

No. 730,595.

PATENTED JUNE 9, 1903.

C. C. BADEAU.  
GROUND DETECTOR.

APPLICATION FILED JULY 26, 1901.

NO MODEL.

Fig. 1.

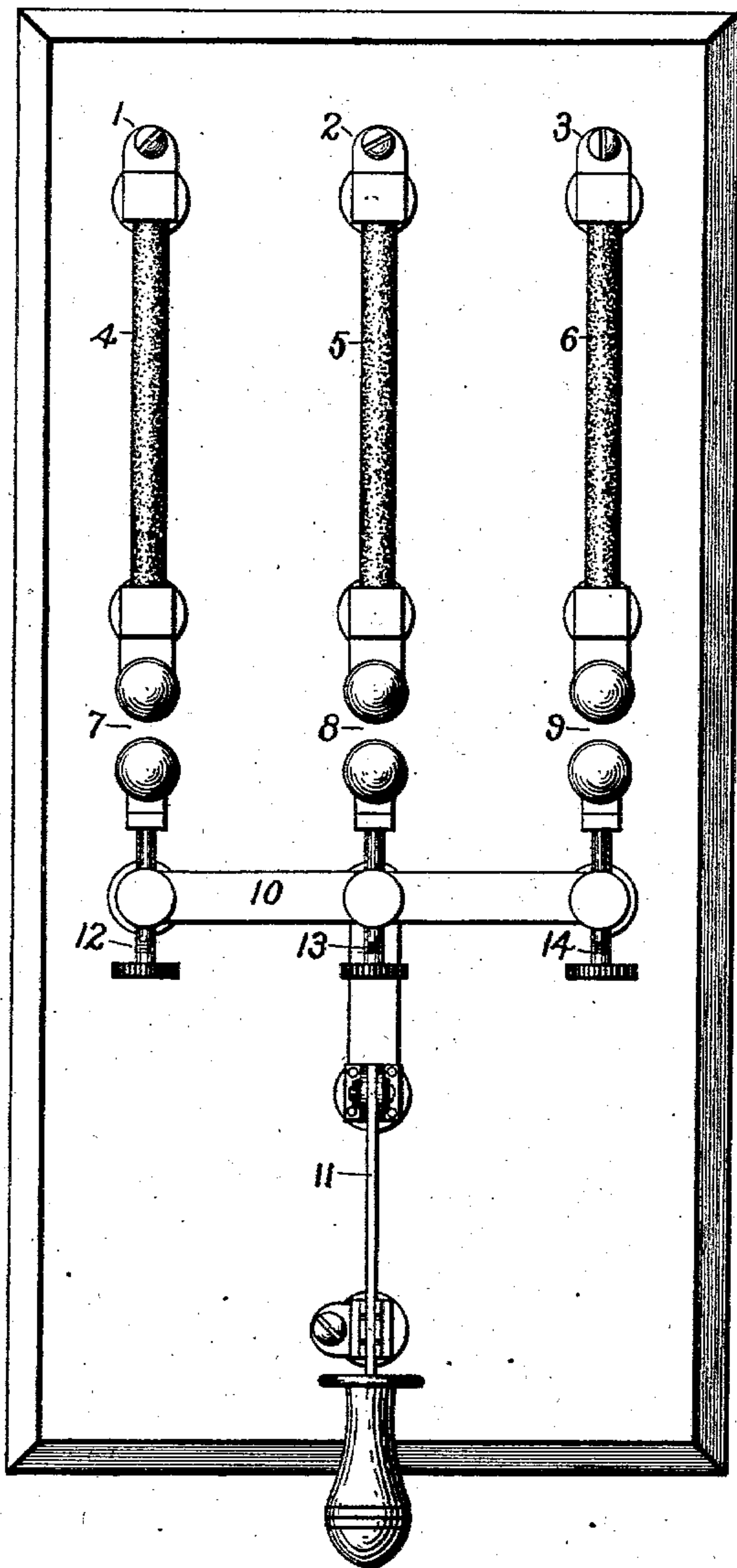


Fig. 2.

