(No Model.)

O. P. LOOMIS.

AUTOMATIC GROUND DETECTOR FOR ELECTRIC CIRCUITS.

No. 396,582. Patented Jan. 22, 1889.

Fig. I.

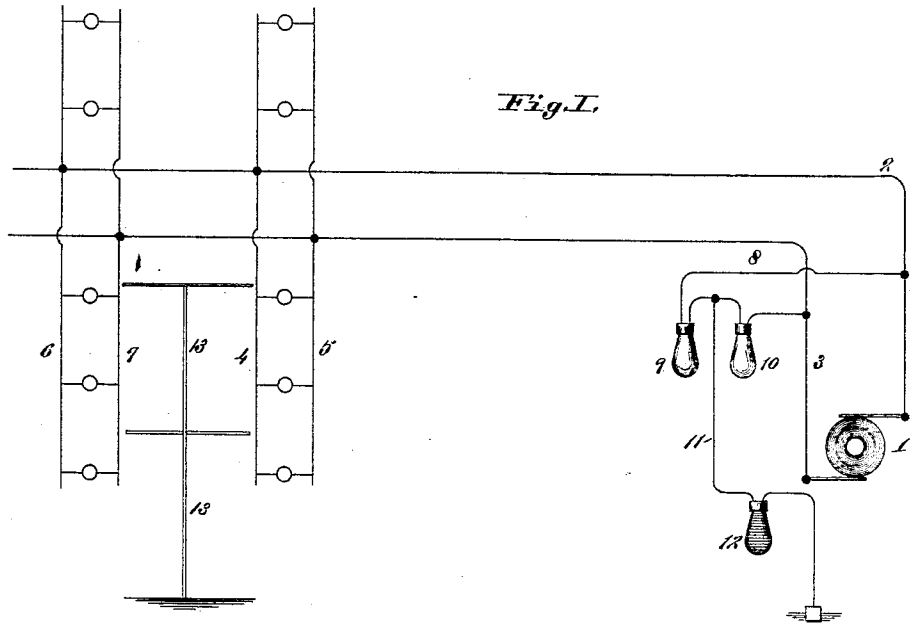


Fig. II.

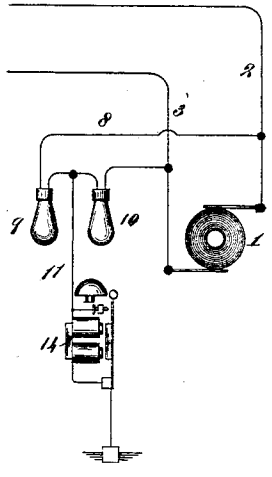
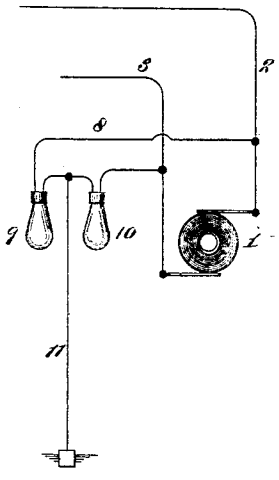


Fig. III.



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UNITED STATES PATENT OFFICE.

OSBORN P. LOOMIS, OF SOMERVILLE, MASSACHUSETTS, ASSIGNOR TO THE LOOMIS ELECTRIC MANUFACTURING COMPANY, OF NEW YORK.

AUTOMATIC GROUND-DETECTOR FOR ELECTRIC CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 396,582, dated January 22, 1889.

Application filed August 7, 1888. Serial No. 282,182. (No model.)

To all whom it may concern:

Be it known that I, OSBORN P. LOOMIS, a citizen of the United States, residing at Somerville, in the county of Middlesex and State of Massachusetts, have invented a certain new and useful Automatic Ground-Detector for Electric Circuits, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates more particularly to ground-detectors for electric-light circuits.

The object of the invention is to indicate when an electric circuit becomes grounded at any point or any portion of the current short-circuited.

