

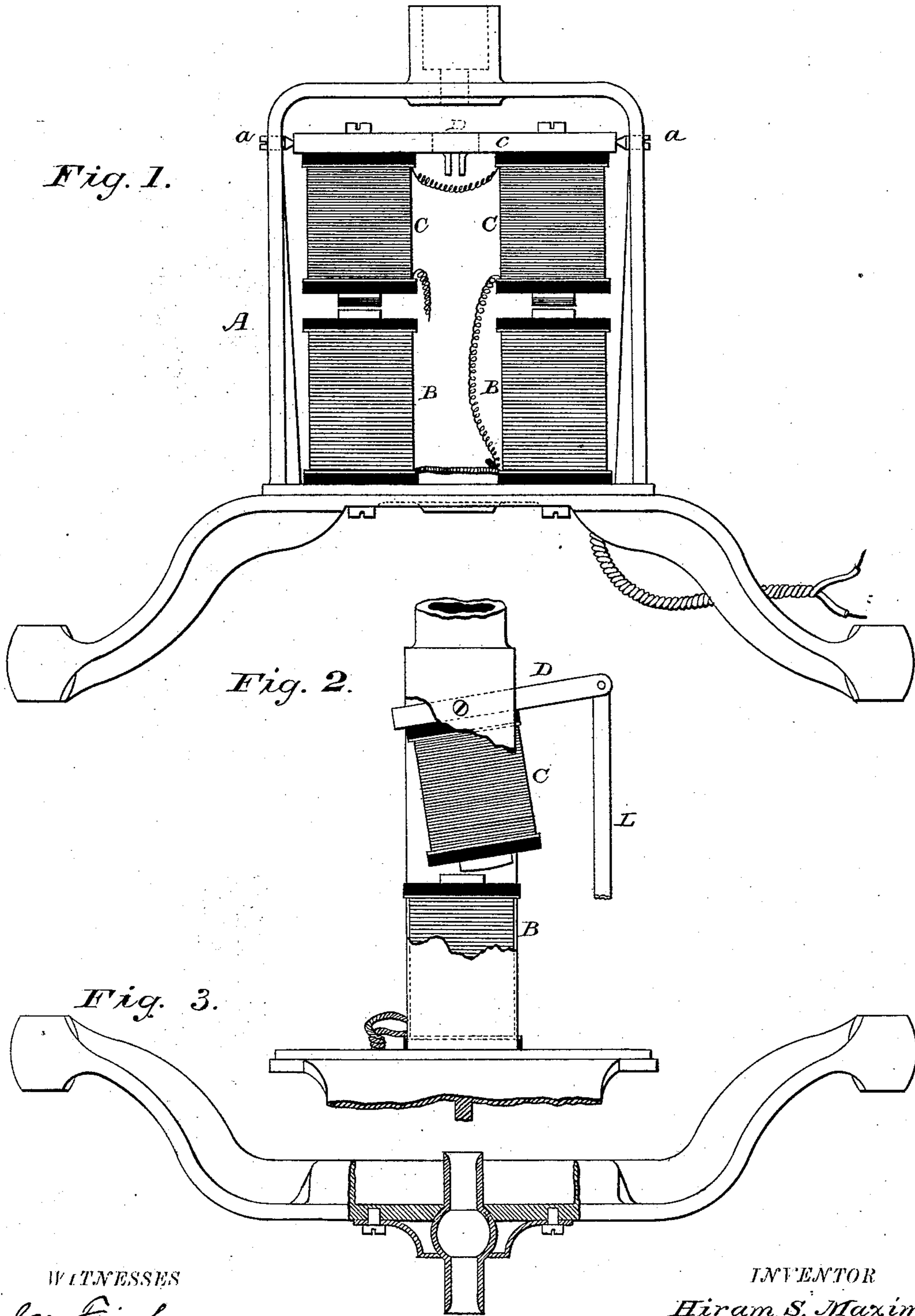
(No Model.)

3 Sheets—Sheet 1.

H. S. MAXIM.  
ELECTRIC LAMP.

No. 283,629.