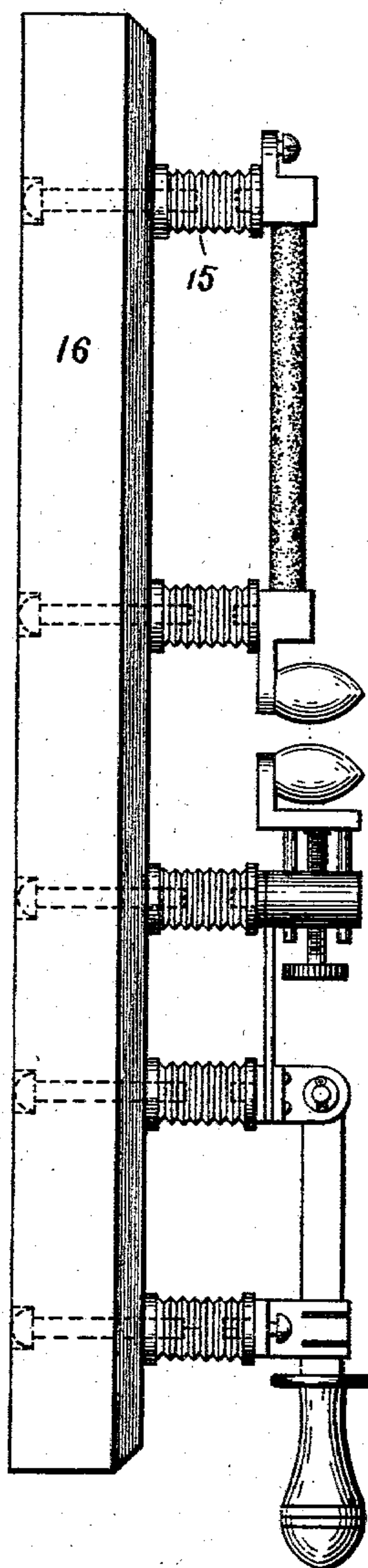
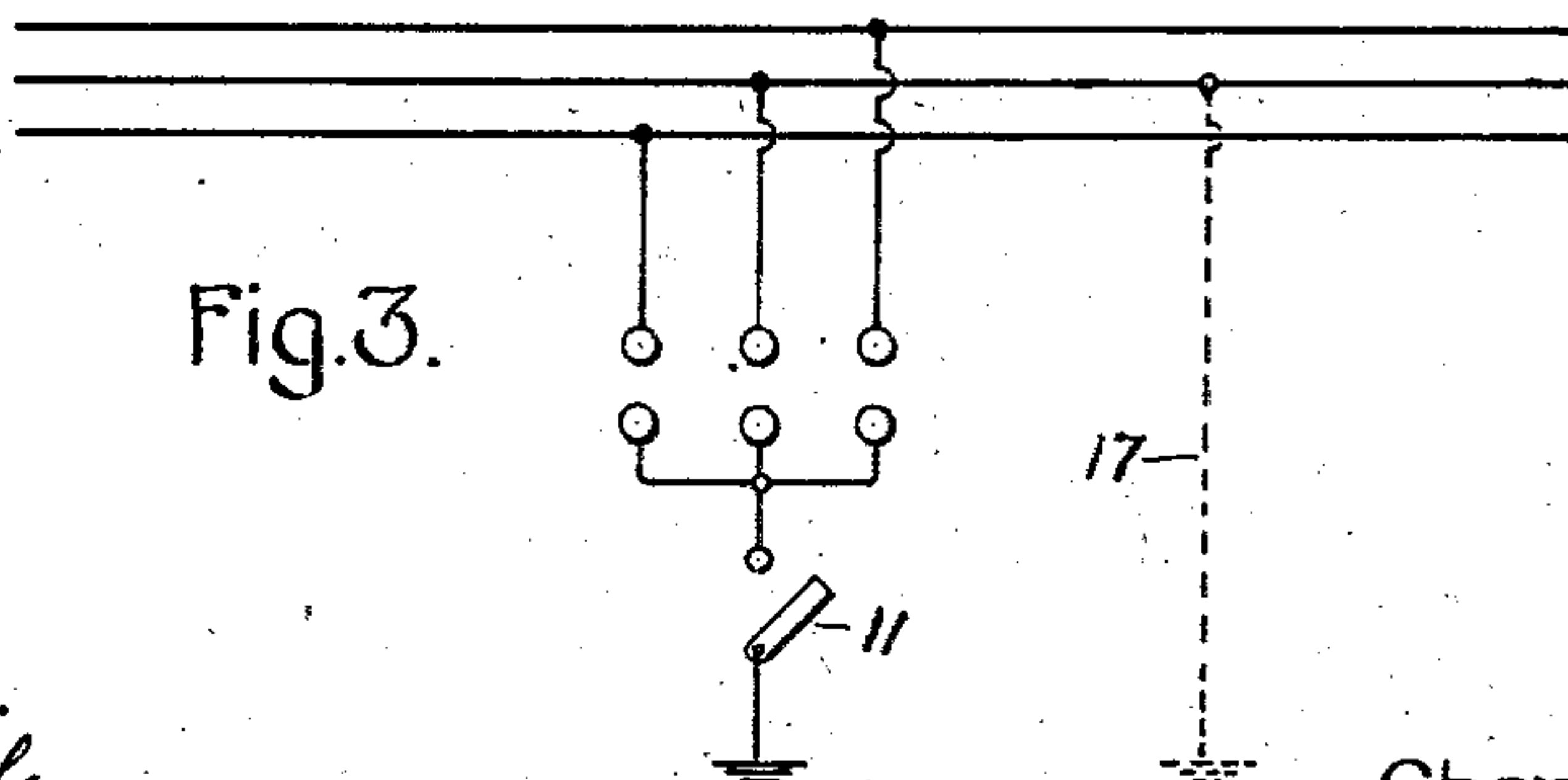


Fig. 3.



