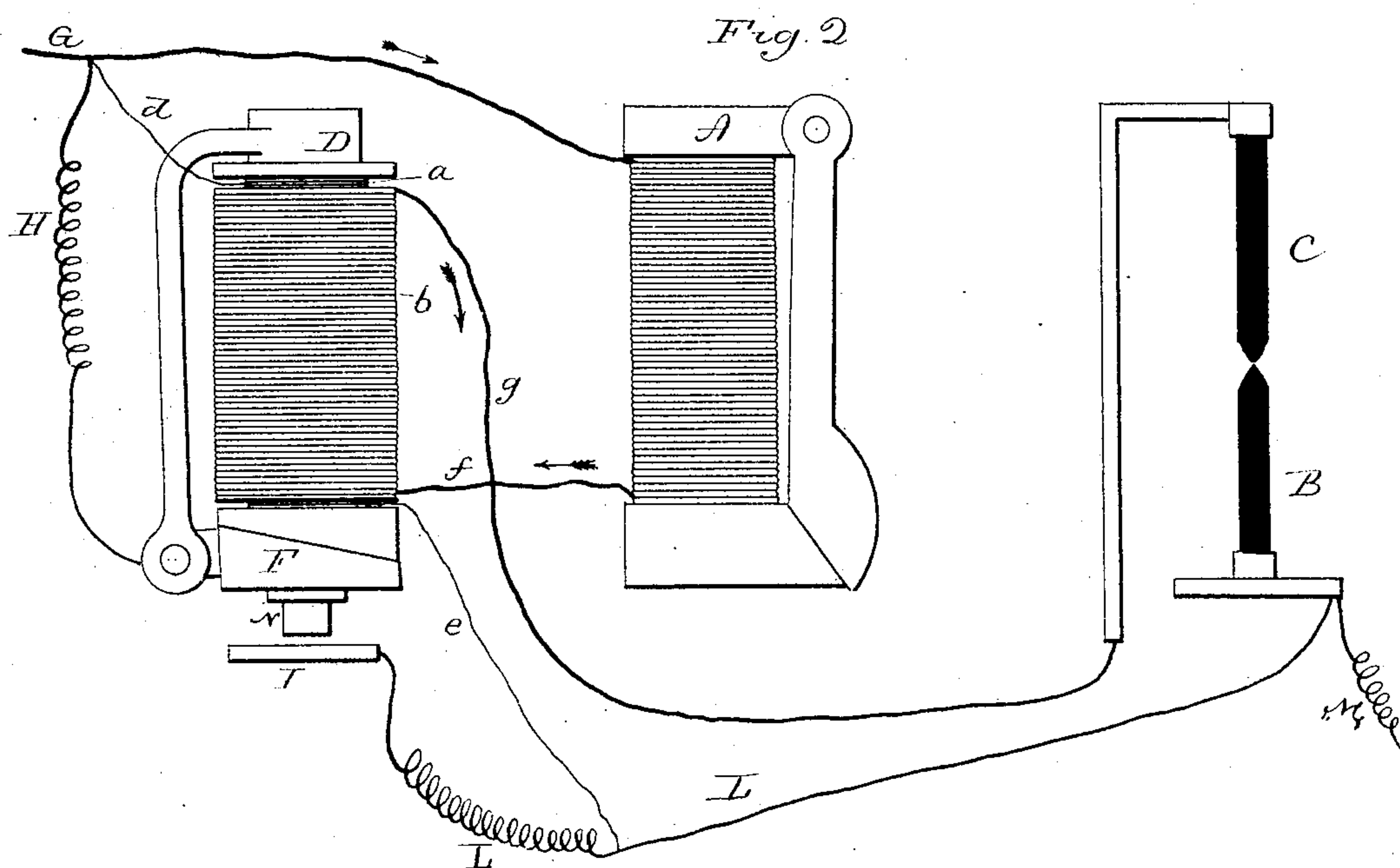
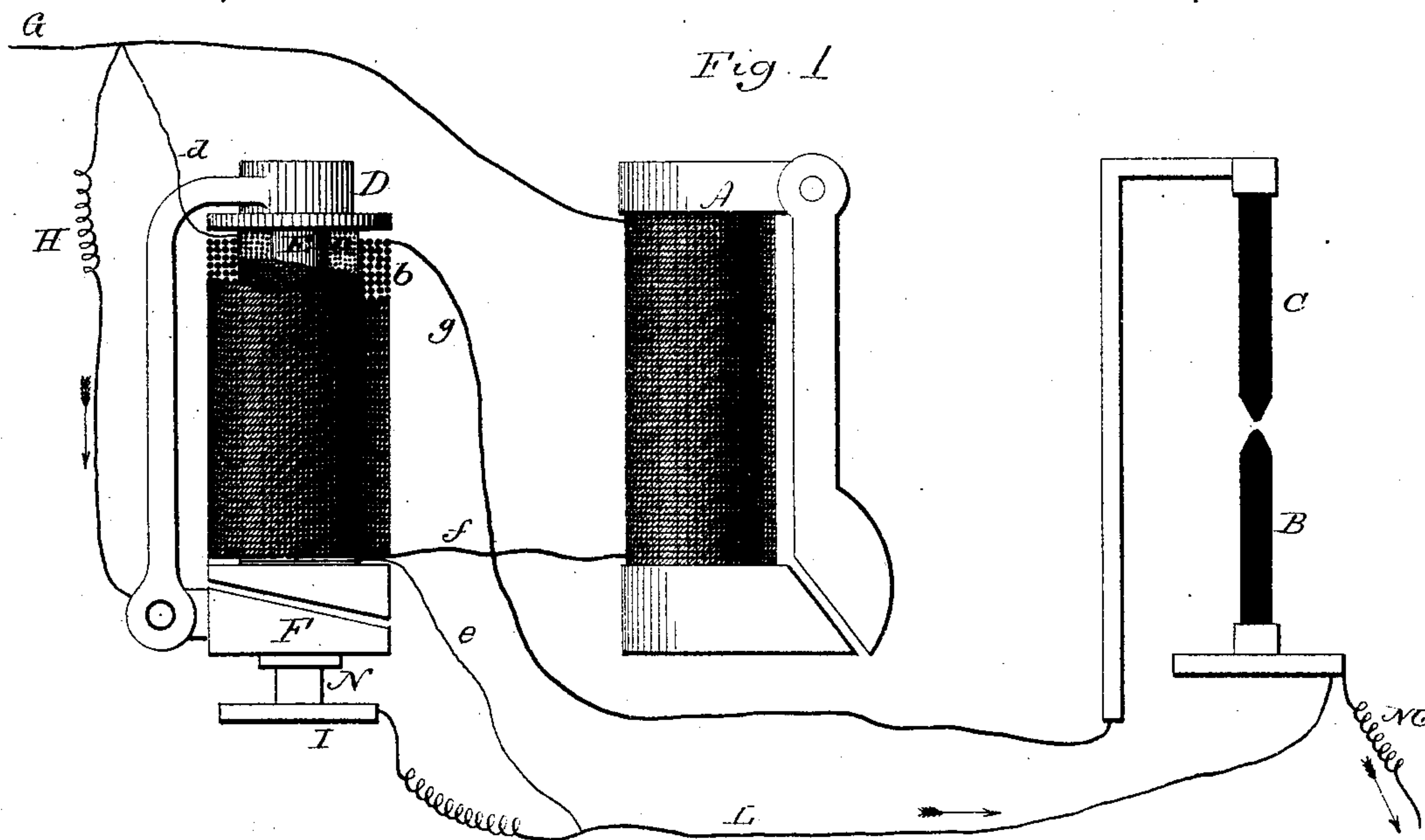


