

(No Model.)

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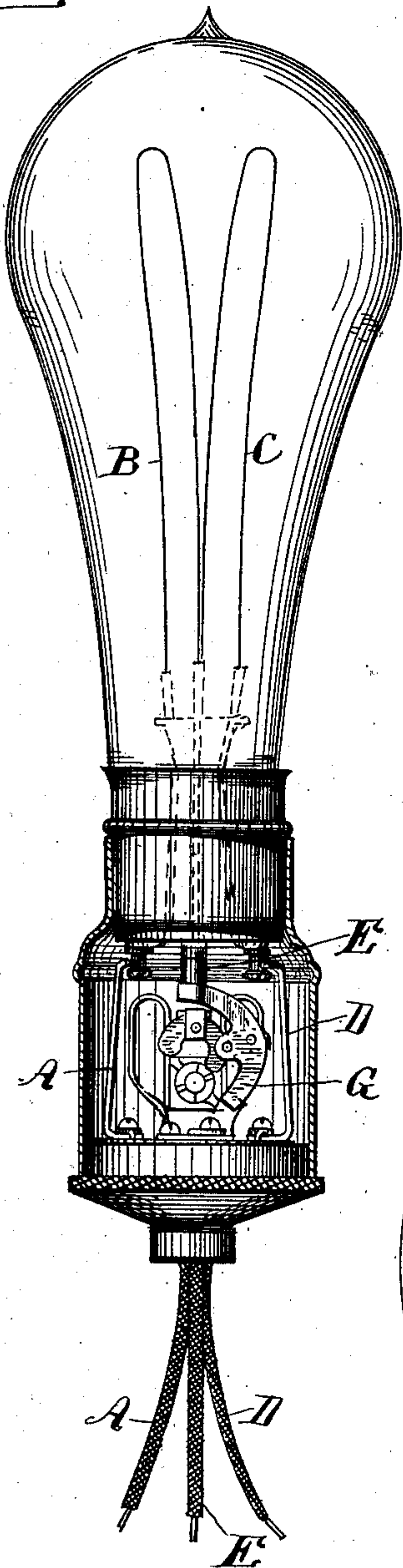
A. W. MORRELL.

GROUND DETECTOR FOR ELECTRIC LIGHT CIRCUITS.

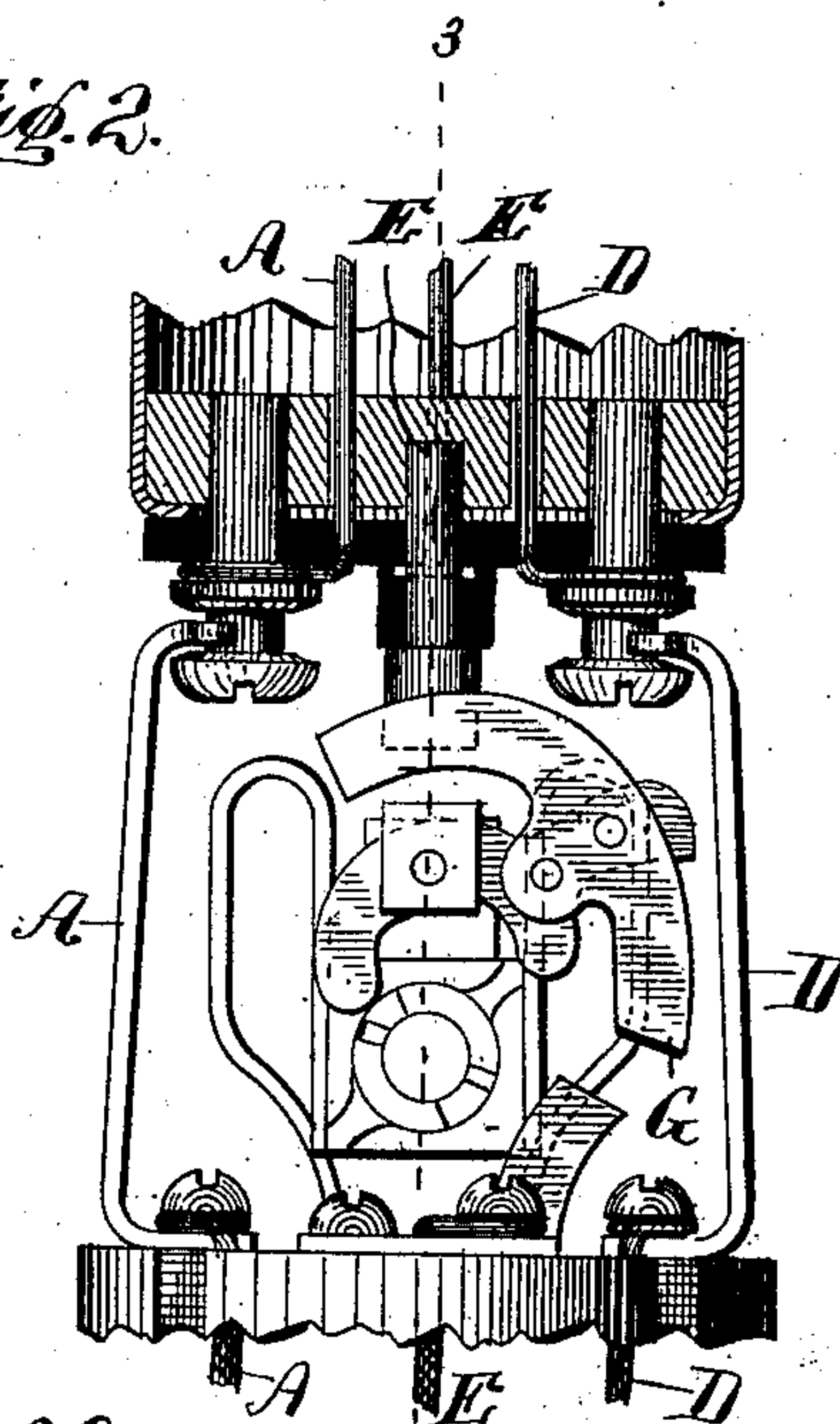
No. 389,758.