Witnesses.

John Ellis Glenn.  
Benjamin B. Hall.

Inventor.

Charles C. Badeau.

by *Albert G. Davis*  
Atty.



# UNITED STATES PATENT OFFICE.

CHARLES C. BADEAU, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## GROUND-DETECTOR.

SPECIFICATION forming part of Letters Patent No. 730,595, dated June 9, 1903.

Application filed July 26, 1901. Serial No. 69,742. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES C. BADEAU, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Ground-Detectors, (Case No. 2,215,) of which the following is a specification.

The object of this invention is to provide an effective ground-detector for electric circuits and to distinguish between a static and dynamic discharge by a device durable and simple in construction.

The essential feature of my invention consists in providing a spark-gap between the lines and earth at the point at which the detector is located and means for increasing the length of said gap with respect to a charge between the line-wires.

The best form I have thus far devised in carrying out the invention comprises a plurality of gaps with respect to the line-wires, the aggregate sparking distance of which the potential of the line is unable to bridge, and a switch for throwing on and off a ground. Thus if a discharge occurs across the gaps a removal of the ground will force the potential to traverse the aggregate arcing distance, and since the line-potential is unable to do this a dynamic discharge will be quieted, thereby indicating the character of the discharge. I include in series with the device a resistance for cutting down the current, so as to prevent destruction of the contacts.

My invention therefore consists in a ground-detector provided with means for requiring a longer path of discharge from wire to wire than from any wire to ground in connection with a switch for throwing off and on the ground and comprises also a plurality of discharge-paths from different line-wires in connection with a common ground-switch.

The novel features will be more particularly hereinafter described and will be definitely indicated in the claims appended to this specification.

In the accompanying drawings, which illustrate the invention, Figure 1 is a front view of an apparatus embodying my improvements. Fig. 2 is a side elevation, and Fig. 3

is a diagram showing the relation of the instrument to a circuit.

Referring first to Figs. 1 and 2, 1 2 3 represent terminals adapted to be connected with leads from a circuit. The device shown is adapted to three-wire circuits or triphase circuits, though my improvements are in no respect limited to such an application. In series with the terminals are resistance-blocks 4 5 6, such as a baked mixture of graphite and clay, connected in series relation to spark-gaps 7 8 9, mounted in a common metal support 10, adapted for connection with ground through a switch 11. Each gap may be varied in length by means of adjusting-screws 12 13 14. The parts are supported upon insulating-pillars, as 15, mounted upon a base 16. In a three-wire circuit the terminals 1 2 3 are connected with the three line-wires, respectively, or for a two-wire circuit two may be so connected. The gaps are adjusted with respect to the circuit so that the arcing distance of the several gaps interposed between the line-wires will be longer than the potential of the system can jump. The switch is normally closed. Thus if a ground occurs on the system the line-potential is sufficient to spark across but one of the gaps, and by opening the switch the sparking will cease. If, however, the discharge is a static one, the sparking will still continue, since the aggregate gap is within jumping distance of a static discharge.

The dotted line 17 in Fig. 3 indicates a supposed ground on one of the line-wires. The switch 11 being assumed closed, the gap will be bridged; but opening the switch will quiet the discharge if dynamic in character. If, however, the discharge is static, it will still continue. I preferably provide a gap for each wire, since an indication thus is afforded as to the wire on which the ground occurs. The parts being in multiple, the grounded wire will be the only one in whose spark-gap no sparking will occur. The interposition of the resistance-blocks 4 5 6 cuts down the current, thus preventing damage to the instrument and waste of energy and at the same time acts as a relief for the line from static charges.



Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A ground-detector having a spark-gap  
5 of greater dielectric resistance between the line-terminals than to ground, and means for cutting on and off the ground.
2. A ground-detector provided with arcing-terminals having a longer gap in series with  
10 the line-wires than to ground, and means for opening and closing the ground.
3. A ground-detector provided with a plurality of spark-gaps in parallel relation to the several line-wires and ground, and means  
15 for throwing on and off the ground.
4. A ground-detector provided with a plurality of spark-gaps between ground and the several line-wires, and means for throwing

on and off a ground connection through a part of the aggregate gap less than the whole. 20

5. A ground-detector provided with a spark-gap between each line-wire and ground, a resistance in series with each gap, and means for connecting a ground with a less part than the whole of the aggregate sparking gap. 25

6. A ground-detector provided with a plurality of adjustable gaps in series relation with respect to line-wires and in parallel relation with respect to ground, and means for throwing on and off the ground. 30

In witness whereof I have hereunto set my hand this 24th day of July, 1901.

CHARLES C. BADEAU.

Witnesses:

BENJAMIN B. HULL,  
FRED RUSS.