Patented Aug. 21, 1883.



*Fig. 1.*

*Fig. 2.*

*Fig. 3.*

WITNESSES

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*Henry Bain.*

INVENTOR

*Hiram S. Maxim*

By his Attorney

*Patrick W. Page.*

(No Model.)

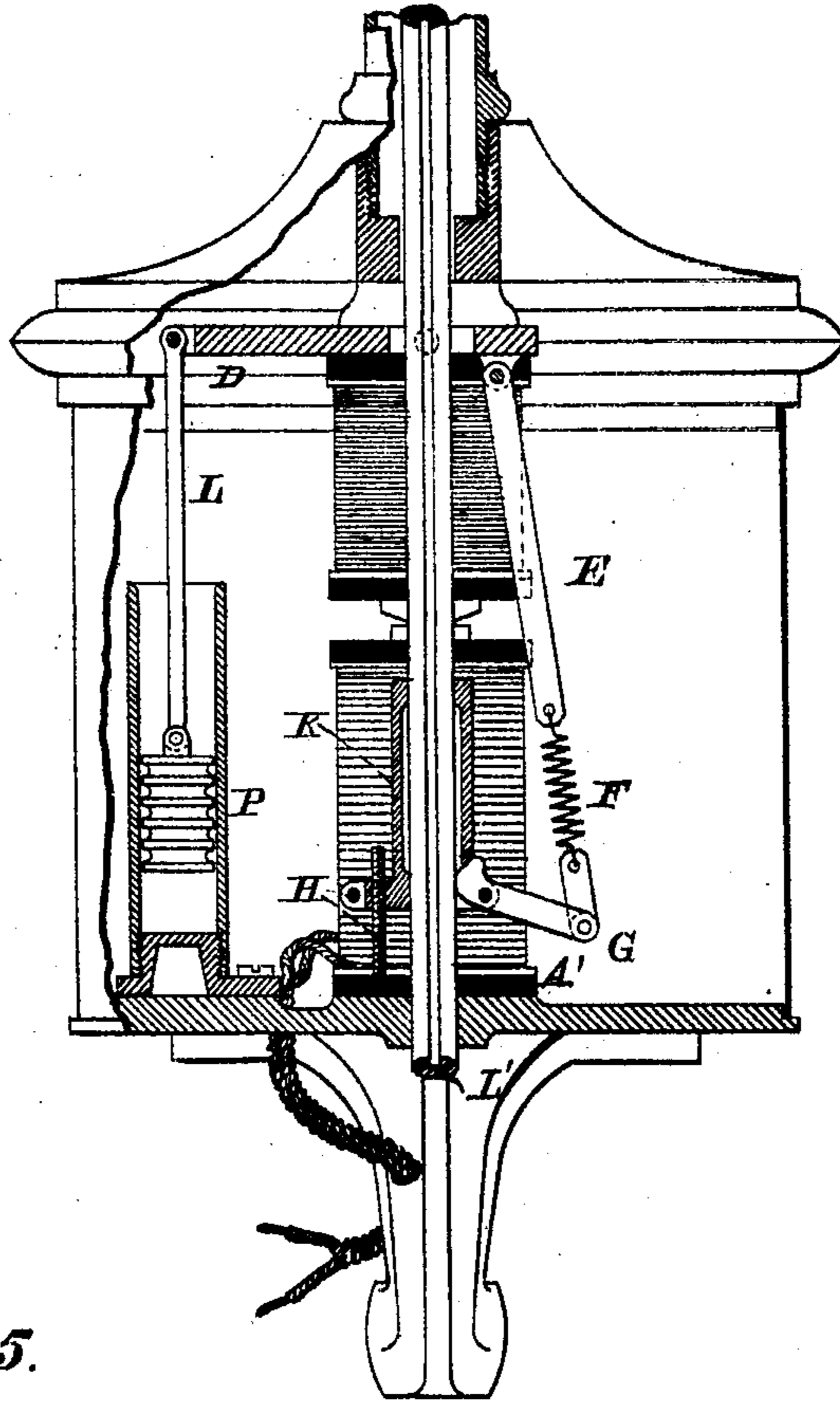
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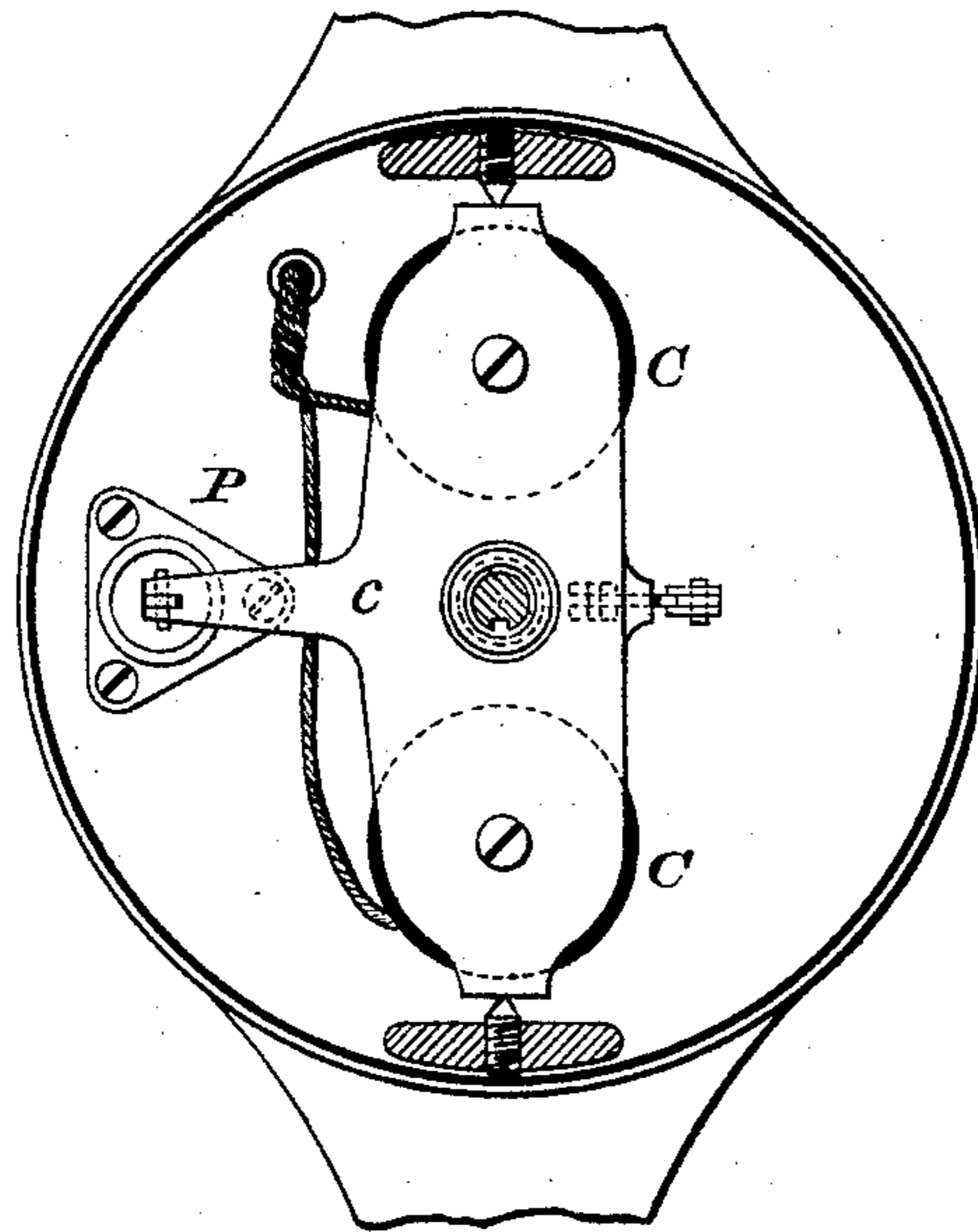
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*Fig. 4.*