Patented Sept. 18, 1888.

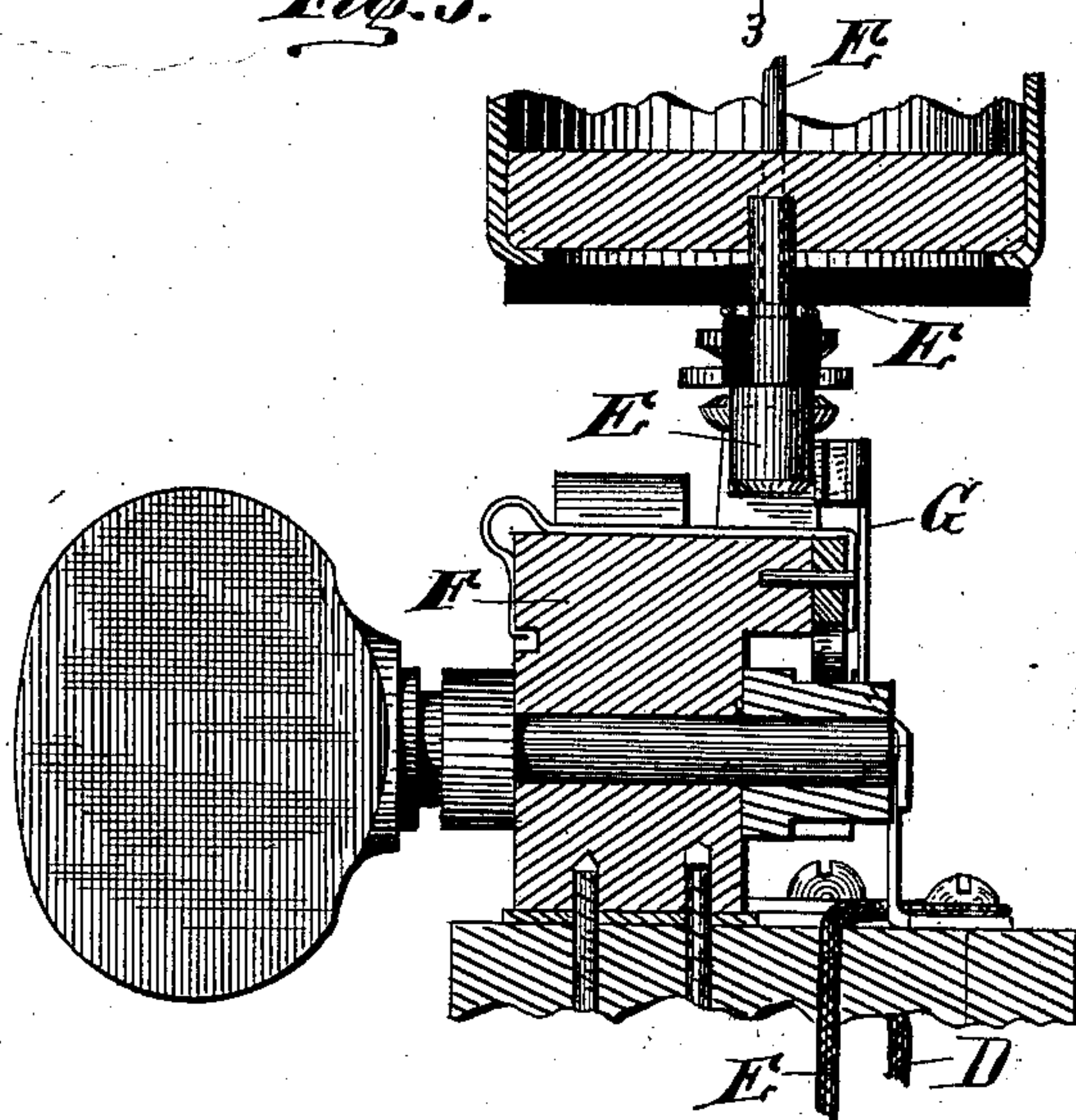
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