The invention consists in a ground-wire connected, at preferably the central station, to a wire in electrical communication between the two parts of the circuit, in which ground-wire, or in the connection between the two parts of the circuit, or in both, may be placed one or more devices to indicate when a portion of the current is passing over the ground-wire, which would occur only when the circuit was grounded at some point.

I will now describe one form of my invention by referring to the accompanying drawings, making a part of this specification.

Figure I is a diagrammatic view of an electric-lighting circuit provided with one form of my invention. Fig. II shows a portion of the foregoing with a modified form of indicating device, and Fig. III shows a portion of the apparatus of Fig. I with the lamp 12 of the signal device in the ground-wire omitted.

The same figures of reference indicate corresponding parts throughout the several views.

Having now more particular reference to Fig. I, 1 designates a dynamo-machine supplying mains 2 and 3 with current, and 4 5 and 6 7 are subsidiary or house circuits connected with the aforesaid main by having incandescent lamps arranged in multiple arc between the same.

My invention is not confined to use with an electrical-lighting circuit nor to an incandescent electric-lighting circuit, as arc lamps or any other translating devices can be supplied from the main 2 and 3 in any well-known manner.

8 is a wire connected from one main to the other, and is provided with suitable resistances, in order to prevent too great a portion of the current from passing over said wire and short-circuiting the machine. I preferably arrange in said wire 8 two incandescent lamps, 9 and 10, in series therein, and connect the ground-wire 11 at a point intermediate between the two lamps. In this ground-wire I arrange, preferably, a third incandescent lamp having a colored globe.

13 indicates a gas or water pipe, with which a part of the circuit may come in contact, and thus short-circuit a portion of the current should the insulation of the circuit be imperfect at said point. The ground may be formed by any part of the circuit touching any conductor in communication with the ground, such, for instance, as the roof of a building. When this occurs, the current will be short-circuited to ground, and by way of the ground back to the opposite terminal of the dynamo, the insulation of which is always more or less imperfect. In the present invention, however, the current would pass from the ground to the ground-wire 11 by way of the lamp 12, and through one of the lamps 9 or 10 back to the other terminal of the dynamo. Thus the colored lamp at the central office would become lighted, and the attendant in charge would at once be made aware of the fact that a ground had occurred at some point of the circuit. This will occur when the mains themselves establish the ground-connection, or when any part of the subsidiary circuits form a ground. The lamp 12, which normally is extinguished, will in either case become lighted and give the warning.

In Fig. II the operation is precisely the same, except that an electric bell, 14, is used in place of the lamp 12. This bell is preferably made in a well-known way, so as to cut in and out the magnet-resistance only as the bell vibrates, so that the circuit will always remain intact and there will be no sparking, as there would be in the case of an absolute make-and-break of circuit in the ordinary rheotome-bell.

In Fig. III the ground-wire 11 is not provided with an indicator-lamp, such as 12. In this instance when the ground is established one of the lamps 9 and 10 would burn with greater brilliancy than the other, and thus inform the attendant that something is wrong with the circuit, for under normal operations both lamps 9 and 10 burn with equal candle-power, being arranged in series in the same circuit 8, as before described.

In the apparatus shown in Fig. I the same function would be performed by the lamps 9 and 10. The colored lamp 12 is provided in order to render the signal more conspicuous. In place of the incandescent lamps shown in Figs. I and II, resistance-coils could be used as well or any other electrical devices with sufficient resistance.

I do not wish to limit myself to any kind of an indicating device, as any suitable signal-giving device could be used; nor do I wish to be confined to the exact arrangement and location of the parts described, as the same may be varied by those skilled in the art without departing from my invention.

What I desire to claim, and secure by Letters Patent of the United States, is—

An automatic ground-detector for electric-light circuits, consisting of a wire, 8, connected, preferably, between the mains of said circuit at the central station, electric lamps 9 and 10 in series in said circuit 8, a ground-connection between the two, for the purpose described, and a signal-giving device located in said ground, substantially as and for the purpose described.

In testimony whereof I have hereunto set my hand, this 1st day of August, 1888, in the presence of two subscribing witnesses.

OSBORN P. LOOMIS. [L. S.]

Witnesses:
GEO. WYATT DICKERMAN,
W. A. WARNER.