*Fig. 5.*



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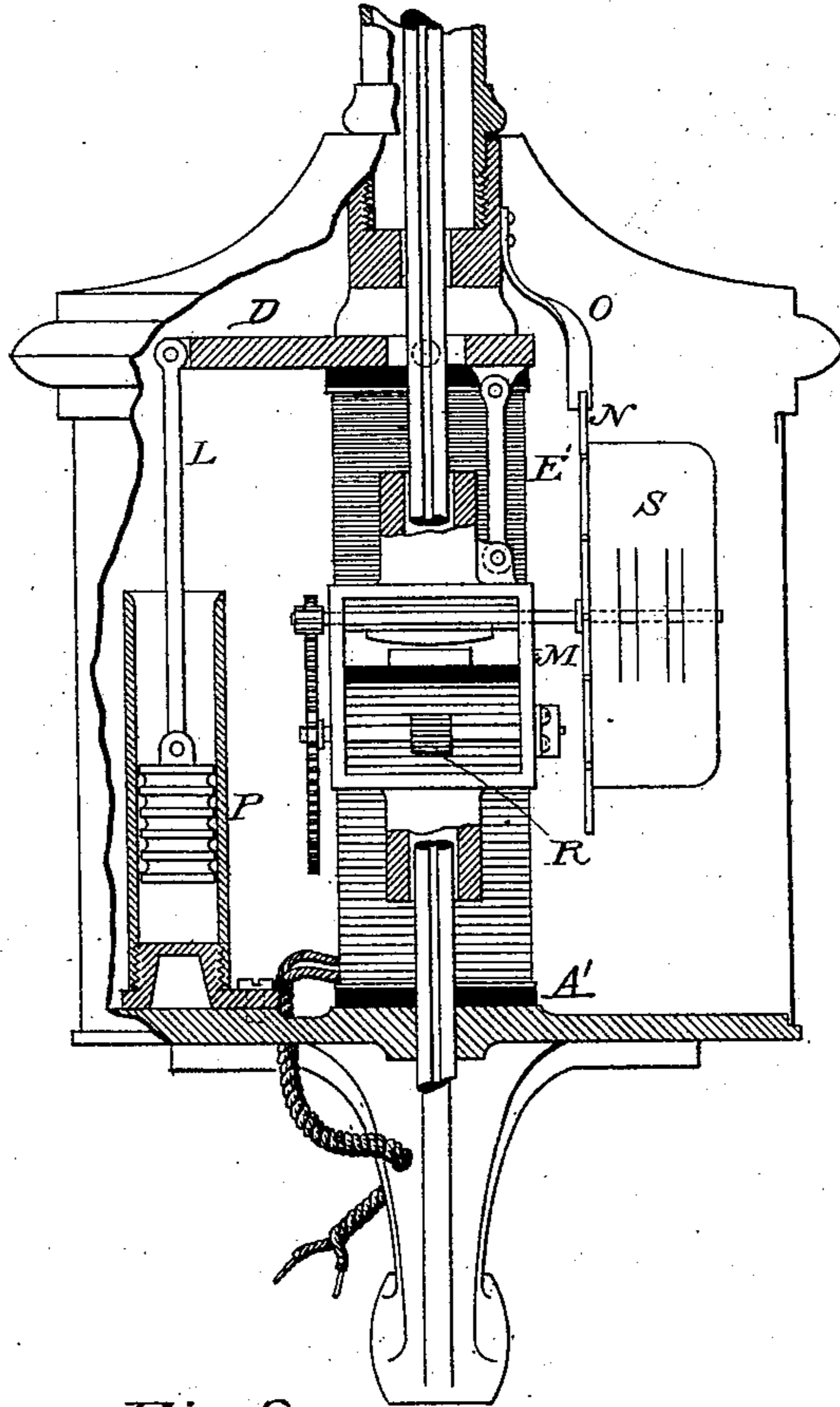
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