

No. 688,724.

Patented Dec. 10, 1901.

W. A. FARRELL.

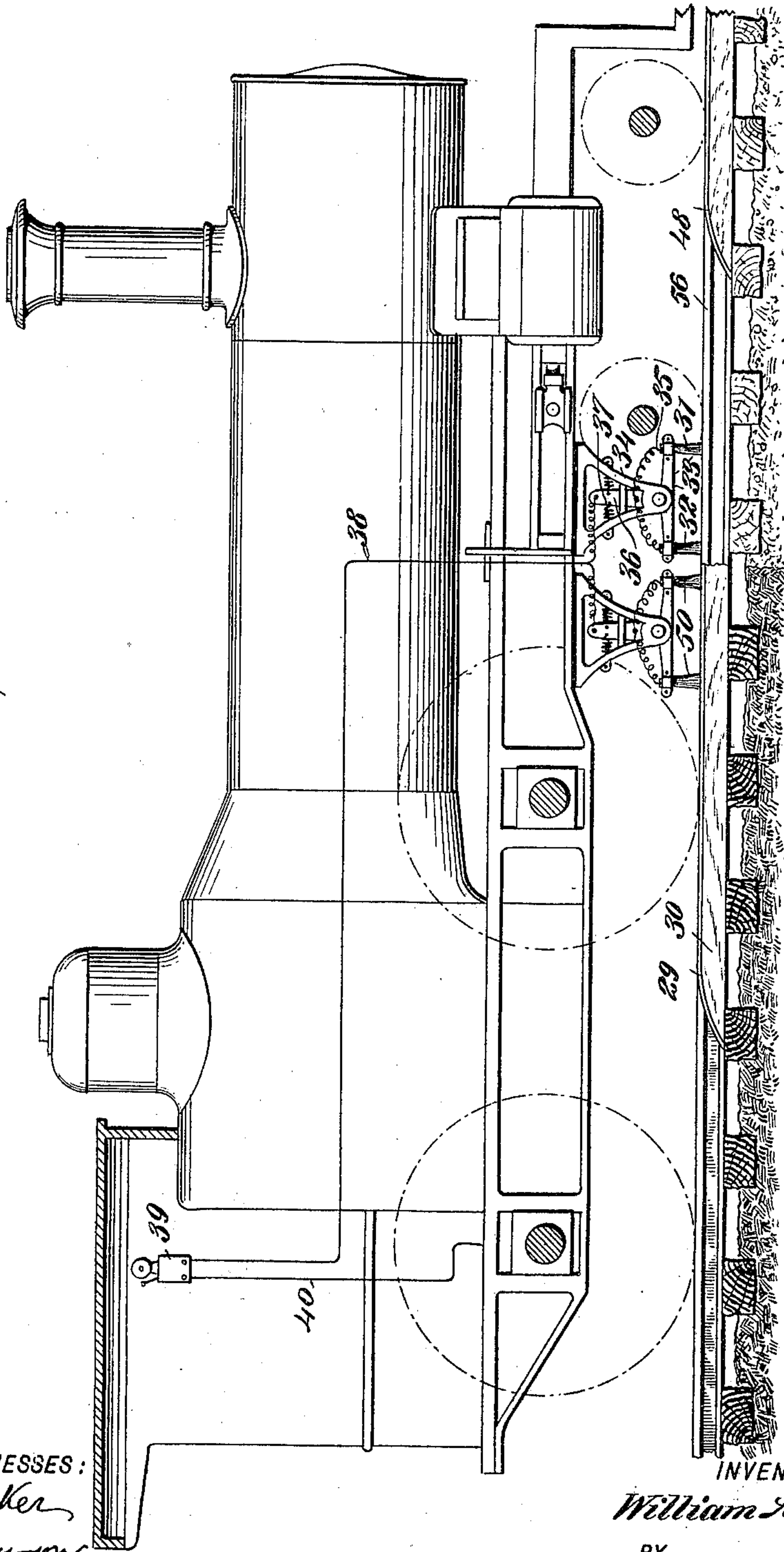
ELECTRIC SIGNALING DEVICE FOR RAILWAYS.

(Application filed Apr. 1, 1901.)

(No Model.)

4 Sheets—Sheet 1.

FIG 1



WITNESSES:

H. Walker
C. R. Ferguson

INVENTOR

William A. Farrell

BY

Mum
ATTORNEYS

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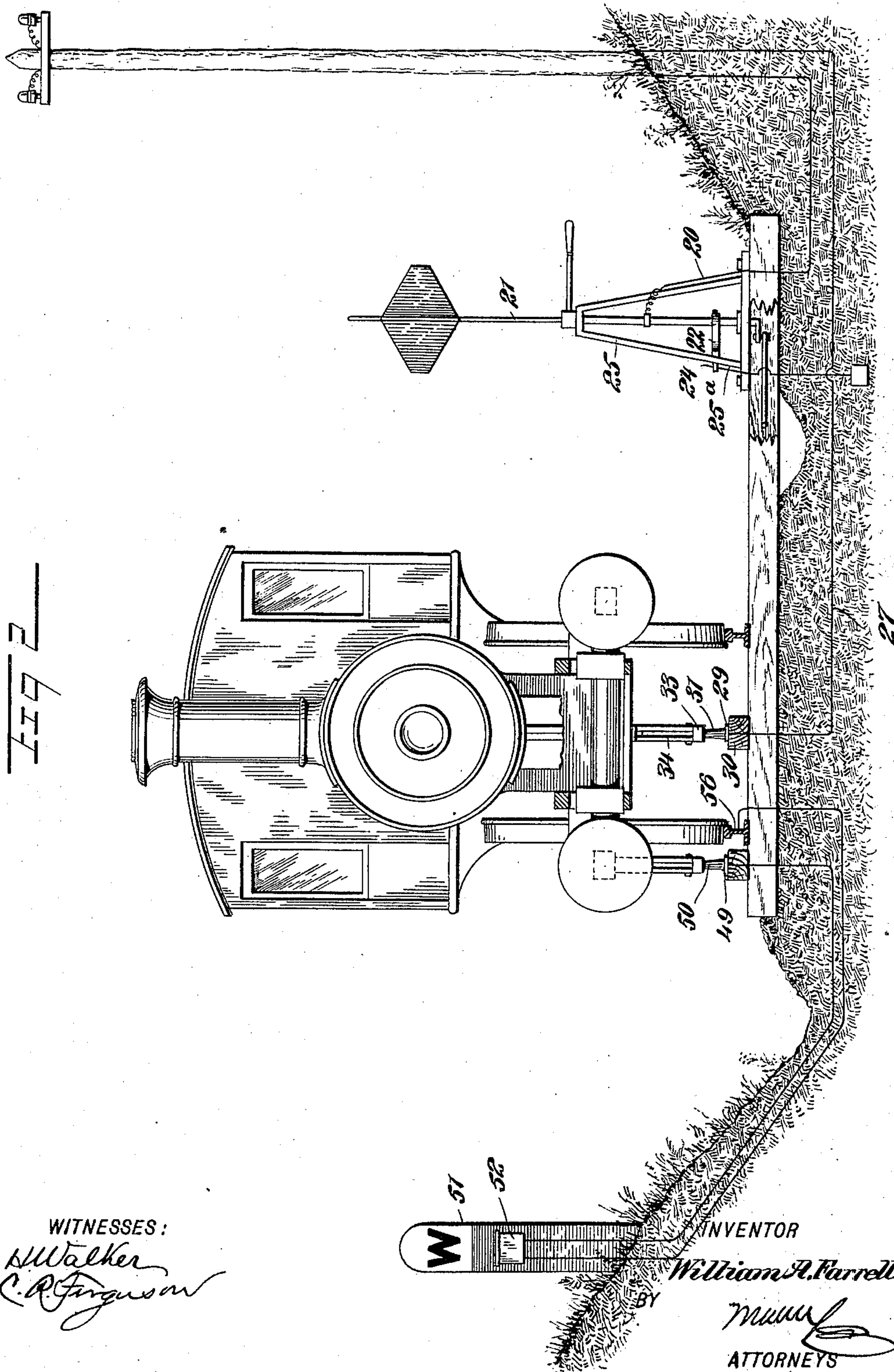
W. A. FARRELL.

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4 Sheets—Sheet 2.



WITNESSES:
H. Walker
C. R. Ferguson

INVENTOR
William A. Farrell
BY
M. W. & C. R. Ferguson
ATTORNEYS

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W. A. FARRELL.