WITNESSES.

*G. W. H. Brown,*  
*G. W. Wood.*

INVENTOR.

*Albert W. Morrell,*  
*per*  
*Let E. W. Bradford.*  
ATTORNEYS.

(No Model.)

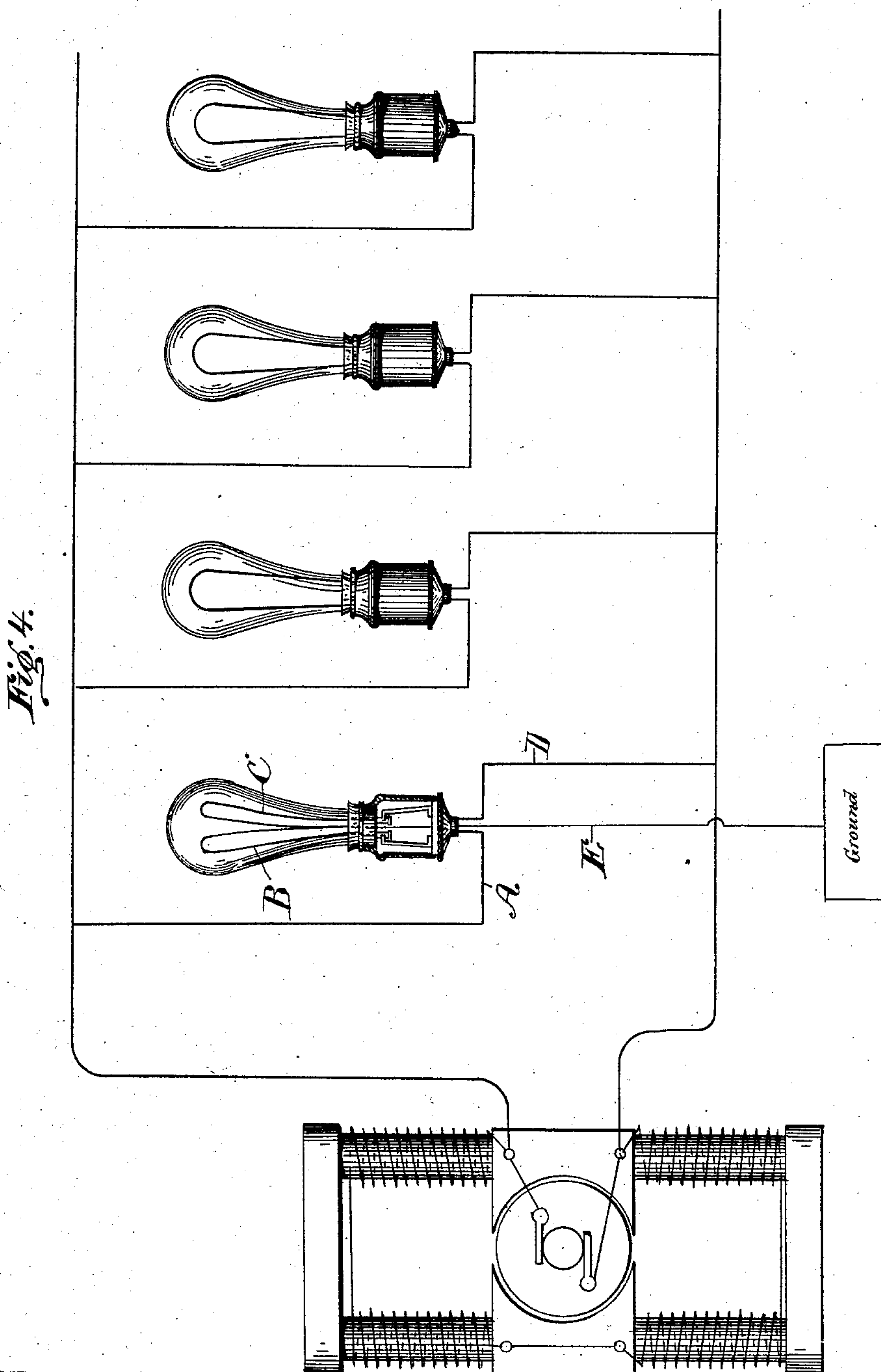
2 Sheets—Sheet 2.