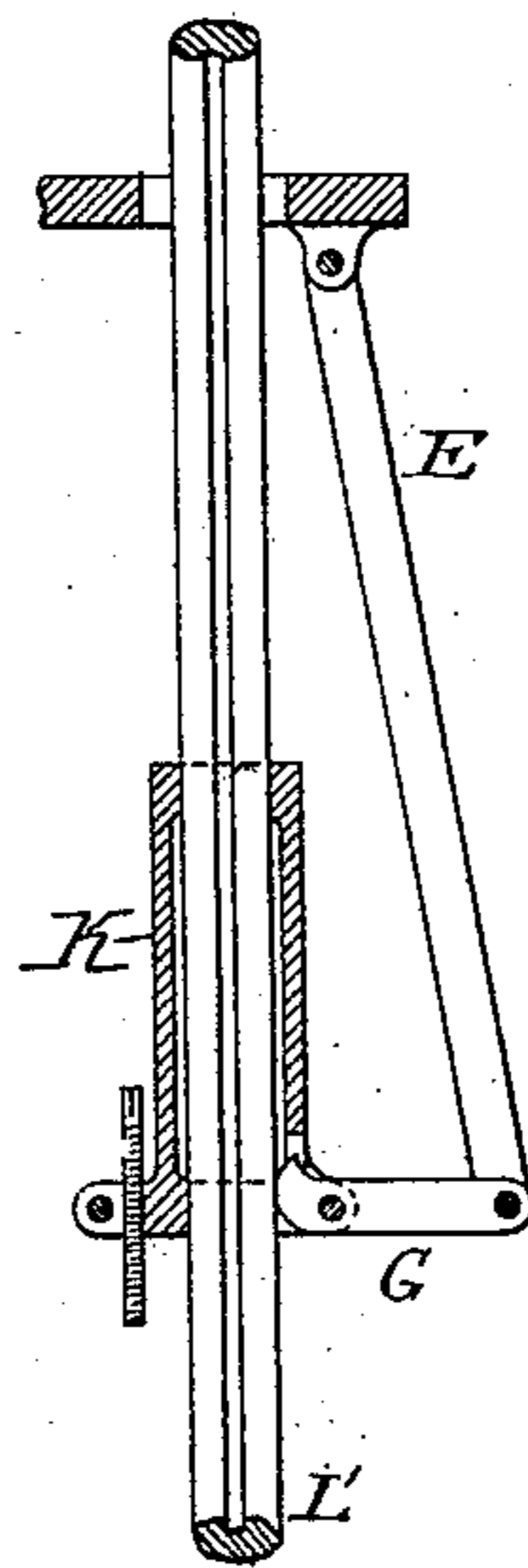
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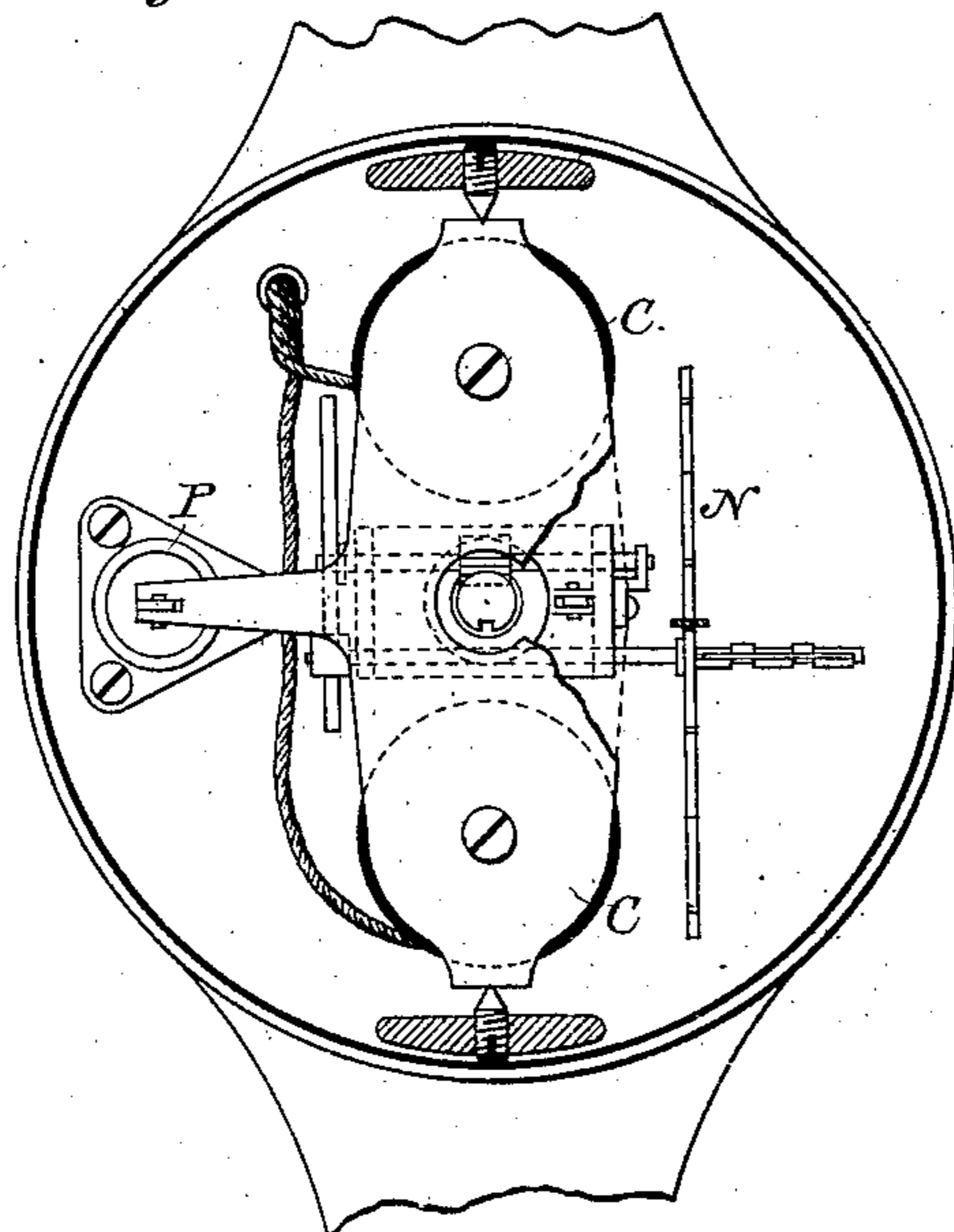
*Fig. 7.*