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Fig 3

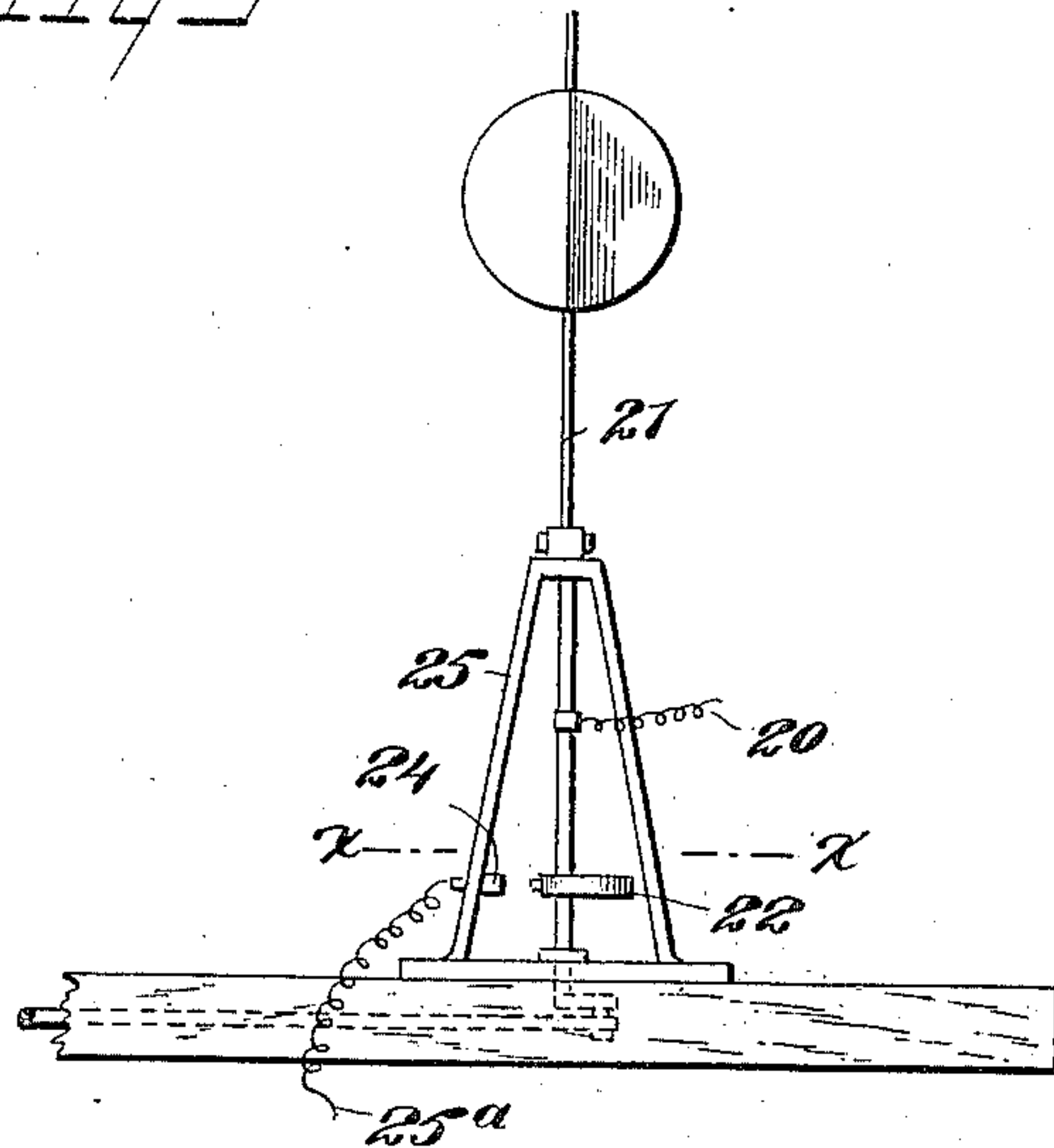


