

(No Model.)

E. R. KNOWLES.  
ELECTRIC ARC LAMP.

No. 282,461.

Patented July 31, 1883.

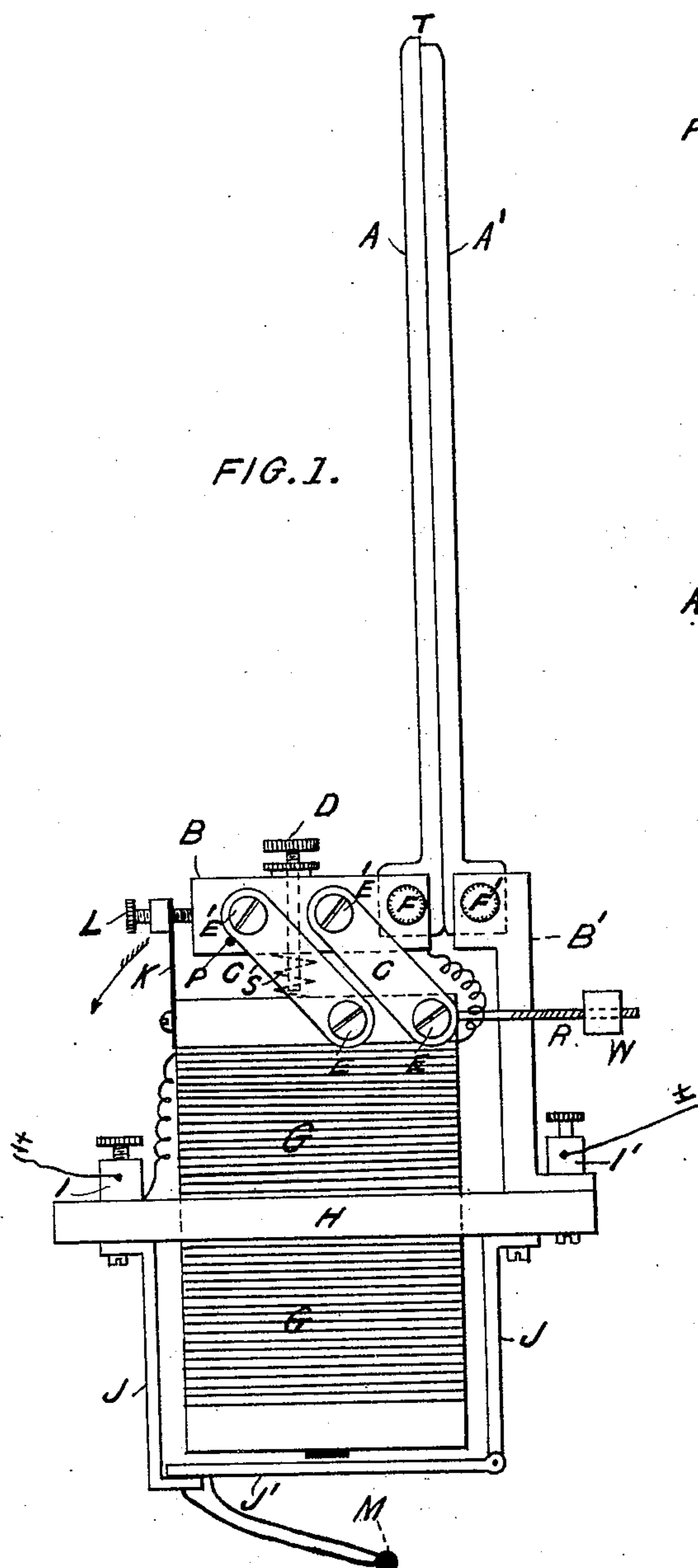


FIG. 2.

