the hooks *h h*. The catch *n*, in the form of a bell-crank lever, is pivoted to the frame A by means of a hub *n'*, to which I secure one end of a spiral spring *n*², the other end of said spring being attached to the frame A, the resiliency of the spring tending to hold the catch *n* in contact with the shoulder N on the frame K, as shown in Fig. 2.

To one end of the spindle L, I secure the lever O, which lever projects below the spindle L at O', and which is movable between the lugs P P on the lower interior side of one arm of the frame K, so adjusted that the lever O may be moved a short distance before the projecting piece O' shall press against the lug P on the arm of the frame K. Near the upper portion of the lever O, I arrange a projecting piece O², adapted to come into contact with the upwardly-projecting portion of the catch *n*.

Upon the spindle L, I arrange the spiral spring R, one end being secured to said spindle, the other to the frame A, arranged in such a manner that the resiliency of the spring will tend to throw the lever O forward away from the catch *n*, as shown in Fig. 2. Thus when the lever O is drawn back the projecting piece O² will release the catch *n* from the shoulder N of one arm of the frame K, as shown by dotted lines in Fig. 5. A further movement in the same direction of the lever O will force the projecting piece O' against the lug P, which allows the spring *l* to operate one arm of the frame K, causing

the frame K to be raised abruptly and forcibly, liberating the lug M' from contact with the notched wheel M, allowing the cylinder to be revolved by means of the knob S, attached to the spindle T, upon which the cylinder is mounted, and the contact-posts J J, as soon as the frictional resistance due to their contact with the hooks *h h* is overcome, instantly and abruptly separate therefrom by a suddenly-developed quick motion of the frame K, a motion that is very much exaggerated as compared with the motion of the lever O. In order to make this motion as abrupt and rapid as possible, I prefer to use the spiral spring heretofore described, but I do not desire to confine myself to the use of such spring, as it might be accomplished by other means.

Means for locking the cylinder M is provided in the lug M' on the frame K. The device for locking the switch is the catch *n*, adapted to engage with the shoulder N on the frame K. We have thus two independent locking devices, one for the cylinder and the other for the switch, both of which are operated, however, simultaneously. By this arrangement the cylinder is locked while the circuit is made, and it is impossible to revolve the cylinder before breaking the circuit. The fingers are thus in contact with the metallic points at all times when the circuit is complete, and it is thus impossible for the cylinder to be injured by burning.

When the circuit is broken, the contact-posts are forcibly ejected from the poles and there is thus no opportunity for sparking. When the cylinder is placed in the desired position, which is done by revolving the knob attached thereto, the posts are forced into the hooks at the poles forcibly, the fingers are in position on the contact-points of the cylinder, and there can be no burning or sparking. By arranging for the movement of the lever before the contact is broken I obviate the injury which often accrues from meddling with the switch or controller by incompetent and curious people. Great damage has been frequently accomplished by the class of people last mentioned manipulating the operating-lever of electric switches placed on street-cars connected with the electric heating apparatus. My device being particularly adapted for use in electric heating appliances, I have endeavored to obviate this important objection to its use.

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

1. In a multiple-series controller, a cylinder suitably mounted, metallic contact-points in the surface of said cylinder, fingers suitably mounted to rest on said cylinder, a means for conveying the current from the positive pole to one of said fingers, contact-posts adapted to connect the positive with the negative pole of the controller, a means for locking the connecting-posts in contact with poles of the controller by means of a locking device oper-

ating upon the frame carrying the post, tending to prevent the elevation of the frame and simultaneously locking the cylinder to the post-carrying frame by means of suitable engagement therewith, substantially as described and for the purpose set forth.

2. In a multiple-series controller, a suitable frame with positive and negative poles, a cylinder mounted in said frame, contact-points arranged on the surface of said cylinder, a means for revolving said cylinder in said frame, contact-fingers secured to said frame and resting upon the surface of said cylinder, the positive pole of said frame connected with one of said contact-fingers, a metallic connection between the positive and negative poles of said frame, said metallic connection adapted to be raised and lowered by means of a spring set in operation by a lever so arranged that by the movement of the lever, the metallic connection between the poles may be broken abruptly and forcibly, substantially as described and for the purpose set forth.

3. In a multiple-series controller, a frame provided with positive and negative poles, a spindle mounted in said frame, contact-posts adapted to connect said poles mounted in arms secured to said spindle, a spiral spring mounted on said spindle, the resiliency of said spring adapted to break the contact, a lever mounted on said spindle, a cylinder, metallic points thereon, metallic fingers connected therewith, a means for preventing the revolution of said cylinder when said contact is made, so adjusted that by the operation of said lever, the cylinder is unlocked, and the contact broken simultaneously and forcibly, substantially as described and for the purpose set forth.

4. In a multiple-series controller, a frame having a positive and negative pole, a means for conducting the electricity in multiple series, a means for breaking the circuit forcibly and abruptly and simultaneously unlocking the controller, substantially as described and for the purpose set forth.

5. In a multiple-series controller, a frame provided with a positive and negative pole, a cylinder mounted therein, provided with metallic contact-points, contact-fingers mounted thereon, connecting-posts for the purpose of engaging said poles, said connecting-posts secured to arms mounted on a spindle operated by a spiral spring, the resiliency of which tends to break the circuit, a catch mounted on said frame adapted to lock the connecting-posts in contact with the poles, a notched wheel secured to said cylinder, a lug on the arm of one of said connecting-posts adapted to engage with the notches in said notched wheel, a lever arranged to remove said catch from contact with said arm, to revolve the spindle to which said arm is attached, to withdraw said lug from said notches in said wheel and to set in operation said spring, the resiliency of which causes the contact to be broken, sub-

stantially as described and for the purpose set forth.

6. In a multiple-series controller, two switches in series, one an adjustable, the other
5 a make-and-break switch, a handle-piece adapted to operate the make-and-break switch, means for breaking the circuit abruptly with a quick exaggerated or enlarged motion, and means for simultaneously unlock-
10 ing said adjusting-switch, substantially as described.

7. In a multiple-series controller, the com-

bination of two switches in series, one of which is a make-and-break switch, the other an adjusting-switch, a handpiece so con- 15 nected to the make-and-break switch as to open the circuit abruptly and to simultaneously unlock the adjusting-switch, substantially as described.

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Witnesses:

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C. S. HAWLEY.