Fig 4

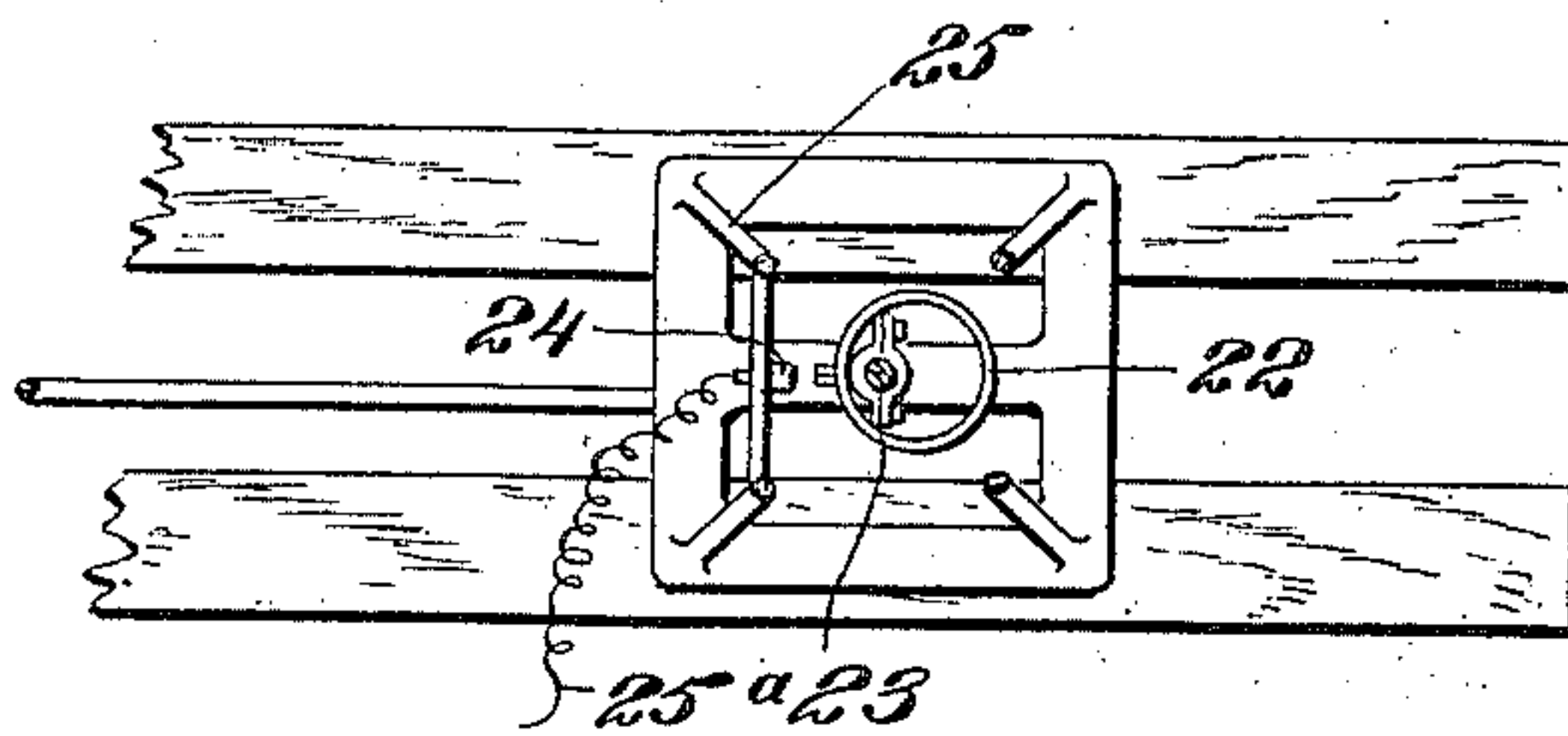
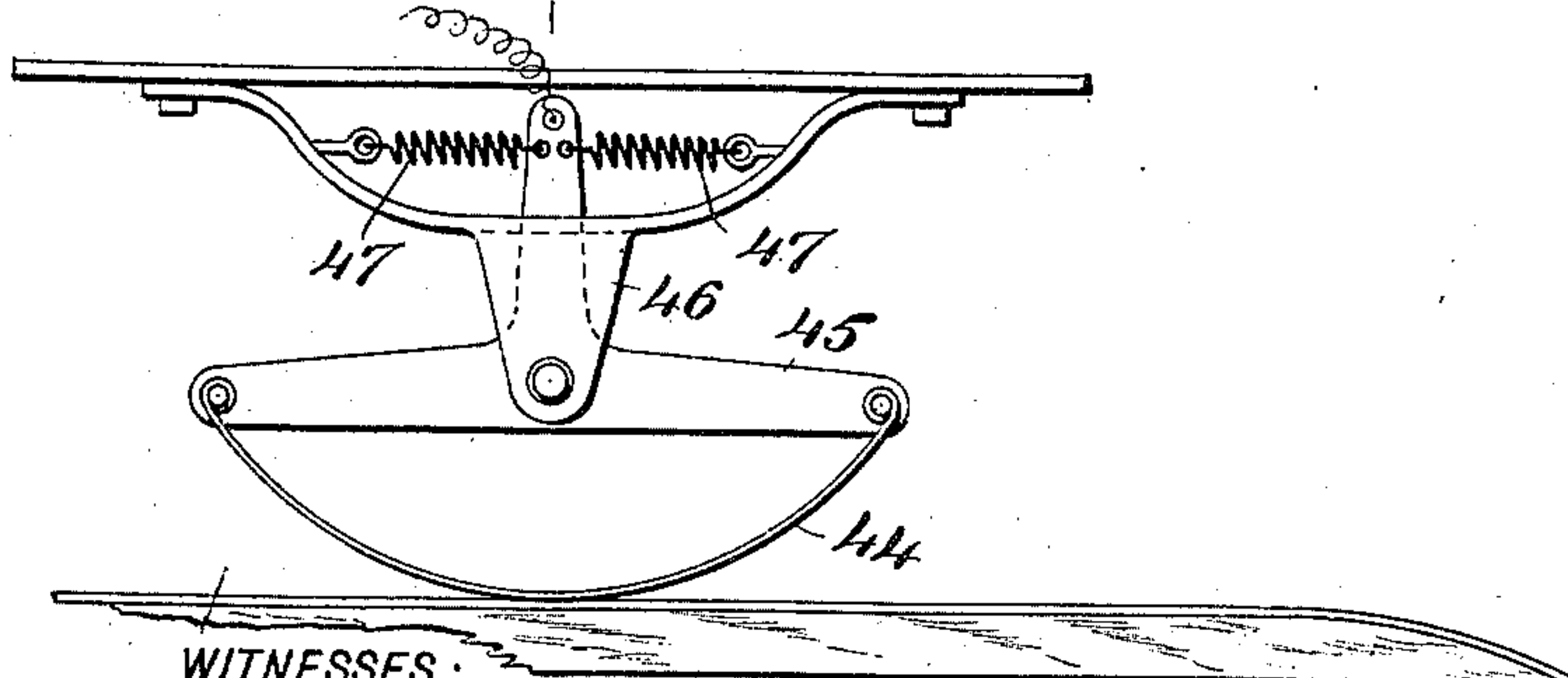