*Fig. 6.*



*Fig. 8.*



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# UNITED STATES PATENT OFFICE.

HIRAM S. MAXIM, OF BROOKLYN, ASSIGNOR TO THE UNITED STATES  
ELECTRIC LIGHTING COMPANY, OF NEW YORK, N. Y.

## ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 283,629, dated August 21, 1883.

Application filed September 7, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, HIRAM S. MAXIM, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Electric Lamps, of which the following is a specification.

My invention relates to electric-lamp-regulating mechanism; and it consists in the devices hereinafter specified for causing the carbons to feed together at a rate proportional to their consumption, so that a continuous and steady light shall be maintained.

In the accompanying drawings, Figure 1 is a view of the feed-controlling magnets detached from the remaining portions of the lamp; Fig. 2, a side view of the same; Fig. 3, a part sectional view of the lower cross-bar of the lamp-frame; Fig. 4, an elevation of the feeding mechanism; Fig. 5, a plan of the same. Fig. 6 represents the clamping devices detached from the lamp. Fig. 7 is a view in elevation of the interior of a modified form of lamp, and Fig. 8 a plan view of the same.

Similar letters in the several figures indicate corresponding parts of the lamp.

B B are the main electro-magnets. They are wound, as is customary, with wire of low resistance, which forms part of the main or arc circuit, and are fixed to the upper cross-bar, A', in an upright position.

C C are a pair of cores forming an electro-magnet, the cross-bar *c* of which is held by pivoting-screws *a a* in the frame A in such manner as to swing directly over and in front of the poles of the main magnets B B.

D is a projecting portion of cross-bar *c*, or a short rod attached thereto, and connected by rod L with the piston of a dash-pot, P. The oscillation of magnets C is thus retarded and sudden movement or jerking prevented.