(No Model.)

N. McCARTY.  
ELECTRIC ARC LAMP.

No. 310,837.

Patented Jan. 13, 1885.



Witnesses.  
J. N. Shumway  
Jas. C. Earle

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# UNITED STATES PATENT OFFICE.

NORMAN McCARTY, OF HOOSAC, NEW YORK, ASSIGNOR TO J. B. TIBBITS,  
OF SAME PLACE.

## ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 310,837, dated January 13, 1885.

Application filed April 18, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, NORMAN McCARTY, of Hoosac, in the county of Rensselaer and State of New York, have invented a new Improvement in Electric-Arc Lamps; and I do hereby declare the following, when taken in connection with accompanying drawings, and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 2, a diagram showing the carbons, principal magnet, and shunt as in proper working condition, arrows denoting the direction of the current; Fig. 1, the same diagram, showing the armature of the shunt-magnet driven from its pole, and whereby the circuit is taken through the resistance-coils, arrows indicating the direction of that circuit.

This invention relates to an improvement in electric-arc lamps in which a shunt-magnet is employed, and in a system of several lamps on a single circuit, the object of the invention being to avoid the difficulty arising from imperfection in the mechanism of either lamp, whereby at any time the carbons in any one lamp shall fail to feed by causing the lamp not only to be automatically cut out when the feed is imperfect, but automatically cut in when the imperfection is removed, and at the same time maintain a balance between the outside circuit and the machine the same as if the defective lamp were in perfect operation; and the invention consists in the method and in the combination of the devices hereinafter fully described, and particularly recited in the claims, whereby this object is accomplished.