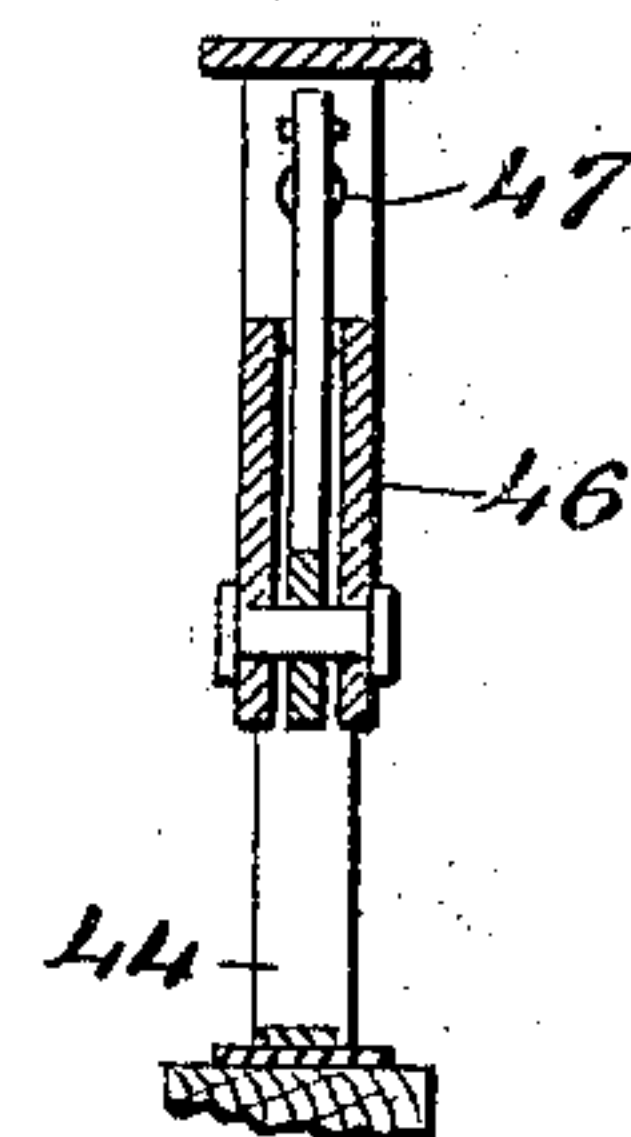
Fig 5



WITNESSES:

N. Walker
C. R. Ferguson

Fig 6



INVENTOR

William A. Farrell

BY

Mumford

ATTORNEYS

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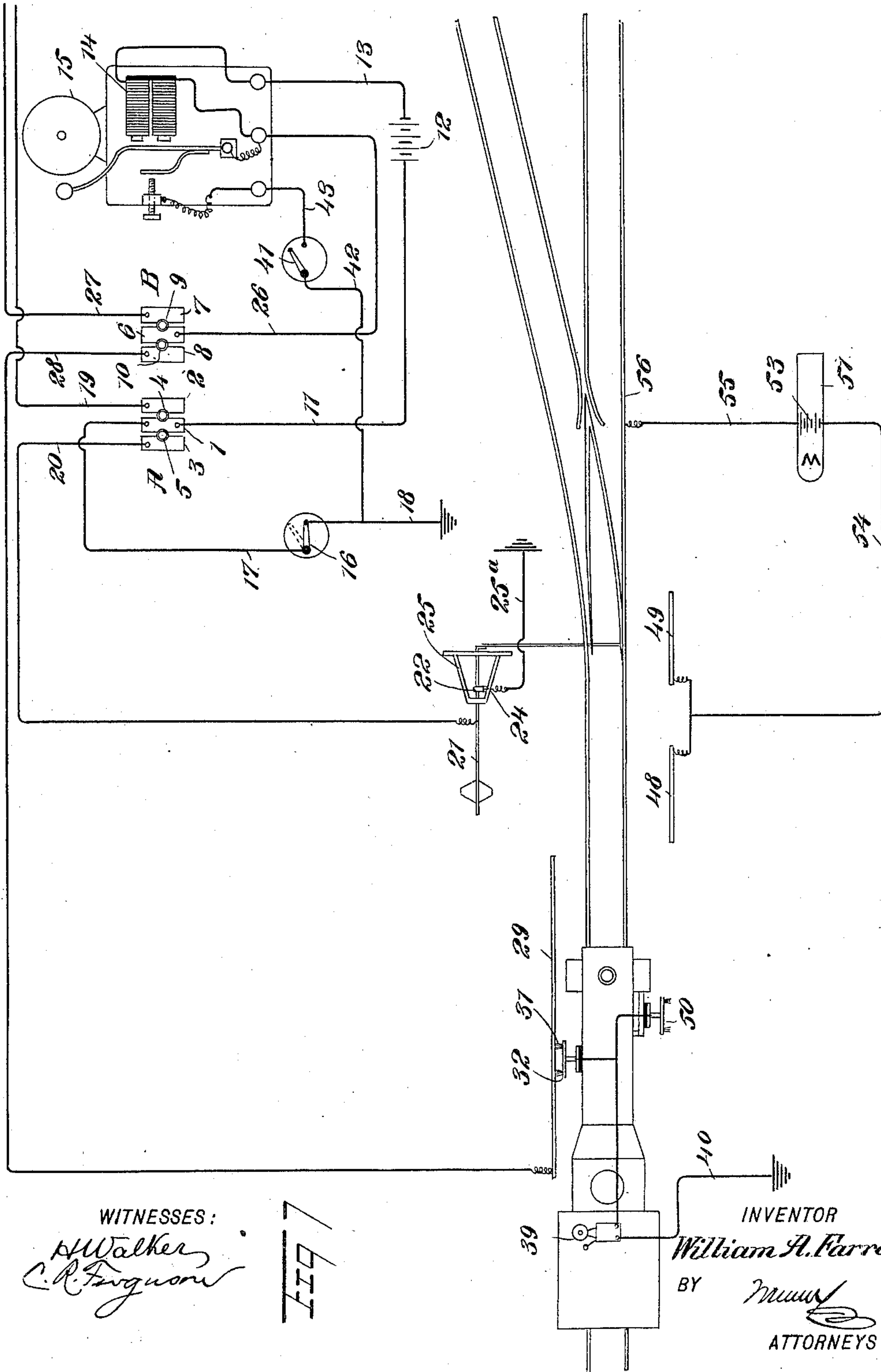
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4 Sheets—Sheet 4.