E is a rod or strip hinged to cross-bar *c*, and connected to a pivoted clutch-lever, G. K is a short tube surrounding the carbon-carrier L', through a slot in which the rounded end of lever G passes. H is an adjusting-screw for limiting the downward movement of tube K.

The operation of this device is as follows: The magnets C C have a normal tendency to occupy the position shown in Fig. 2—that is,

to swing out of line, so as to release the carbon-carrier from the clutch-lever G. When, therefore, a current is passed through magnets B B, and consequently through the lamp, the magnets C C, which are wound with wire of very high resistance, included in a closed shunt about the lamp, have but little magnetism of their own, and are consequently attracted in the same manner as armatures, and are drawn down in line with the main magnets B B. They will therefore occupy the position shown in Fig. 4. Rod E, being now raised, draws up the clutch-lever G, which locks the carbon-carrier and raises it, thus forming the arc. As the length of the arc increases, more current is diverted through magnets C C, and as the direction of winding in these is such as to exert a magnetism similar to that in the opposing poles of magnet B, the attraction of the latter is neutralized and the magnets C are tilted. By this means clutch-lever G is permitted to descend until screw H encounters the cross-bar A', or a suitably-situated stop, in which case the binding force of lever G is removed and carbon-carrier L' slides down slightly and decreases the length of arc. As soon as the resistance in the main circuit is lessened by the shortening of the arc the previous magnetic conditions of the main and shunt magnets are re-established and the lever G again caused to bind and raise the carbon-carrier. In reality the movement of lever G is so slight as to be almost imperceptible, and the carbon-carrier descends by infinitesimal steps.

In Fig. 4 the rod E is shown connected to the clamping-lever G by means of a spring, F, which yields as the lifting strain is applied, and thereby produces a more sensitive action of the clamp than when the ordinary or rigid connection, such as shown in Fig. 6, is employed.

Figs. 7 and 8 illustrate the application to a rack-and-pinion lamp of the magnets described in connection with the preceding figures. In this case the rod E is supplanted by a connecting-bar, E', which sustains a light frame, M, in which is arranged a train of gears connecting with the carbon-holder, which in this case is in the form of a rack, by a pinion, R,

and ending in a flutter-wheel or fan, S. A wheel, N, with teeth set wide apart, is fixed to the fan-shaft, and a stationary detent, O, is arranged in such position relatively thereto  
 5 that when the frame M, with its train of gears, is raised by the magnets C C, the teeth of wheel N will be locked by the said detent and prevented from revolving. In principle of operation this form is similar to that previously  
 10 described, except that the detent and gear-wheels are substituted for the clutch-lever and stop. The main and derived circuit magnets are in this as in other cases wound in such manner that similar poles are always pre-  
 15 sented to each other. The movement, therefore, of connecting-bar E' is due to the neutralization of the magnetic attraction and the repulsive effect of similar juxtaposed poles.

The magnets herein described are applicable  
 20 to electric lamps and regulators generally, and may be placed in various positions, according to the character of the lamp with which they are used.

The distensible or yielding connection be-  
 25 tween the armature and clamp, which I have shown in connection with the lamp forming the subject of my present application, I do not claim as my invention.

Having described my invention, what I claim as new, and desire to secure by Letters 30 Patent, is—

1. The combination, in an electric lamp, of an electro-magnet in the main or arc circuit, an electro-magnet in a shunt or derived circuit, pivoted in a position to oscillate in front 35 of the poles of the main magnet, and feed-regulating devices connected with and operated by the movement of the pivoted electro-magnet, as described.

2. The combination, in an electric lamp, of 40 an electro-magnet in the main or arc circuit, an electro-magnet in a shunt or derived circuit, pivoted above the main magnet, with similar poles opposed to one another, and feed-regulating devices connected with and oper- 45 ated by the movement of the pivoted magnet, as set forth.

In testimony whereof I have hereunto set my hand this 13th day of July, 1881.

HIRAM S. MAXIM.

Witnesses:

W. J. VAN PELT, Jr.,  
 PARKER W. PAGE.