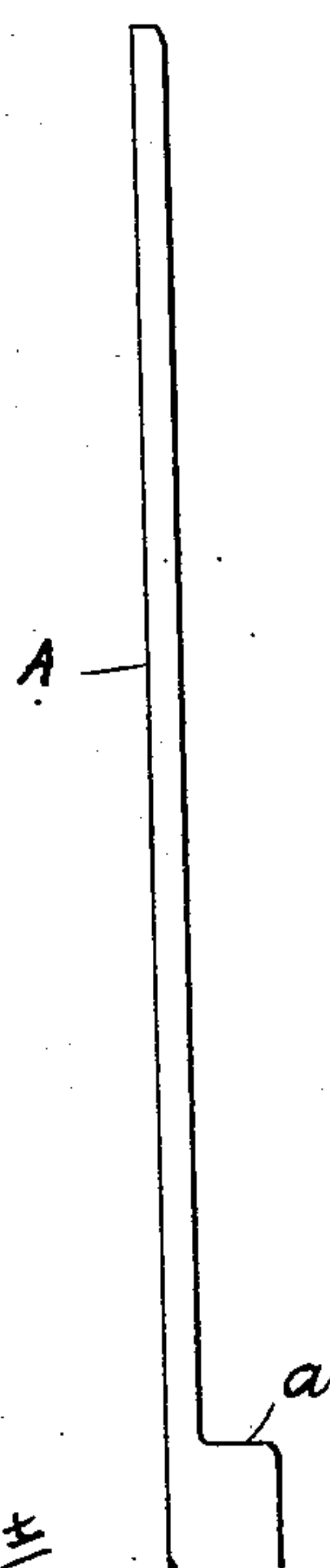


FIG. 3.