WITNESSES:

H. Walker
C. R. Ferguson

1677

INVENTOR

William A. Farrell

BY

Munn & Co.
ATTORNEYS

UNITED STATES PATENT OFFICE.

WILLIAM A. FARRELL, OF WELLSVILLE, NEW YORK, ASSIGNOR OF ONE-HALF TO JACOB RAUBER, OF WELLSVILLE, NEW YORK.

ELECTRIC SIGNALING DEVICE FOR RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 688,724, dated December 10, 1901.

Application filed April 1, 1901. Serial No. 53,830. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. FARRELL, a citizen of the United States, and a resident of Wellsville, in the county of Allegany and State of New York, have invented new and useful Improvements in Electric Signaling Devices for Railways, of which the following is a full, clear, and exact description.

This invention relates to improvements in electric signaling devices for railways; and the object is to provide a simple means not liable to get out of order by which in case a switch should be open an alarm will be sounded in the locomotive and also in a station or switch-tower; further, to enable an attendant in a station to make tests for open switches, and, further, to signal the engineer when approaching a crossing or arriving at a point where the locomotive-whistle is to be sounded.

I will describe an electric signaling device for railways embodying my invention and then point out the novel features in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of a locomotive, showing a signaling device embodying my invention attached thereto. Fig. 2 is a front view of the same. Fig. 3 is an elevation of a switch-operating rod and electrical connections thereon. Fig. 4 is a section on the line *x x* of Fig. 3. Fig. 5 shows a modified form of contact-brush that may be employed. Fig. 6 is a section on the line *y y* of Fig. 5, and Fig. 7 is a diagrammatic view of the system.

Arranged in the tower or station are switchboards A and B. The switchboard A has a central contact-plate 1 and side contact-plates 2 3, designed to be put in electrical connection with the plate 1 by plugs 4 5. The switchboard B comprises a central plate 6 and side plates 7 and 8, designed to be put in electrical connection with the center plate by plugs 9 and 10. From the center plate 1 a wire 11 leads to one pole of a battery 12, and from the other pole of this battery a wire 13 leads to the electromagnet 14 of a bell or gong 15,

and also leading from this center plate 1 to a switch 16 is a wire 17, and this switch has a grounding-wire 18. From the plates 2 and 3 wires 19 and 20 lead in opposite directions for connection with switch-operating rods. I have shown but one switch-operating rod 21; but it is to be understood that such switch-operating rods may be located at opposite sides of the station or tower.

Mounted on the switch-operating rod 21 is a ring-shaped spring-yielding contact-plate 22. This may be readily attached to the rod by means of clamping-clips 23. This ring-shaped contact 22 when the switch is open is designed to engage with a contact-strip 24, mounted on the frame 25 of the operating-rod, and from this contact 24 leads a grounding-wire 25^a. From the center plate 6 a wire 26 leads to the electromagnet 14, and from the plates 7 and 8 wires 27 and 28 lead in opposite directions to connect with contact-rails 29, located at opposite sides of the station sufficiently remote from the switches. The contact-rail 29, as here shown, is located between the track-rails, and it consists of a metal strip or plate secured to an insulating device—such, for instance, as a wooden bar 30—attached to the railway-ties. This contact-rail 29 is designed to be engaged by brushes 31 and 32, carried by a locomotive. These brushes consist of bunches of metal wire clamped to a bar 33, which is pivoted in a hanger 34, attached to the locomotive, and these opposite brushes are insulated from the bar 33, but are electrically connected together by a wire 35, which is in connection with an arm 36, extended upward from the bar 33, and a slight yielding or rocking movement of the bar 33 is permitted by springs 37, extended from said arm 36 to the hanger. By employing two brushes, one forward of the other, it is obvious that should one brush leave the contact-rail, or, in other words, swing upward, the other brush will remain in contact with the rail. It will be noted in the drawings that the ends of the contact-rail are curved downward, so that there will be no great shock imparted to the brushes when engaging with the ends of the rail. A wire 38 leads from the arm 36 to an alarm or bell 39, arranged in the locomotive-

cab, and this bell is grounded through a wire 40, the locomotive-wheels, and the track-rails.