For convenience of illustration I show the principal magnet, the shunt-magnet, and the carbons detached from the usual mechanism of the lamp.

A represents the principal magnet, which is in connection with the feeding-carbon by any of the usual or known mechanism, whereby the carbon will be caused to feed.

B represents the lower or fixed carbon, and C the upper or feeding carbon.

D is a magnet composed of a core, E, with the armature F. The core is wound with a fine wire, as at a, in shunt-circuit in one di-

rection, and a coarse wire, as at b, in main circuit in the opposite direction, similar to the winding of all differential magnets.

G represents the main-line wire, running to the principal magnet, A, but also in connection with a resistance-coil, H, leading to or in connection with the armature F. Below the armature F is a contact, I, from which a resistance-coil, L, is in connection with the wire M, leading to the next lamp. The armature is provided with a point, N, which, when the circuit through the carbons is broken, rests upon the contact I, as seen in Fig. 1. From the main-line wire where the resistance-coil H connects a fine wire, d, leads to one end of the shunt-coil a, and from the other end of that coil a fine wire, e, leads to the resistance-coil L. From the main magnet the wire f leads to one end of the coarse coil b, and thence, by a wire, g, to the positive carbon C. The resistance-coils H L are equal to or greater than the resistance of the arc when the lamp is cold—that is, not working. The armature F is disengaged from its pole and the contact N rests upon the contact I. The current then will be from the main line G through the coil H, armature F, contacts N I, coil L, to the wire M, leaving the main magnet and carbons cut out; but at the same time there is another course open to the current—that is, from the main line around the cut-out magnet D to the main magnet, thence to the positive carbon, to the negative carbon, thence off through the wire M. When the circuit is closed, the current will divide at the point where the resistance-coil H is connected, and in inverse proportion to the resistance, the larger portion following the line through the principal magnet and carbons. This will magnetize the core E, raise the armature F, and break the contact between N and I, and thus force the entire current through the principal magnet, which, by the usual mechanism, will form the arc at the carbon points. Now, if through any defect in the mechanism the carbons fail to feed, the arc will increase in length, forcing more and more of the current through the shunt-line d until its effect upon the core E is sufficient to neutralize the effect of the coarse wire. Then the armature F will be



forced from its pole and make contact between N and I, thereby forming a new circuit around the lamp, instead of through it, at the same time throwing in a resistance, H L, equal to  
 5 that of the arc when burning, so that the effect on the machine under this condition is the same as if the lamp were burning. So soon as the cause of the obstruction is removed and the carbons come together, the current will  
 10 again divide at the point where the resistance H leads from the main line, the armature F will be raised, as before, and throw the circuit entirely through the carbons.

Defects in feeding frequently occur in the  
 15 best mechanisms; but generally they are such defects that after a short interval relieve themselves—such, for instance, as the failure of the carbon to fall at the instant required; but after a short interval it will drop of its own  
 20 gravity.

By my invention the lamp not only cuts itself out when imperfections in feeding occur, but cuts itself in when the imperfection or interruption is overcome, at the same time keeping up the balance between the outside circuit and the machine; or in some cases it may be  
 25 used as a secondary feed by breaking the circuit through the carbons at such times as the main feeding device fails to work, causing the  
 30 carbons to approach each other.

I claim—

1. In an arc lamp, the combination of the principal or feeding magnet A, the magnet D, having its core E wound with fine wire and with an overlay of coarse wire, the coarse wire  
 35 in the circuit through the principal magnet and positive carbon, the resistance-coil H, leading from the main line to the armature F of the magnet D, a second resistance-coil, L, between the contact I and the negative carbon,  
 40 the armature F, provided with a contact, N, arranged to engage the contact I when said armature F is released from its magnet, one end of the fine-coil or shunt wire of the magnet D in connection with the main line, the  
 45 other in connection with the second resistance-coil, L, substantially as described.

2. In an arc lamp, the combination of the principal or feeding magnet, a differential magnet, and resistance-coils between the main  
 50 line and the negative carbon, outside the principal magnet, the circuit being through the armature of the differential magnet, substantially as described, and whereby said magnet and resistance-coils maintain a balance between  
 55 the outside circuit and the machine, substantially as and for the purpose described.

NORMAN McCARTY.

Witnesses:

W. T. BABCOCK,  
 NOBLE PHILLIPS.