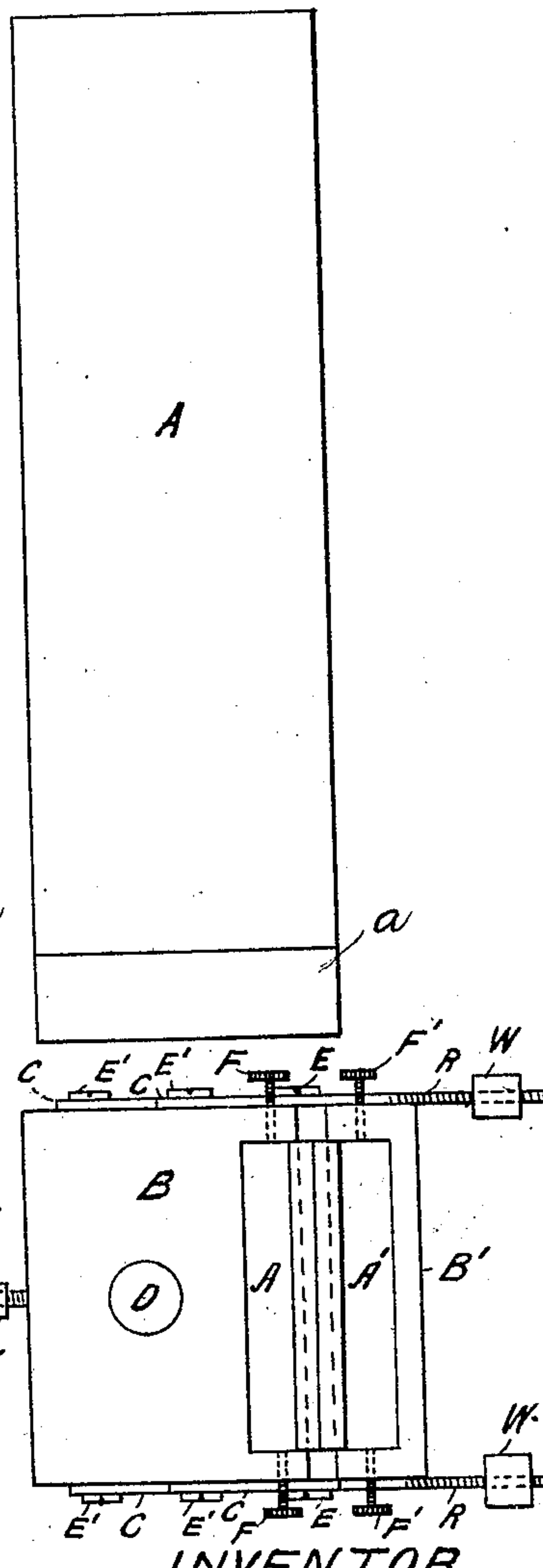
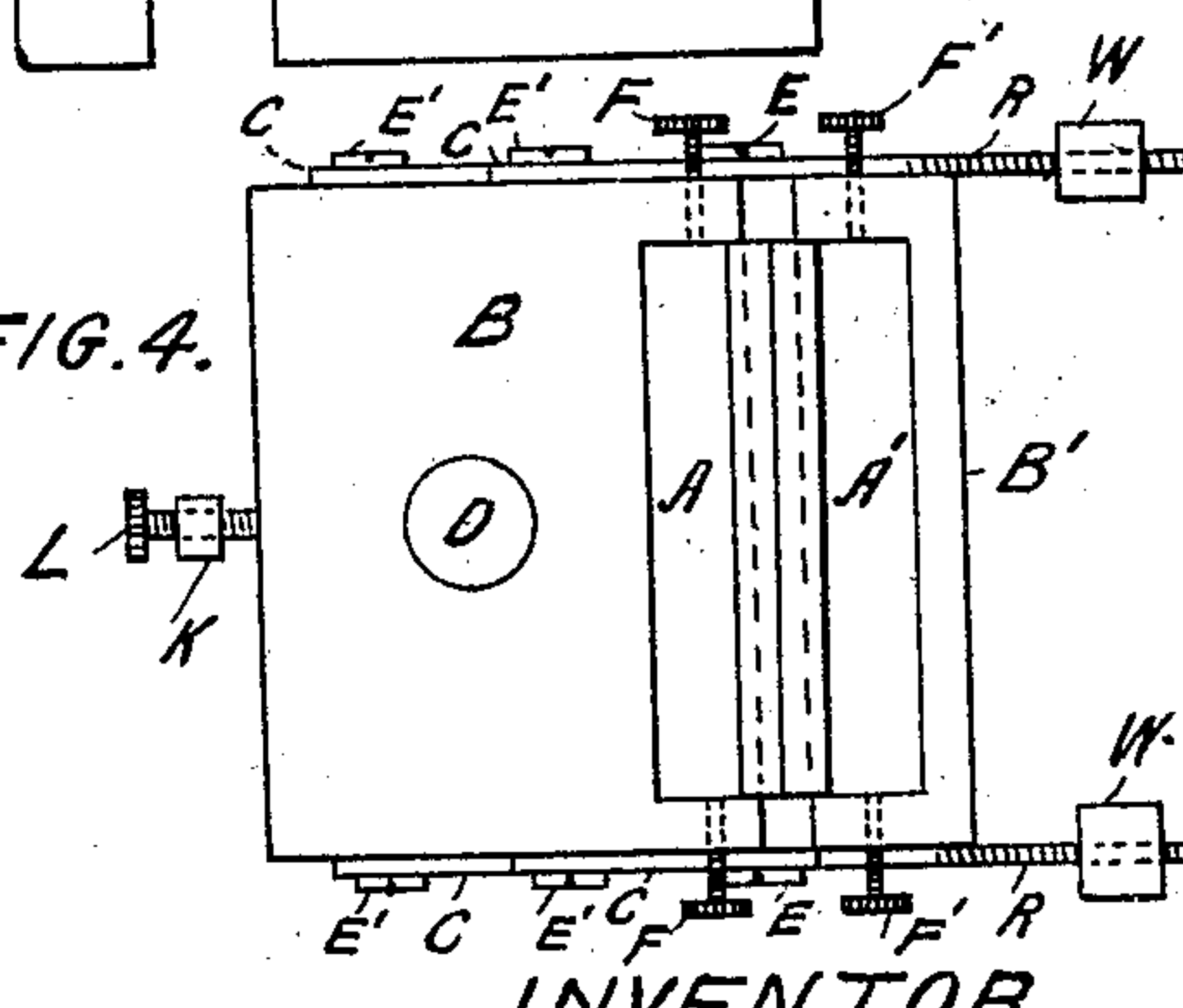