In the operation of the signaling device so far described should a switch be open the contacts 22 and 24 will be in engagement, and therefore when the plug 5 is inserted and the plug 10 also inserted an alarm will be sounded on the gong 15 in the station when the circuit is closed by the brushes 31 and 32 engaging with the rail 29. The circuit may be traced as follows: from the ground 25^a through the switch-rod, the wire 20, the plates 3 and 1, the wire 11, the battery 12, the wire 13, through the electromagnet 14, thence through the wire 26, the plates 6 and 8, the wire 27, the rail 29, the brushes engaging therewith, thence through the bell in the locomotive to the ground 40, and back to the ground 25^a. Should an attendant in the station desire to signal the engineer in the locomotive at times when the switch is not open, he may do so by closing the switch 16. The circuit will now be from the grounding-wire 18 through the switch 16, the wire 17, the plate 1, the wires 11 and 13, through the bell-magnet, thence through the wire 26, the plates 6 and 8, the wire 27, and through the alarm in the locomotive, as before described, and thence from the ground 40 to the ground 18. Should an attendant in the station desire to test for an open switch, he will close a switch 41, from which a wire 42 leads to the grounding-wire 18, and a wire 43 also leads from this switch to the bell. Should a switch be open—say the switch connecting with the wire 20—the circuit will be from the ground 25^a through the switch-rod, the wire 20, the plates 3 and 1, the wires 11 and 13, through the bell-magnet, thence back through the switch 41 to the ground 18, and thence to the ground 25^a. Both plugs 4 and 5 being inserted, the operator or attendant may easily ascertain which direction a switch is open by removing one of the plugs or removing them alternately. All main-line switches in a given direction are connected to the same wire.

While I may prefer to employ the brushes consisting of wire, as before described, I may employ a brush consisting of a yielding strip of metal 44, as shown in Fig. 5. This strip of metal has its center curved downward and its ends are connected to a rock-bar 45, pivoted in a hanger 46, attached to the locomotive and held yieldingly by means of springs 47.

I will now describe a means for signaling the engineer when the locomotive is approaching a crossing or approaching a point where the whistle is to be sounded, and it is desired that the alarm for this purpose shall be different from the sounding first described—that is, the circuit through the alarm-bell in the locomotive should be closed two or more times.

Arranged at the side of the railway-track at a suitable distance from the crossing are

contact-rails 48 and 49, designed to be engaged by brushes 50, carried by the locomotive and similar to the brushes first described, these brushes 50 being in electrical connection with the bell in the locomotive. On the whistle-directing post 51 is a battery-box 52, in which a battery 53 is arranged, one pole of this battery being connected by wire 54 with the contact-rails 48 and 49, and from the other pole of said battery 53 a wire 55 leads to a track-rail 56. In operation when the brushes 50 engage with the rail 48 the circuit will be closed from the battery 53 through the wire 55, the rail 56, the locomotive, to the bell 39, thence through the wire 38 to the brushes 50, the rail 48, and back to the battery through the wire 54. When the brushes 50 leave the rail 48, the alarm 39 will be silent until the brushes 50 engage with the rail 49 to again close the circuit.

While I have shown the contact-rails 48 and 49 located at the outer side of the railway-track, it is obvious that the said contact-rails may be arranged between the track-rails. In such event the brushes 31 and 32 would engage therewith and the brushes 50 might be omitted.

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

1. In railway electric signaling, an alarm device arranged in a station or tower, a railway-switch-operating rod, means for grounding the same when the switch is open, means for placing said rod in electrical connection with the alarm in the station, an alarm carried by a locomotive, means for putting the first-named alarm in electrical connection with the alarm carried by the locomotive, and a switch under the control of the attendant at the station and connected with the alarm device at the station and with a grounding-wire for testing for an open railway-switch, substantially as specified.

2. In a railway electric signaling device, a signal arranged in a station or tower, a railway-switch-operating rod having electrical connection with the signal, a grounded contact for said rod and engaged thereby when the railway-switch is open, a signal carried by a locomotive, means for grounding the latter signal, a brush carried by the locomotive, a contact-rail adapted to be engaged by said brush, means for electrically connecting said contact-rail with the signal in the station, and a switch at the station under the control of the attendant and connected with the signal and with a grounding-wire, substantially as specified.

3. In electric signaling for railways, an alarm device arranged in a station or tower, a railway-switch-operating rod having electrical connection with the alarm device, a grounded contact for said rod and engaged thereby when the railway-switch is open, and a circuit-closer at the station and connected

with the alarm device and with a grounding-wire, for testing for an open railway-switch, substantially as specified.

4. In electric signaling for railways, a signaling device arranged in a station, a railway-switch-operating rod having electrical connection with said signaling device, a contact device mounted on said rod, a contact-point mounted on the supporting-frame for the rod and engaged by said contact device when the railway-switch is open, a grounding-wire leading from said contact-point, a grounding-wire for the alarm, and a switch arranged in the circuit at the station and under the control of the attendant for testing for an open railway-switch, substantially as specified.