A. W. MORRELL.

# GROUND DETECTOR FOR ELECTRIC LIGHT CIRCUITS.

No. 389,758.

Patented Sept. 18, 1888.



**WITNESSES.**

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J. K. Wood.

INVENTOR,

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Albert W. Morrell,  
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E. W. Bradford.  
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# UNITED STATES PATENT OFFICE.

ALBERT W. MORRELL, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO THE  
JENNEY ELECTRIC COMPANY, OF SAME PLACE.

## GROUND-DETECTOR FOR ELECTRIC-LIGHT CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 389,758, dated September 18, 1888.

Application filed June 11, 1888. Serial No. 276,708. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT W. MORRELL, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Ground - Detectors, of which the following is a specification.

The object of my said invention is to provide in a single device a "ground - detector," by which leaks from the line-wire of electric lamps in a multiple incandescent system can be accurately detected. This object is accomplished by constructing, in the form of an ordinary incandescent electric lamp, a device embodying two carbons which are united at one end, but which at the other ends are connected with the line-wire in the ordinary manner, the two united ends being connected to a wire which leads to the ground.

My said invention therefore consists in a construction whereby more complete tests can be made than with the device in its simple form, all as will be hereinafter more particularly described and claimed.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a front elevation of an electric lamp and its switch constructed to form a ground-detector in accordance with my invention, the switch being turned to connect the united ends of the carbons with the ground; Fig. 2, a view of the switch and adjacent parts, on an enlarged scale, said switch being turned so as to break the connection; Fig. 3, a central vertical sectional view, looking toward the right from the dotted line 3 3 in Fig. 2, the switch, however, being turned as in Fig. 1; and Fig. 4, an electrical diagram showing my invention in circuit.

In said drawings, the portion marked A represents the line-wire from the machine to the device; B C, the carbons; D, the line-wire to the machine from the device or lamps; E, the wire leading to the ground; F, the frame of the switch, and G the portion of the switch over which the current passes in my invention.

The switch shown is substantially that shown and described in application No. 270,533 of John S. Adams, filed April 13, 1888, except that I have added the portion G to make it

suitable for my purpose. Said switch will not, therefore, be further described herein, except incidentally in describing the invention, and many other forms of switch might be employed without departing therefrom.

The carbons B and C are in themselves simply two ordinary carbons. They are, however, united at one end, and a double length of carbon is thus formed in the single lamp.

This ground-detector is set into the circuit in precisely the same manner that an ordinary lamp is, and the operation is as follows: When the line is in order, the current comes to the lamp over the wire A, passes through the carbon B, thence through the carbon C, and out over the wire D, back to the machine in precisely the ordinary manner. The carbons, however, in this ground-detector burn much more dimly than in the ordinary lamp, because of the greater resistance due to the increased length of carbon. Should, however, there be another ground-connection anywhere upon the line, a short circuit would be established, and one of the carbons would immediately brighten up to about the brilliancy of an ordinary lamp, while the other would dim down, or go entirely out, according to the perfectness of the second ground-connection. Should the ground-connection be very slight, it is sometimes difficult to detect it by a simple inspection of the lamp, as in such a case the variation in the brilliancy of the two carbons would also be slight, and this might be due to other causes. I have therefore provided a switch by which the ground-wire to my device can be cut off and the current thus forced through the carbons. If there is any variation of the brilliancy of the two carbons when this is done from that which existed before, it must be due to a ground-connection elsewhere upon the line; but if the same relative brilliancy is maintained between the two carbons, notwithstanding that one is more brilliant than the other, there is no ground-connection, however slight. By this means, therefore, a very slight leak upon the line is easily determined.

I have lettered the various contact springs and points shown in connection with this device similarly to the wires with which they connect and form the electrical path.

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

1. The combination, in a single structure, of  
5 two carbons united at one end and there connected to a wire leading to the ground, and the other ends connected to the line-wires, respectively, the device thus forming a ground-detector, substantially as set forth.
- 10 2. A ground-detector consisting of an electric lamp having two carbons, one end of each of which is connected to an ordinary line-wire

and the other ends of both being united and connected to a single wire leading to the ground, and a switch interposed in said ground-connection, substantially as set forth. 15

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 4th day of June, A. D. 1888.

ALBERT W. MORRELL. [L. S.]

Witnesses:

B. F. WITT,

F. W. WOOD.