FIG. 4.



WITNESSES

*Arthur Rank*  
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INVENTOR.

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# UNITED STATES PATENT OFFICE.

EDWARD R. KNOWLES, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-HALF  
TO BYRON A. BROOKS, OF SAME PLACE.

## ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 282,461, dated July 31, 1883.

Application filed June 2, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD R. KNOWLES, residing in Brooklyn, in the county of Kings and State of New York, have invented certain  
5 new and useful Improvements in Electric Lights, of which the following is a description in such full, clear, concise, and exact terms as to enable any one skilled in the art to which my invention appertains or with which it is  
10 most nearly connected to make and use the same, reference being had to the accompanying drawings, and to the letters and figures marked thereon, similar letters representing corresponding parts in all the figures.

15 Figure 1 is a side elevation, and Fig. 4 a top view, of my invention; Fig. 2, an edge, and Fig. 3 a front, view of the illuminating-conductors.

My invention consists of a novel method of  
20 combining, adjusting, and operating the illuminating-conductors of an arc-light.

The construction and operation of the invention will be understood from the following description, the points of novelty being designated in the claims following the description  
25 of the several parts and their operation.

Reference being had to the drawings, A and A' are two plates of carbon, preferably of the shape shown, although they may be perfectly  
30 flat without the enlargement *a* at the bottom.

B is an armature of an electro-magnet, G, and serves also to carry the illuminating-conductor A. This armature is made of iron, and is supported above the magnet G by a pair of  
35 links, C C, pivoted to the magnet at E E and to the armature of E' E'. The links are set at an inclination with the perpendicular and the weight of the armature and carbon A is supported upon springs S and K and by the counter-weight W W, the spring S being made to embrace an adjusting-screw, D, and the spring K being bolted to the side of the magnet, and connected to the armature by means of a set  
40 screw, L. The weights W are carried by levers R, fixed to the pivots E of the links C C.

45 H is a frame or plate of insulating material that supports the magnet and also the other parts of the lamp.

To the frame H is fastened a carbon-holder,  
50 B', into which a recess or cavity is made to

receive the carbon A', which is firmly held in position by means of set-screws F' F'.

The armature B has also a square recess cut into it to receive the lower end of the carbon A, which is also held in position by set-  
55 screws F F.

J M J' J is a branch circuit of high resistance placed around the lamp, M being the resistance. The lever J, which is operated by the magnet G, acts to introduce the resistance  
60 M into the circuit when the lamp is in operation, and to cut it out when the lamp is not in operation.

The lamp is operated by an alternating current, and its action is as follows: The current  
65 enters at I and divides, one part going through the magnet and the carbons and the other through the circuit J M J' J. The magnet G is energized by the current and lifts the lever J', introducing the resistance M into the circuit J M J' J, and at the same time attracts the armature B, which, being movable around  
70 E as a center, is drawn toward the magnet, but on the circumference of a circle described by the links C C. By these means the carbon A is drawn away from the carbon A' until  
75 stopped by the screw D on the top of the magnet, while at the same time the two carbons are maintained upon planes parallel to each other. The arc is thus established between  
80 the carbons A A', and no matter where it starts it will instantly travel to the highest points of the carbons A A' and remain there, and as the carbons are parallel to each other and are always the same distance apart through  
85 their entire length, the arc will travel across their tops back and forth, consuming them evenly, and the intensity of the light will remain constant, as will also the resistance of the circuit in so far as such resistance may be  
90 affected by the distance between the carbons. The lamp will continue to burn until the carbons are consumed provided the current be supplied; but if a break should occur to stop the passage of the current through the lamp  
95 the lever J' is released by the magnet and cuts the high resistance M out of the circuit, preserving the continuity of the lighting-circuit. The resistance M also acts to reduce the sparking at the junction between the lever J' with  
100



J whenever the lever J is lifted by the magnet G. If when working the light becomes extinguished through a temporary disruption of the current, the carbons are instantly forced together by the springs K and S and weights W W, thus making a new contact, and re-establishing the arc as before.

To cut the lamp out of circuit it is only necessary to put the carbons A and A' in contact and keep them so, which is done by turning down the screw D, in which case the current will short-circuit through the foot of the carbons, thus avoiding the use of a switch for putting the lamp in or out of circuit.

It will be observed the principal purpose of the invention is to maintain the carbons always exactly parallel to each other and always the same distance apart, so as to insure even and equal consumption and a uniform intensity of light.

In fitting the lamp for use care should be taken to make the carbon A just a trifle longer than A', so that when it is drawn away from the carbon A' by the magnet the upper ends of the two carbons will be exactly on the same level.

Having thus described my invention, I claim—

1. The method substantially herein described of making, adjusting, and operating the illuminating-conductors of an arc-light, which method consists of making two illuminating-conductors and placing their sides together in actual contact from end to end, and of causing them to make and break such contact to form or extinguish the arc at their ends by moving to or from each other on a line transverse their length, and at the same time to maintain themselves in a position parallel to each other when in or out of contact, the distance between the conductors and the length of the arc remaining constant until the conductors are consumed from end to end.

2. The means substantially herein described of extinguishing the lamp and of maintaining at the same time the continuity of the lighting-circuit, which means consists of two illuminating-electrodes placed side by side upon parallel planes, in combination with mechanism to force and hold them together, by which the arc is short-circuited through the foot of the electrodes.

EDWARD R. KNOWLES.

Witnesses:

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AMOS BROADNAX.