5. In electric signaling for railways, a signaling device arranged in a station, a switchboard arranged in the station and having electrical connection with the signaling device, a railway-switch-operating rod having electrical connection with said switchboard, a grounding-wire with which said railway-switch-operating rod is connected when the railway-switch is open, a switch arranged in the station and under the control of the attendant, a grounding-wire for said switch, and electrical connections between the switch and the signaling device, whereby when the railway-switch is open the circuit is completed through the signaling device when the said switch at the station is closed, substantially as specified.

6. In electric signaling for railways, a signaling device arranged in a station, an electric circuit in which the signaling device is located, a railway-switch-operating rod in the said circuit, a ring-shaped contact mounted eccentrically on said rod, a contact-point in said circuit and mounted on the rod-supporting frame and adapted to be engaged by said ring-shaped contact when the railway-switch is open, and a switch in said circuit at the station and under the control of the attendant, substantially as specified.

7. In electric signaling for railways, a switchboard arranged in a station, an alarm device arranged in the station and having electrical connection with said switchboard, wires leading from the switchboard in opposite directions, railway-switch-operating rods located at opposite sides of the station and connected with said wires, a grounding-wire for each of said rods, and with which the rods are electrically connected when the railway-switches are open, a switch arranged at the station and connected with the signaling device, and a grounding-wire for said switch, the said switch being under the control of the attendant for testing for an open railway-switch in either direction, substantially as specified.

8. In electric signaling for railways, a signaling device arranged in a station, a contact-rail arranged along the railway-track and having connection with said signaling device, brushes carried by a locomotive for engag-

ing with said rail, a rock-bar on which said brushes are clamped, a hanger attached to the locomotive and to which the rock-bar is pivoted, an arm extending upward from the bar, springs extending from the said arm to the hanger for holding the bar yieldingly, a bell in the locomotive, and an electrical connection between said bell and the brushes, substantially as specified.

9. In railway signaling, switchboards arranged in a station, an alarm device arranged in the station and having electrical connection with said switchboards, wires leading from one of the switchboards in opposite directions, contact-rails arranged along the railway-track at opposite sides of the station and with which said wires connect, wires leading from the other switchboard in opposite directions, railway-switch-operating rods located at opposite sides of the station and connected with the said wires, and grounding-wires for the said rods, substantially as specified.

10. In electric signaling for railways, switchboards arranged in a station, a signaling device arranged in the station and having electrical connection with said switchboards, wires leading from one of the switchboards in opposite directions, contact-rails arranged along the railway-track at opposite sides of the station and with which said wires connect, wires leading from the other switchboard in opposite directions, railway-switch-operating rods located at opposite sides of the station and connected with the said wires, grounding-wires with which the said rods connect when the railway-switches are open, a switch for testing for open railway-switches arranged in the station and connected with the signaling device, and a grounding-wire for said switch, substantially as specified.

11. In electric signaling for railways, a signaling device arranged in a station, switchboards arranged in the station and having electrical connection with the signaling device, wires leading from one of the switchboards in opposite directions, contact-rails arranged along the railway-track at opposite sides of the station and with which said wires connect, wires leading from the other switchboard in opposite directions, railway-switch-operating rods located at opposite sides of the station and connected with the said wires, grounding-wires with which the said rods connect when the railway-switches are open, an alarm carried by a locomotive, a brush carried by the locomotive and adapted to engage the contact-rail, a switch located at the station and connected with the signaling device, and a grounding-wire for said switch, whereby the attendant at the station can test for open railway-switches, substantially as specified.

12. In railway signaling, switchboards arranged in a station, an alarm device arranged in the station and having electrical connection with said switchboards, wires leading from one of the switchboards in opposite directions, contact-rails arranged along the rail-

way-track at opposite sides of the station and with which said wires connect, wires leading from the other switchboard in opposite directions, railway-switch-operating rods located
5 at opposite sides of the station and connected with the said wires, a grounding-wire leading from the latter switchboard, a switch in said grounding-wire, an alarm carried by a locomotive, and a brush carried by said locomotive,
10 tive, substantially as specified.

13. In railway signaling, switchboards arranged in a station, an alarm device arranged in the station and having electrical connection with said switchboards, a wire leading
5 from one of the switchboards, a railway-switch-operating rod connected with said wire, an alarm carried by a locomotive, a wire leading from the other switchboard, means for electrically connecting said wire with the alarm
20 carried by the locomotive, and means for electrically connecting the alarm in the station with the alarm carried by the locomotive, substantially as specified.

14. In electric signaling for railways, switch-

boards arranged in a station, an alarm device
25 at the station and having electrical connection with the switchboards, a contact-rail in electrical connection with one of said switchboards, a railway-switch-operating rod electrically connected with the other switchboard,
30 a grounded contact for said switch-operating rod, a switch at the station and connected with the latter switchboard, an alarm carried by a locomotive, means for electrically connecting the alarm with the contact-rail, means
35 for grounding the alarm in the locomotive, and a second switch at the station and connected with the station-alarm, the said switches being connected with a grounding-wire, substantially as specified.
40

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM A. FARRELL.

Witnesses:

W. C. KENDALL,
WILLIAM OPP.